CSIR IP LICENSING OPPORTUNITIES FORUM

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RK Gupta
Head, Intellectual Property Management Division (IPMD)
14 Satsang Vihar Marg, Special Institutional Area,
New Delhi-67
Tel No. 011-26965613, Fax No. 011-26968819
Email: guptark04@yahoo.com; head.ipmd@niscair.res.in

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LABWISE DISTRIBUTION OF IP PORTFOLIO

Lab	Patent No./Application No (Date of filing/ Date of grant)	Inventor
AMPRI	IN 1888DEL2004 -30/09/2004 US 7524452 - 28/04/2009	Amritphale; Sudhir Sitaram

Title: Low temperature process for making radiopac materials utilizing industrial/agricultural waste as raw material

Field of invention: The present invention relates to a novel process for making radiopac materials. The process of present invention is particularly useful for making radiopac materials useful for shielding of X-ray radiation. The radiopac materials contain the oxide of barium--an alkaline earth metal and oxide(s) of one or more of the elements such as silicon, iron, titanium and aluminum derived from fly ash (an industrial waste generated in thermal power plants), red mud (an industrial waste generated in aluminum industry), ash of rice husk (an agricultural waste) or pyrophyllite an underutilized clay mineral. Usage of the radiopac materials obtained by the novel process of the present invention is in making ceramic tiles/bricks or incorporating in polymer matrix and woven fabrics to make curtains for shielding of X-ray radiation at ambient temperatures. The above ceramic tiles and bricks are also useful for the shielding of X-ray radiations at elevated temperatures up to 1300.degree. C. and also posses good impact and crushing strengths. The ceramic tiles and bricks can be used for construction of diagnostic and CT scanner rooms to provide adequate shielding against X-ray photons.

Background of invention: Generally the sheets of lead metal are used for X-ray radiation shielding. The other metals which are capable of shielding X-ray radiation include copper, aluminum, titanium (http://hpsorg/publicinformation/ate/q1742.html), iron/steel, chromium, magnesium and barium etc.(Quan Lin et al, Polymer 41 (2000) 8305-8309). Concrete is also often used as shielding material (P. Soo and L. M. Milian, J. Mat. Sci. Letters 20, 2001, 1345-1348). Polymers containing heavy metals in polymeric chains (Jpn Kokai Tokkyo Koho, 157092, 1985 and Jpn Kokai Tokkyo Koho, 98765,1986)) or metal oxides dispersed in polymer matrix also have radiopac properties (European Patent appl.19121). The lead/rare earths (Ching--hwa lee and Chi--Shiung His, Environ. Sci. Technol., 200,36,69-75 and Kompozit.mat@g23.Relkom.ru) and barium.

Summary of the invention :. The present invention is particularly useful for making radiopac materials useful for shielding of X-ray radiation. The radiopac materials contain the oxide of barium--an alkaline earth metal and oxide(s) of one or more of the elements such as silicon, iron, titanium and aluminum derived from fly ash (an industrial waste generated in thermal power plants), red mud (an industrial waste generated in aluminum industry), ash of rice husk (an agricultural waste) or pyrophyllite and underutilized clay mineral. These industrial/agricultural waste materials contain various necessary constituents required for making radiopac materials namely silicon, titanium, iron and aluminum.

Advantages: . The novel process of present invention utilizes wastes namely fly ash (generated in thermal power plants), red mud (generated in aluminum production), rice hulls silica (an agro-waste) and pyrophyllite (an underutilized mineral) in place of non-repleneshible mineral resources such as feldspar, quartz and clays and obviates the need of use of lead (toxic in nature) and rare earth containing compounds/raw materials II. The novel process of present invention substantially utilizes waste materials, which inherently contain the various important elements such as silicon, aluminum, iron and specially titanium, necessary for obtaining radiopac materials.

Lab	Patent No./Application No (Date of filing/Date of grant)	Inventor
CCMB	IN 224401 - 14/10/2008 US 7141364 - 28/11/2006	Sunil Kumar Verma et al

Title: Universal primers for wildlife identification.

Field of invention: The invention relates to the identification of novel universal primers that can amplify the fragment of cytochrome b gene of any animal species in polymerase chain reaction (PCR) and reveal the identity of the biological material of any unknown animal origin at species and sub-species sources. The invention also provides a method for the identification of fragments on mitochondrial cytochrome b gene in biological material of unknown origin.

Background of invention: A large number of studies in evolutionary biology utilize phylogenetic information obtained from mitochondrial cytochrome b gene. It has been identified a potent molecule to distinguish the phylogenetic depth of different lineages to family, genus and species in molecular taxonomy.sup.1 66. A vast database of the sequences of cytochrome b gene of different animal species has accumulated in public databases such as GenBank, NCBI (http://www.ncbi.nlm.nih.gov) etc. We have utilized this capacity of cytochrome b gene in establishing the identity of the origin of animal parts and product to its family, genus and species sources. The technique developed is based on a pair of universal primer that can amplify a small fragment of cytochrome b gene from a vast range of animal species.

Summary of the invention : The invention provides novel universal primers that can amplify the fragment of cytochrome b gene of any animal species in polymerase chain reaction (PCR) and reveal the identity of the biological material of any unknown animal origin

Advantages: The main advantage is to identify a fragment on mitochondrial cytochrome b gene capable of significantly discriminating among various evolutionary lineages of different animal species and to identify a fragment on mitochondrial cytochrome b gene which is flanked by the highly conserved sequences at a vast range of animal species.

Lab	Patent No. / Application No. (Date of filing/ Date of grant)	Inventor
CCMB	US 6958224-25/10/2005	Goenka S et al

Title: Chimeric protein alpha BNAC crystallin with extraordinarily high chaperone-like activity and a method related to the use thereof .

Field of invention: The present invention relates to a chimera .alpha. BNAC and a corresponding chimeric protein .alpha. BNAC crystallin with the chimeric protein having extraordinarily high chaperone-like activity. The present invention further relates to a method of preventing protein aggregation using the described chimeric protein.

Background of invention: Alpha.-crystallin, a major lens protein having homology with small heat shock proteins, prevents aggregation of other proteins like a molecular chaperone. The inventors had earlier shown that .alpha.-crystallin can prevent photo-aggregation of .gamma.-crystallin, which may have relevance in cataractogenesis. By using various non-thermal modes of aggregation, it was shown that chaperone-like activity of .alpha.-crystallin is temperature-dependent. A structural perturbation above 30 degree C. enhances this activity severalfold. In order to probe the molecular mechanism of the chaperone-like activity and its enhancement upon structural perturbation, the inventors have studied alpha.-crystallin and its constituent subunits. The recent study of the alphaA and alphaB heteroaggregates showed that despite high sequence homology, these proteins differ in their stability, chaperone-like activity, and the temperature dapendence of this activity. This study also indicated different roles for the two proteins in that .alpha.-crystallin heteroaggregate in the eye lens and as separate proteins in non-lenticular tissues.

Summary of the invention : The present invention relates to a chimera .alpha. BNAC of and to a corresponding chimeric protein alpha. BNAC crystallin with the chimeric protein having extraordinarily high chaperone-like activity. The present invention also relates to a method of preventing protein aggregation using the described protein.

Advantages of the invention: The main advantage of the present invention is to develop a chimera using .alpha.A and .alpha.B crystallins. Another advantage is to develop a chimeric protein .alpha. BNAC crystallin having extraordinarily high chaperone-like activity and to develop a method of preventing protein aggregation using chimeric protein .alpha. BNAC crystallin.

Lab	Patent No. / Application No. (Date of filing / date of grant)	Inventor
CCMB	US 6942843-13/09/2005	M. Vithal et al

Title: Preparation, characterization, ESR and PAS studies of CU0.5 NBAIP3o12(CNP) and HNBAIP3012(HNP)

Field of invention: The present invention relates to the process of preparation, characterization, electron spin resonance (ESR) and photo acoustic (PA) studies of Cu.sub.0.5 NbAlP.sub.3 O.sub.12 (CNP) and HNbAlP.sub.3 O.sub.12 (HNP).

Background of invention:. Sodium super ionic conductor (NASICON) and related sodium zirconium phosphate NaZr.sub.2 P.sub.3 O.sub.12 (NZP) and niobium titanium phosphate NbTiP.sub.3 O.sub.12 are well studied [1-6] due to their important properties of (i) low thermal expansion behavior [5-9], (ii) fast ionic conductivity [2] and (iii) high temperature stability [2]. They are used as heat exchangers and I mirror blanks for space technology, catalyst supports, high temperature fuel cells, possible host for radioactive waste and as humidity and gas sensors [10-15]. Their general formula is AMM'P.sub.3 O.sub.12 where, `A` can be alkali, alkaline earth or Cu.sup.2+ ion, M and M' can be tri-, tetra- or pentavalent transition metal ion. The structure is characterized by corner sharing of PO.sub.4 tetrahedra with MO.sub.6, (and M'O.sub.6,) octahedrai [16,17]. The three dimensionally linked interstitial space can accommodate ions as H.sup.+ or as large as Cs+ This space can also remain vacant as in NbTiP.sub.3 O.sub.12 [18]. The structure is flexible for substitution at A, M or M' sites, giving rise to a large number of closely related compounds. Among the NASICONs, copper NASICONs are relatively less investigated [19-22]. In this paper, we report the preparation, characterization, electron spin resonance (ESR) and photo acoustic (PA) studies of Cu.sub.0.5 --NbAlP.sub.3 O.sub.12 (CNP) and HNbAlP.sub.3 O.sub.12 (HNP).

Summary of the invention : The present invention relates to the process of preparation, characterization, electron spin resonance (ESR) and photo acoustic (PA) studies of compounds Cu.sub.0.5 NbAlP.sub.3 O.sub.12 (CNP) and HNbAlP.sub.3 O.sub.12 (HNP).

Advantages of the invention: Main advantage of the present invention is to provide a process of preparation, characterization, electron spin resonance (ESR) and photo acoustic (PA) studies of Cu.sub.00.5 NbAlP.sub.3 O.sub.12 (CNP) and HNbAlP.sub.3 O.sub.12 (HNP). Another advantage of the present invention is to provide a novel sodium superionic conductor (NASICON) types niobium aluminum phosphate and a method for preparation of the same, to characterize the above said compound and to study the electron spin resonanace (ESR) and photoacoustic (PA) characters of the said compound.

Lab	Patent No./Application No (Date of filing/ Date of grant)	Inventor
CCMB	US 7115572 -03/10/2006	C. Subbalakshmi et al

Title: Indolicidin analogs with anti-microbial activity.

Field of invention: The present invention relates to three single tryptophan analogs IL4 IL8 and IL11, of Indolicidin, a cationic tridecapeptide amide found in the granules of bovine neutrophils, said analogs having said amino acid only at 4th, 8th or 11th position from N-terminal, with leucine at its all other conventional positions, said analogs selectively having only anti-microbial activity and no hemolytic activity of Indolicidin, and thereby providing therapeutic options and a method thereof.

Background of invention: Indolicidin (IL) is a 13-residue anti-microbial peptide having the sequence ILPWKWPWWPWRR-amide (SEQ ID NO: 4). It is present in the cytoplasmic granules ofbovineneutrophils. The presence of five tryptophans out of 13-residues renders its amino acid composition unique among host-defense endogenous anti-microbial peptides. It is cationic due to the presence of two arginines and one lysine and exhibits broad-spectrum anti-microbial activity.

Summary of the invention :. The present invention relates to three single tryptophan analogs IL4, IL8 and IL11, of Indolicidin, a cationic tridecapeptide amide found in the granules of bovine neutrophils, said analogs having said amino acid only at 4th, 8th or 11th position from N-terminal, with leucine at its all other conventional positions, said analogs selectively having only anti-microbial activity and no hemolytic activity of Indolicidin, and thereby providing therapeutic options and a method thereof.

Advantages: The main advantage is to develop novel analogs of Indolicidin. Another advantage is to develop analogs of Indolicidin with selective anti-microbial activity. Another advantage is to develop analogs of Indolicidin with no hemolytic activity. Another advantage is to determine the structure of the Indolicidin analogs in various mediums.

Lab	Patent No. / Application No. (Date of filing /date of grant)	Inventor
CCMB	US 11/797895- 08/05/2007	Ray M K

Title: Novel regulatory elements of cold-inducible gene from the antarctic psychrotrophic bacterium pseudomonas syringae.

Field of invention: A DNA sequence from the upstream region of cold-inducible hutU gene of the Antarctic Psychrotrophic Bacterium Pseudomonas Syringae, comprising promoter elements and other regulatory sequences, with unique `CAAAA` nucleotide sequence at -10 site of multiple transcription start sites and using said promoter to express genes of interest in the said bacterium at temperature as low as 4.degree. C. and using the said bacterium with generation time ranging between two and half to three hours, as a system to produce low temperature labile proteins of pharmaceutical significance.

Background of invention: Antarctic bacteria provide a useful model system for studying cold adaptation (15, 17, 31, 36). These organisms are generally represented by the psychrotrophs and psychrophiles, which have the ability to grow at 0.degree. C. They can transcribe at this lower temperature both in vitro and in vivo (31). However, nothing much is known about the nature of promoter and regulatory elements from these bacteria or about the mechanism of transcription at lower temperatures. Most of the transcriptional studies thus far have been carried out with only mesophilic bacterium, and the RNA polymerase from these bacteria, including Escherichia coli, cannot transcribe at 0.degree. C.

Summary of the invention : A DNA sequence from nucleotide 2961 to 3600 of the upstream region of cold-inducible hutU region of the Antarctic Psychrotrophic Bacterium Pseudomonas Syringae of accession No. AF326719, comprising promoter elements and other regulatory sequences, with unique `CAAAA` nucleotide sequence at -10 site of multiple transcription start sites and using said promoter to express genes of interest in the said bacterium at temperature as low as 4.degree. C. and using the said bacterium with generation time ranging between two and half to three hours, as a system to produce low temperature labile proteins of pharmaceutical significance.

Advantages: Use of the promoter from the upstream region of cold-inducible hut U gene of the Antarctic Psychrotrophic Bacterium Pseudomonas syringaepromoter to express genes of interest in the said bacterium at temperature as low as 4.degree. C. and using the said bacterium with generation time ranging between two and half to three hours, as a system to produce heat labile proteins of pharmaceutical significance.

Lab	Patent No./Application No (Date of filing/ Date of grant)	Inventor
CCMB	IN 0991DEL2003 -12/08/2003 US 7186702 -06/03/2007	Amitabha Chattopadhyay et al

Title: Method of treating leishmaniasis using methyl-beta-cyclodextrin.

Field of invention: The present invention relates to a composition useful for the treatment of leishmaniasis.The said composition comprising pharmaceutically effective amount of methyl-beta-cyclodextrin, optionally along with other anti-leishmanial agent(s) and/or pharmaceutically acceptable additives, and a method thereof, wherein the said method reduces the cholesterol levels of the plasma membrane of the infected host cells by about 50%.

Background of invention: Leishmania are protozoan parasites that are responsible for substantial public health problems, especially in tropical and subtropical regions. In a recent survey, 88 countries have been declared as leishmaniasis-endemic.sup.7. The current increase in leishmaniasis throughout the world to epidemic proportion coupled with increasing incidence of the disease in developed countries, and emergence of visceral leishmaniasis as an important opportunistic infection among people with human immunodeficiency-1 (HIV-1) infection.sup.9 have created an urgency to provide treatment for this intracellular infection. Studies on the molecular mechanisms of parasite entry have led to the identification of several candidate receptors facilitating multiple routes of entry and thus highlighting the redundancy in the entry process. These include macrophage cell surface receptors such as the CR1 and CR3, the mannose-fucose receptor, the fibronectin receptor, the receptor for advanced glycosylation end products, the Fc receptor and the C-reactive protein receptor.sup.8. However, the large number of different receptors responsible for the attachment and internalization of the parasite to macrophages have contributed to the fact that no single panacea has yet been developed for the treatment of leishmaniasis.

Summary of the invention :. The present invention provides a process for the preparation of alkaline protease which comprises growing a fungal strain *Conidiobolus coronatus* in a medium having pH 6.0 to 9.0, a carbon source and a nitrogen source under aerobic conditions in submerged culture, at a temperature ranging between 20 to 30.degree. C., for a period ranging between 2 to 6 days, harvesting the medium and separating the enzyme in liquid phase.

Advantages: The main advantage is to develop a method for treating leishmaniasis using methyl-beta-cyclodextrin.Another advantage is to develop a safe and efficient composition for the management of leishmaniasis.

Lab	Patent No./Application No (Date of filing/Date of grant)	Inventor
CCMB	IN 235486 - 06/07/2009 US 7303904 -04/12/2007	Nalam Madhusudhana Rao et al

Title: Stable gene variants of lipases

Field of invention: The present invention relates to the generation and production of novel thermostable, organic solvent stable and pH tolerant lipase gene variants. The invention also relates to methods of selecting lipase variants for high temperatures and for their purification.

Background of invention: Enzymes are the workhorses of a cell that affect virtually every biological process that characterizes a living organism. They catalyze chemical reactions with remarkable specificity and rate enhancements. The awesome catalytic power and versatility of enzymes has long been recognized and enzymes have proved to be very useful outside the living system as well. Enzymes today have widespread application in industry and are seen as environment friendly alternatives to chemical reagents because enzymatic reactions require milder conditions and tend to be cleaner with lesser byproduct and waste generation. Enzymes are being used in numerous new applications in the food, feed, agriculture, paper, leather, and textiles industries, resulting in significant cost reductions and environment-friendly operations.

Summary of the invention :. The present invention relates to novel gene variants of lipase enzyme as developed through site directed muatgenesis. These gene variants are highly thermostable, resistant against strong organic solvents and can tolerate high pH. The thermostability of the developed gene variants was as high 200 fold in the temperature range of 50 to 90.degree.. The developed gene variants due to high thermostability, specific activity and tolerance due to high pH have application in household detergents and laundry industry.

Advantages: The main advantage of the present invention relates to novel thermostable, organic solvent stable and pH tolerant lipase gene variants.Present invention relates to an expression system comprising of novel thermostable, organic solvent stable and pH tolerant lipase gene variants.Present invention relates to a method of preparing an expression system, said system comprising of novel thermostable, organic solvent stable and pH tolerant lipase gene variants.

Lab	Patent No. / Application No. (Date of filing /date of grant)	Inventor
CCMB	US11/598021 13/11/2006 IN3337DEL200516/10/2006	Imran Siddiqi

Title: Nucleic acids and methods for producing seeds having a full diploid complement of the maternal genome in the embryo.

Field of invention: The present invention relates to the use of alleles of the DYAD gene and gene product of Arabidopsis, Boechera, rice and other plants to manipulate gametogenesis and seed development for the purpose of producing seeds that carry a full diploid complement of the maternal genome in the embryo. The present invention also relates to use of an altered DYAD gene for producing an unreduced female gametophyte without substantial effect on pollen development.

Background of invention:. The plant life cycle alternates between a diploid sporophyte generation and a haploid gametophyte generation. Meiosis represents the transition between the diploid sporophyte and haploid gametophyte phases of the plant life cycle. Meiosis leads to the formation of haploid spores. In plants, unlike animals, the meiotic products undergo additional divisions to form a multicellular haploid gametophyte. Differentiation of the gametes occurs towards the later stages of gametophyte development, following division of the meiotic products. The sexual process prior to fertilization therefore comprises two distinct stages: sporogenesis which includes meiosis and the formation of haploid spores; and gametogenesis which refers to the development of the spores into a gametophyte, comprising the gamete and associated cells required for fertilization and for supporting growth of the embryo. [0003] Most plant species undergo sexual reproduction; however some plant species are capable of asexual reproduction. The term apomixis is generally accepted as the replacement of sexual reproduction by any of certain forms of asexual reproduction (Koltunow A. and Grossniklauss U. Annu. Rev. Plant Biol. Vol. 54: 547-74, 2003).

Summary of the invention : There are two general strategies that may be considered in order to introduce apomixis into cultivated crops. The first is by introgression from wild relatives into cultivated species. The second is by identification of genes from sexual species that can confer aspects of apomixis, followed by pyramiding these genes to produce the full repertoire of apomixis. These genes could then be introduced into cultivated crops using transgenic methods. Thus for instance, expression of one or more genes could be used to engineer apomeiosis, and these genes could be combined with another set of genes or other treatments to induce parthenogenetic embryo development. Methods for inducing parthenogenesis in plants are known in the art (See, e.g. U.S. Pat. No. 5,840,567). A preferred method for inducing parthenogenetic development for use with the present invention is to pollinate a plant using pollen that has been irradiated, thereby inactivating it for fertilization.

Advantages of the invention: The invention is useful for propagating desired hybrid phenotypes in a manner of an apomictic plant and for increasing the ploidy of a plant genotype, which may result in plants having increased biomass.

Lab	Patent No. / Application No. (Date of filing /date of grant)	Inventor
CCMB	IN 0096DEL2006 -11/01/2007 US 12/551269- 11/01/2007	Murthy Bulusu S

Title: Method for developing a tissue proteome library.

Field of invention: The present invention relates to a method for developing a tissue proteome library, useful in making a representative library of the "truly" expressed proteins and over expressing a large number of transcripts (mRNAs) present in a given tissue.

Background of invention: There is need for developing technologies for construction of cDNA expression libraries that over express all the transcripts present in tissues, which can be used in identifying important factors expressed in tissues under specialized physiological conditions. PCR amplification of mRNA pool after reverse-transcription to cDNA from tissues available in limited amounts facilitate construction of total cDNA library and expression of entire library for isolation and identification of important and low abundant transcripts present in the library. Since high throughput proteomic methods have become available, it would be possible to conduct studies on large number of proteins over expressed in such libraries. Isolation and identification of all the proteins made in cells and tissues enable proteome-wide investigations, which could enhance our understanding of the mechanisms involved in fundamental processes of life

Summary of the invention : The present invention relates to description of a novel method for developing tissue proteome library, which overexpresses all the transcripts (mRNAs) present in a given tissue. Transcripts of interest present in a tissue are normally cloned and over expressed individually to enable purification of expressed protein and for conducting its structure-function studies. Methods for identification of novel and low abundant transcripts present in tissues are not available, particularly of specimen tissue samples, oocytes and early embryos, for which tissue availability is a serious limitation. Expression of all the transcripts present in a tissue and comparison of the profile of total expressed protein with that of appropriate controls can be used in identification of all and particularly novel transcripts present in a tissue. This novel tissue proteome library construction approach enables expression of all the transcripts present in a tissue just in one go and analysis of all the expressed proteins employing proteomics and/or other suitable approaches.

Advantages: It allows one to achieve overexpression of a pool of cloned cDNAs into a pool of their respective proteins. It allows for overexpression of a large number of proteins, for which mRNAs/cDNAs are present in their tissue/library. It allows us to identify and/isolate such proteins from the pool of proteins overexpressed in the tissue proteome library.

Lab	Patent No./Application No (Date of filing/Date of grant)	Inventor
CCMB	IN0845DEL2008- 27/03/2009 PCT/IN2009/000213-31/03/2009	Jinka Rajeswari et al

Title: A tumour model system useful to study multistage cancer.

Field of invention: The present invention relates to a method of developing a tumor model system. The invention deals with a tumor model system with adhesion deprived cells. This invention provides a new method for primary detection of transformation of adhesion-deprived cells and tumorigenicity.

Background of invention:. Cancer is a serious disease and a major killer. Although there have been advances in the diagnosis and treatment of certain cancers in recent years, there is still a need for a development of a model system, which helps in understanding the nature of cancer and is useful in screening different types of drugs. The present invention relates to transformation and in particular to cancer. Many reports showed that the integrins play a crucial role in treatment of cancer. The integrins that bind to RGD peptides are generally over-expressed in angiogenic vessels, including those of tumors and in inflammatory lesions, such as rheumatoid arthritis. In some tumors, the tumor cells also express RGD-binding integrins. A vast body of preclinical and clinical literature exists on the use of RGD-based integrin antagonists in cardiovascular disease and cancer. (Ruoslahti, E. 2003. RGD story: A personal account. A Landmark Essay. Matrix Biology. 22: 459-465).

Summary of the invention : The present invention relates to a method of developing a tumor model system to study the efficiency of growth and drug treatment at multistage of cancer. Cell matrix and cell-cell interactions are important physiological determinants of cell growth, survival and transformation. Normal adherent cells lose their viability rapidly when deprived from cell adhesion. Adhesion deprived cells are different physiologically and morphologically when compared with normal adherent cells and show the characteristics of transformation. In our current invention the cells that are changing their morphology phenotypically and physiologically show variation in transformation efficiency with the different time points of adhesion deprivation.

Advantages: Reasons are not specific for numerous and diverse genetic alterations that accompany tumorigenesis and raises questions as to whether experimental cancer-promoting factors remain relevant to tumor maintenance. We have shown that the adhesion deprivation as one of causative factors involved in the process of transformation in *in vivo and in vitro* conditions. Though several model systems of cancer exist in various patents and literature, our current observations showed a tumor model system with adhesion deprived cells. This observation provides a new method for primary detection of transformation of adhesion-deprived cells and tumorigenicity.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
CDRI	IN 1803DEL2006- 01/08/2007 US 12/376909 - 09/02/2009	Ram Pratap et al

Title: R-(-) / S-(+)-7-[3- N- substituted amino-2-hydroxypropoxy] flavones.

Field of invention: The present invention relates to R (-) / S-(+)-7-[3-N- substituted amino-2-hydroxypropoxy] flavones and salts thereof. The present invention relates to synthesis of suitably substituted flavone derivatives exhibiting pronounced antidiabetic and antidyslipidemic activities. More particularly the invention relates to synthesis of R (-) / S-(+)-7-[3 N-substitutedamino-2-hydroxypropoxy] flavones of formula I and pharmaceutical composition containing these derivatives, as described in the following description.

Background of invention: Type II insulin resistant diabetes mellitus accounts for 90-95% of all diabetes. Changed sedentary life style has contributed towards affliction of the disease to adult population also. The main force driving this increasing incidence is a staggering increase in obesity, the single most important contributor to the pathogenesis of diabetes mellitus. Prolonged disease condition leads to chronic macrovascular complications such as retinopathy and nephropathy. The disease is collectively referred, as metabolic syndrome encompasses type II diabetes and common constellation of closely linked clinical features.

Summary of the invention : The present invention provides novel flavone derivatives of formula I which exhibit antihyperglycemic and antidyslipidemic activity. The invention also provides a method for controlling 'type II' diabetes and associated hyperlipidemic conditions in a mammal by administering these compounds and compositions containing these derivatives.

Advantages: It provides R (-) / S-(+)-7-[3-N- substituted amino-2-hydroxypropoxy] flavones and salts thereof. to provide process for preparation of compound of formula I. It also provides a pharmaceutical composition containing these flavone derivatives and a pharmaceutically acceptable carrier or diluent thereof.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
CDRI	IN 0534DEL2008- 24/11/2008 PCT/IN2009/000146 - 03/03/2009	Rakesh Maurya,et al

Title: Ulmus wallichiana planchon derived extract,designated as "osteoanabol" and its compounds employed in prevention or treatment of osteo-health related disorders.

Field of invention: The present invention relates to the field of pharmaceutical composition that provides novel flavonoid compounds, novel plant extracts, their fractions and pure compounds isolated from natural sources.

Background of invention: Osteoporosis, which has been defined as a "state of low bone mass" is one of the major aging problems of the society. Osteoporosis is a metabolic disorder characterized by microarchitectural deterioration of bone tissue leading to enhanced bone fragility and consequent increase in fracture risk in older members of the population. Osteoporosis fractures occur most commonly in the spine, hip, distal radius and ribs.

Summary of the invention : The present invention relates to the field of pharmaceutical composition that provides novel plant extracts, their fractions and pure compounds isolated from natural sources that are useful for the prevention and/or treatment of various medical indications associated with estrogen dependent or independent diseases or syndromes or disorders preferably in the prevention or treatment of estrogen dependent or independent diseases or syndromes or disorders caused in humans and animals, and achievement of peak bone mass (PBM) during skeletal growth and health in humans and animals. Particularly the present invention further relates to the processes for the preparation of biologically active extracts.

Advantages: It provides a bioactive extract/fraction useful for the management or prevention or treatment of bone disorders and to identify the marker compounds of the bioactive extract/fraction.

Lab	Patent No. /Application No. (Date of filing /Date of grant)	Inventor
CDRI	IN 0773DEL2008- 19/11/2008 US 12/323156 - 25/11/2008	Koneni Venkata Sashidhara et al

Title: Method of treating dyslipidemia by using naturally occurring diterpene.

Field of invention: The present invention relates to process useful for treatment and or/ prevention of dyslipidemia. More specifically, the invention relates to reducing low density lipoprotein cholesterol concentration by using naturally occurring diterpene.

Background of invention: Atherosclerosis, the principal contributor to the pathogenesis of myocardial and cerebral infarction, is known to be one of the leading causes of morbidity and mortality worldwide. Elevated plasma concentration of cholesterol, especially low density lipoprotein (LDL) and triglyceride is recognized as a leading cause in the development of atherosclerosis and coronary heart disease. (Cholesterol and Mortality: 30 years of Follow-up from the Framingham Study, Anderson, Castelli, & Levy, JAMA, Vol 257,pp.2176-80 (1987). These conditions are responsible for one-third of deaths in industrialized nations. (Eghdamian, E.; Ghose, K. *Drugs Today,* 1998, 34, pp.943.)

Summary of the invention : The present invention provides a method of treatment of dyslipidemia by naturally occurring compound .

Advantages: Naturally occurring, plant-based compound, which could reduce the increased levels of lipid in plasma. Discovery of dyslipidemic activity from this plant/ or compound.Isolation from a renewable source like leaves in quantitative yields (0.28%) so it is ecologically safe and this technology commercial viable.The plant is very commonly available in India and thus raw material is not a problem for commercial up scaling. The biological activity is highly significant based on *in vivo* data in hamster model.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
CDRI	IN 0838DEL2008- 24/11/2008 PCT/IN2009/000215 - 31/03/2009	Atul Goel et al

Title Novel donor-acceptor flurene scaffolds:a process and uses thereof.

Field of invention: The present invention relates to novel donor-acceptor fluorenes, fluorenones which can be used potentially in preparing electroluminescent devices, and a process of preparing said novel compounds.

Background of invention: The development of efficient light emitting organic compounds for the fabrication of optoelectronic and electroluminescent materials such as organic light emitting diodes (OLEDs), solar cells, and field-effect transistors (FETs) has commanded increasing attention in recent years. The development of fluorescent blue-light emitting organic compounds for the fabrication of electroluminescent materials has been fascinating, challenging and hot research object of academic and industrial endeavours.[1] Various poly-acetylenes, poly-*p*-phenylenes, polyfluorenes, poly-heteroarenes and their cross-combination compounds with high luminescence quantum efficiencies have been developed.[2-5] However, the practical applicability of these first-generation □-conjugated compounds in preparing electroluminescent devices is restricted by their tendency to form aggregates and exciplexes leading to emission band broadening and bathochromic shift, thus exhibiting low quantum yield in the solid state.

Summary of the invention : The present invention relates to novel donor-acceptor fluorenes, fluorenones and their □-conjugated systems of the general formula I which can be used potentially in preparing electroluminescent devices, and a process of preparing said novel compounds.

Advantages: .It provides novel donor-acceptor fluorenes, fluoreneones and □-conjugated compounds having the general formula I.and to provide a process for the preparation of the novel donor-acceptor fluorenes, fluorenones and their □-conjugated compounds to overcome the problem of 'green emission defect' caused by oxidation of 9-unsubstituted-fluorene units in oligofluorenes or polyfluorenes into corresponding fluorenones, which show green emission band and destroys the purity of blue color polyfluorene based OLEDs.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor Date of Publication
CDRI	IN 2511DEL2008- 06/11/2008 PCT/IN2009/000285 - 14/05/2009	Atul Goel et al

Title Substituted benzfurochromenes and related compounds for the prevention and treatment of bone related disorders.

Field of invention: The present invention relates to the development of substituted benzfurochromenes and related compounds which can be used as therapeutic agents for the prevention or treatment of various medical indications associated with estrogen independent or dependent diseases or syndromes preferably in prevention or treatment of diseases and syndromes caused in humans and animals.

Background of invention: Osteoporosis, which has been defined as a "state of low bone mass", is one of the major problems in our aging society. It is a disease characterized by micro architectural deterioration of bone tissue leading to enhanced bone fragility and consequent increase in fracture risk in older members of the population. It is known to affect >50% of women and 30% men over the age of 50 years. In women, there is also an accelerated rate of bone loss immediately and for variable number of years following menopause.

Summary of the invention :The present invention provides substituted novel benzfurochromenes and related compounds having the general formula I, salts and chiral , achiral derivatives thereof.

Advantages: It provides the substituted benzfurochromenes and related compounds for the prevention and treatment of bone related disorders. It also provides a process for preparation of substituted benzfurochromenes and related compounds having bone forming/strengthening activity.

Lab	Patent No. /Application No. (Date of filing/ /Date of grant)	Inventor Date of Publication
CDRI	IN 0384DEL2009- 26/02/2010 PCT/IN2010/000115 - 26/02/2010	Prabhat Ranjan mishra et al
Title Polymeric nanomatrix associated delivery of kaempferol in rats to improve its osteogenic action.		
Field of invention: The present invention relates to a micro-capsule for controlled release of flavanoid compound for osteogenic action. The present invention particularly relates to a micro-capsule for controlled release of flavanoid compound using the layer by layer technology.		
Background of invention: The mainstay of osteoporosis treatment remains anti-resorptive approach by way of bisphosphonates. Bisphosphonate treatment prevents further bone loss but is ineffective for making up lost bone. Bone forming (osteogenic/anabolic) therapy, which is the ultimate goal for osteoporosis treatment, is limited only to parathyroid hormone (PTH). In addition to being extremely costly, PTH is not readily available in India. Lately, reports of development of osteosarcoma as a result of prolonged use of PTH have been reported. Therefore, finding new bone anabolic agent, that is safe and could increase bone mass and strength and thereby reducing the risk of osteoporotic fracture is an unmet medical need.		
Summary of the invention : The present invention provides a micro-capsule for controlled release of flavanoid compound .		
Advantages: The invention is based on layer-by-layer technology, which involves electrostatic interaction between polyelectrolytes to get a matrix structure which when given orally, the nanomatrix is auto-generated subsequent to dissolution of core particles in gastric fluid which further control the release of active ingredient and facilitates absorption through small intestine.		

Lab	Patent No. /Application No. (Date of Filing/Date of Grant)	Inventor
CECRI	IN 0733DEL2005-28/02/2006 US 11/396163-31/03/2006	Sherwood Daniel, et al.

Title: Method for computing crystal shapes from X-ray diffraction data (XRD) of a substance.

Field of invention: The present invention relates to a method for computing external crystal shapes from X-Ray Diffraction Data (XRD) of a substance.

Background of invention: Crystal shape is the first thing to come to mind when we think of crystallography (morphology and habits are terms related to the crystal shape). There have been several early attempts to relate the internal structure/symmetry of crystals to crystal shapes/habits. Soon it was realized that there was no straight and quantitative relation which applies to all crystals. Further, the external environment during crystallization plays an important role in determining the shape of particular crystals. For example, there are marked differences of habit for crystallization from vapor and from melt. As Gibbs postulated half a century ago, the physical process of crystal growth is one in which energy factors must be important, i.e. the equilibrium shape of a crystal would be one of minimum total surface free energy for a given volume (Wulff's construction [K. Oura et al., Surface Science An Introduction, Spinger-Verlag, New York, 2003; M. Kitayama et. al., J. Am. Ceram. Soc., 85, 611, 2002]).

Summary of the invention: An aspect of the present invention is to provide a method for computing crystal shapes from X-Ray Diffraction Data (XRD) of a substance. Another aspect of the present invention is to provide a method for computing crystal shapes from X-Ray Diffraction Data (XRD) of a substance useful to generate the external shape of the crystals.

Advantages: 1.Depending on the embodiment, advantages of the present invention may include: 1. The shapes/habits/morphologies of the crystals present in the material specimen can be generated from the XRD of the specimen. 2. One gets quantitative information while the prior-art equipments such as TEM and HRTEM yield only visual photographs.3. Another advantage of one embodiment of the present invention is that it enables experimentalists to find the crystal structure and crystal shape by using one and the same equipment, viz. XRD.4. In one embodiment a unique miller index (h, k, l) is assigned to each of the crystal faces identified. 5. Three dimensional information is possible whereas hitherto only projected two dimensional information was accessible to prior-art.6. Crystal shapes can be viewed from arbitrary angles. 7. Generation of crystal shapes will be cheaper using the said algorithmic process.8. One and the same instrument, viz. x-ray diffractometer, can be used to generate both the internal structure and the external shape of crystals.9. The algorithm is superbly suited to find the crystal shapes of nano-crystal and materials. 10. Any crystalline, i.e., non-amorphous, material specimen can be subjected to the said process. The material can be in a powder form or in a single crystal form. The material may further belong to any of the 7 crystal systems (Triclinic, Monoclinic, Orthorhombic, Trigonal, Tetragonal, Hexagonal and Cubic.

Lab	Patent No. /Application No. (Date of Filing/Date of Grant)	Inventor
CECRI	US 11/940203 - 14/11/2007	Akhila Kumar Sahu; et al.

Title: A process for the preparation of sol-gel modified alternative Nafion-Silica composite membrane useful for polymer electrolyte fuel cell.

Field of invention: The present invention relates to a process for the preparation of sol-gel modified alternative Nafion-Silica composite membrane useful for polymer electrolyte fuel cell. More particularly, the present invention relates to a process for the preparation of sol-gel modified alternative Nafion-Silica composite membrane useful for polymer electrolyte fuel cell at both elevated temperatures and low relative-humidity.

Background of Invention: A fuel cell is an electrochemical power source with advantages of both the combustion engine and battery. Like a combustion engine, a fuel cell will run as long as it is provided fuel; and like a battery, fuel cell converts chemical energy directly to electrical energy. The components of a solid polymer electrolyte fuel cell include an anode, a cathode and a solid polymer membrane electrolyte sandwiched between the anode and the cathode. Accordingly, the polymer electrolyte also serves as a physical separator between anode and cathode. A polymer electrolyte membrane fuel cell operates with gaseous hydrogen as fuel and oxygen from the air as the oxidant. In the fuel cell, the ionically conducting membrane should provide high ionic-conductance with high strength, and chemical / electrochemical / thermal stability under operating conditions. In conventional polymer electrolyte membrane fuel cells, the polymer electrolyte membrane is made of one or more fluorinated polymers, for example NAFION®, a perfluorosulfonic acid polymer.

Summary of the Invention: The present invention provides a process for the preparation of sol-gel modified alternative Nafion-Silica composite membrane useful for polymer electrolyte fuel cell.

Advantages: The main advantage of the present invention is to provide a process for the preparation of polymer electrolyte membrane useful for polymer electrolyte fuel cell. Another advantage of the present invention is to provide a process for the preparation of polymer electrolyte membrane, which exhibits high proton conductivity at elevated temperatures and low-humidity ambience. Another advantage is to provide a silica sol by a controlled sol-gel route with simple water hydrolysis and poly-condensation reaction without using any acid or base catalyst. Another advantage is to provide a controlled, homogeneous and transparent silica sol. Another advantage is to provide a membrane electrolyte fuel cell with hydrogen as fuel. Another advantage is to provide a membrane electrolyte fuel cell with hydrogen as fuel, which exhibits good performance at elevated temperatures and under low relative-humidity conditions.

Lab	Patent No. /Application No. (Date of Filing/Date of Grant)	Inventor
CECRI	1831DEL2007-30/07/2008 12/675467-26/02/2010 PCT/IN2008/000512-05/03/2009	Shukla, Ashok Kumar, et al.

Title: Proton conducting polymer electrolyte membrane useful in polymer electrolyte fuel cells.

Field of invention: The present invention relates to an alternate proton conducting polymer electrolyte membrane and a process for the preparation thereof. More particularly the present invention relates to a conducting hybrid polymer electrolyte membrane comprising a stable host polymer and a proton-conducting medium as a guest polymer for its suitability in PEM-based fuel cells. The present invention deals with host polymer, comprising a group of poly (vinyl alcohol), poly (vinyl fluoride), polyethylene oxide, polyethyleneimine, polyethylene glycol, cellulose acetate, polyvinylmethylethyl ether, more preferably polyvinyl alcohol and a guest polymer comprising poly (styrene sulfonic acid), poly(acrylic acid), sulfonated phenolic, polyacrylonitrile, polymethyl acrylate, and quaternary ammonium salt, more preferably poly(styrene sulfonic acid).

Background of invention: The strong interest in the Polymer Electrolyte Membrane Fuel Cells (PEMFCs) stems from the advantages of using a solid polymer electrolyte. The solid polymer electrolyte must be thin and electronically insulating. It also has to act as a gas barrier between the two electrodes while allowing rapid proton transport in a charge-transfer reaction. Once put in place, the polymer electrolyte membrane does not redistribute, diffuse, or evaporate, thus producing easy operation of fuel cells. For fuel cell applications, polymer electrolyte membrane should have high ionic-conductance, high mechanical strength, good chemical, electrochemical and thermal stability under operating conditions. In conventional PEMFCs, the polymer electrolyte membrane is made of one or more fluorinated polymers, for example, Nafion®, a perfluorosulfonic acid polymer. The fuel cells comprising Nafion® membrane should be operated at moderate temperatures and at fully wet-conditions. However, the ionic conductivity of the Nafion® membrane is reduced at elevated temperatures and low relative humidity values, which affects the fuel cell performance. Besides, Nafion® is expensive and has involved synthetic procedure. The multi-step process and incorporation of rare ionomer makes Nafion® membranes cost intensive. Based on the prevailing market price .

Summary of the invention: The present invention provides a hybrid proton conducting polymer electrolyte membrane comprising a host polymer chemically cross-linked with a dialdehyde cross-linking agent and a proton conducting guest polymer, wherein the host polymer is poly (vinyl alcohol) and the guest polymer is poly(styrene sulfonic acid).

Advantages: The invention provides a method to fabricate chemically cross- linked proton conducting polymer electrolyte membrane with high proton conductivity and good water uptake properties. The membrane has an effective utility in PEM-based fuel cells, the anodes of which are fed separately with gaseous hydrogen, aqueous methanol solution and alkaline aqueous sodium borohydride solution.Moreover, the hybrid membrane of the present invention not only has excellent water permeability but also possesses attractive water retention properties at elevated temperatures.

Lab	Patent no. /Application No. (Date of Filing/Date of Grant)	Inventor
CECRI	0526DEL2008- 25/02/2009 PCT/IN2009/000142-11.09.2009	Shukla, Ashok Kumar; et al.

Title: A polymeric hybrid membrane.

Field of Invention: The present invention relates to a novel polymeric hybrid membrane. More particularly, the invention provides membranes comprising chitosan [CS], hydroxy ethyl cellulose [HEC] and montmorillonite [MMT] cross linked in acidic medium. The new types of polymeric membranes of this invention,[1] besides being efficient for air hurnidification, are also cost- effective.

Background of Invention: Membrane-based air humidification is central to prolonged operation of polymer electrolyte fuel cells (PEFCs). To this effect, humidified air is fed to the cathode chambers of the PEFC stack. The humidification of the air is efficiently achieved through a membrane humidifier, generally made of the Nafion® membrane. In such a humidifier, liquid water and dry air are fed to either side of the membrane creating a water activity gradient across the membrane, thereby forcing the water to diffuse across the membrane from the water side to the air side that subsequently evaporates at the membrane/air interface humidifying the air. The use of humidified air is mandatory as compressed air is generally too dry to be used in polymer electrolyte fuel cells while the atmospheric air exhibits considerable variation in its humidity and composition often failing to meet the requirement.

Summary of the Invention: The present invention deals with the natural polymers and its hybrids comprising Chitosan (CS) - Hydroxy ethyl cellulose (HEC) - Montmorillonite (MMT) crosslinked in acidic medium. The invention therefore provides water to be sorbed through- the voids of the membrane small enough to make the membrane impermeable to air. The water diffusion in and across the membrane is facilitated by the hydrophilic-hydrophilic interaction and sorption-diffusion characteristics of the hybrid membranes; the air to be humidified in turn .. takes up the water. Accordingly, the present invention provides a humidifying setup comprising the polymeric membrane sandwiched between two injection-molded graphite plates designed for humidification where water and air is passed on one side to obtain humidified air output. Polymeric hybrid membrane reported in this invention exhibited excellent humidified air output at varying temperatures between 30^0C to 70^0C.

Advantages: The present membranes when used for air humidification is suitable for combining the dew point cooling and the reheating sections allowing rapid changes in operating conditions, with typical response times less than a minute. In the membranes of the present invention, the degree of swelling is high as compared to the prior art membranes which are of utmost importance to impart high permeation flux for desired humidification output.

Lab	Patent No./Application No (Date of filing/ Date of grant)	Inventor
CIMFR	IN 0310DEL2001- 19/03/2001 US 7291199 - 06/11/2007	Sukuru Ramakrishna Rao

Title: Process for the production of a plant growth stimulator from fly ash

Field of invention: The present invention relates to a process for the production of a plant growth stimulator from fly ash. The treated fly ash finds agricultural usage such as plant growth stimulator.

Background of invention: Reference may be made to U.S. Pat. No. 5,451,240 wherein activated humic acid bearing ores are combined with coal ash to provide a composition with plant growth stimulator abilities. However, it consists of several complex steps using several chemicals. First the fly ash is hydrated by water spaying onto the ash in a large mixer. While water is added, the mixture is stirred for about 20-30 minutes. After the ash and the water have been thoroughly mixed, the mixture is transferred to a holding unit, where heat is generated. The mixture is then allowed to cool down. The entire hydration process takes about 24 hours. It is at this point where the activated leonardite ore and the hydrated fly ash are preferably combined. However, the heat of hydration then must be dissipated without allowing an excess temperature rise in the leonardite ore, which would negatively affect the proper formation of a prill. Preferably, the activated ore and the hydrated ash are combined in a 50:50 weight to weight ratio. Then the dry mixture of activated leonardite ore and hydrated fly ash are binded through a liquid binding agent. The binder is a solution of potassium hydroxide and aqueous ammonia.

Summary of the invention :,.The present invention provides a process for the production of plant growth stimulator from fly ash, which comprises treating fly ash with effluent NOx gases in a reactor under agitation at a temperature in the range of 60 to 100 degree Celsius, for a time period in the range of 2 to 5 hours, treating the resulting material with effluent ammonia gas in the same reactor under ambient conditions for time period in the range of 20 to 50 minutes.

Advantages: The process is very simple and pollution free. The unit operations involved are bare minimum.. The process avoids pollution of effluent gases (NOx and ammonia) by utilising for agricultural purpose. The process is absolutely safe, energy efficient and cost effective. . By drawing effluent gases from the plants, the operations of the plants are not effected. . With ever increasing demand in food production due to population explosion, the process utilises all waste materials to get a valuable product, useful for food production.

Lab	Patent No./Application no. (Date of filing/Date of publication/Date of grant)	Inventor
CIMFR	IN 221928 -10/07/2008 US 6,969,699 -29/11/2005	Sen , et al.

Title: Detergent-free scouring composition

Field of invention: The present invention relates to a cleaning powder composition and a process thereof. The present invention more specifically relates to a scouring powder composition, `Glitters`, wherein fly ash, a waste product from thermal power stations, is utilized as an abrasive agent. This invention finds its usage as cleaning powder; especially used for removing stains/scorch marks and burnt-on dirt deposited over kitchen utensils and industrial vessels.

Background of invention: Scouring powders are among the oldest and, even today, still indispensable cleaning materials, which are used both in kitchens and in industries for removing obstinate soils. The basic constituents of scouring powders are, on one hand, the abrasive particles required for mechanically loosening obstinate soil and, on the other hand, surfactants as surface-active agents which are essential for the removal of greasy or fat-containing dirt. The scouring powders currently available in the market contain mostly alkylbenzene sulphonates as surfactants and, from case to case, other active substances and auxiliaries such as, for example, bleaches and disinfectants, zeolites and alkaline salts.

Summary of the invention : The present invention relates to a cleaning powder composition and a process thereof. The present invention more specifically provides a scouring powder composition, `Glitters`, wherein fly ash, a waste product from thermal power stations is utilized as an abrasive agent along with other ingredients. This invention finds its usage as cleaning powder; especially used for removing stains/scorch marks and burnt-on dirt deposited over kitchen utensils and industrial vessels.

Advantages:

Use of fly ash as an abrasive agent reduces the cost of production of scouring powder in comparison to the scouring powders already available in the market. As per international standard the size of mineral abrasion agent in scouring powder should be less than 0.15 mm. Other abrasive agents in the prior art have to be ground to <0.15 m, an operation that is occupationally hazardous. Since the particle size of fly ash is 150 um, no extra grinding is required to meet the international standard. Scouring efficiency of the resultant composition is as good as other scouring powders available in the market.

Lab	Patent No./Application No (Date of filing/Date of grant)	Inventor
CIMFR	IN 02369DELNP2004 -13/08/2004 US7481908 - 27/01/2009	Kaushal Kishore Tiwari et al

Title: System and a process for obtaining high purity phenanthrene from phenanthrene enriched coal tar fraction

Field of invention: The present invention relates to a process to obtain about 95% purity Phenanthrene and a system for obtaining the said product from coal tar distilled fraction containing crude phenanthrene.

Background of invention: Phenanthrene forms the basis for production of 9,10-phenanthraquinone and 2,2'-diphenic acid. It can also be used to synthesize anthracene via the isomerisation product of sym-octahydrophenanthrene. Electrically conductive substances, e.g., for use in batteries and solar cells, can be produced by the electrochemical conversion of phenanthrene diazonium salts in a solvent containing a conductive salt and subsequent doping with various ions (like sodium, barium, hydrogen etc). Liquid crystalline 7-n-alkyl-9, 10-dihydrophenanthrene-2-carboxylic acid ester, used for optical-electronic applications, can be synthesized from 9,10-dihydrophenanthrene. By cross-linking with p-xylene glycol and 4-toluenesulphonic acid, poly-condensed thermosetting resins are obtained for composites or temperature-resistant, electrically insulating coatings.

Summary of the invention :,. The present invention provides a process for obtaining phenanthrene of about 95% purity from coal tar distilled fraction containing crude phenanthrene by performing fractional distillation at a reduced pressure of 50 mm mercury and at a temperature range of 160-180.degree. C. to obtain first distilled fraction containing acenaphthene and fluorene; a second distillate fraction at a temperature range of 200-230.degree. C. containing phenanthrene, anthracene and traces of carbazole; followed by re-distilling the second distillate fraction at a temperature range of 210-224.degree. C. to finally obtaining the pure phenanthrene and a residue which is again used for the recovery of residual phenanthrene by re-distillation at a temperature range of 210-224.degree. C.

Advantages: Recycling of different cuts could separate acenaphthene, fluorene and carbazole, which are also useful chemicals. The chemicals and solvents used in the process are very cheap; thereby the process is cost effective.

Lab	Patent No./Application No (Date of filing/Date of grant)	Inventor
CIMFR	IN 192739 - 14/10/2005 USB 7345176 -18/03/2008 USC 7455827 - 25/11/2008	Ray; Subhash Chandra et al

Title: Process for preparing a catalyst for conversion of cyanopyridines to nicotinamides

Field of invention: The present invention relates to an improved process for conversion of cyanopyridines to nicotinamides. More particularly the present invention relates to the preparation of nicotinamides and isonicotinamides which are used to prepare an anti-TB drug i.e. isoniazid and as an intermediate of vitamin B.sub.12. The present invention also relates to a process for preparing a catalyst useful for the preparation of nicotinamide and isonicotinamide

Background of invention: Reference is made to Bull. Chem. Soc., Japan, Vol.-40, P-1660 (1967) wherein nickel oxide has been used as a catalyst for the hydration of 3-cyanopyridine to nicotinamide. The drawbacks are that the catalytic activity was reported to be low and the yield of nicotinamide was also low. Reference is also made to U.S. Pat. No. 4,008,241 to Gelbein et al for the production of nicotinamide from 3-cyanopyridine by an aqueous ammonia solution. The reaction temperature was 90-150.degree. C., the reaction time was 4-8 hours and the ammonia concentration was 3-8 molar. The maximum conversion of 3-cyanopyridine was about 70%.

Summary of the invention :,. The invention provides a process for conversion of cyanopyridines to nicotinamides comprising dissolving the cyanopyridine in water; adding a transition metal catalyst prepared in neutral medium, refluxing the reaction mixture, cooling, filtering and washing the resultant mixture and evaporating the filtrate to dryness to obtain the product.

Advantages: Nicotinamide can be produced by a catalytic hydration of 3-cyanopyridine without the use of an alkali or an acid as used in the prior art catalyst, which necessitates an extremely complicated and cumbersome separation procedure for the nicotinamide product. The catalyst hydrated manganese dioxide is prepared by a Redox method using potassium permanganate and manganese chloride solution in a neutral medium

Lab	Patent No./Application No (Date of filing/Date of grant)	Inventor
CIMFR	IN 0213DEL2003- 05/03/2003 US 7135588 - 14/11/2006	Chandra Bit Kumares et al.

Title: Method of producing dimethyl phthalate from naphthalene based chemicals

Field of invention: The present invention relates to a method of producing dimethyl phthalate. The present invention particularly relates to a method of producing dimethyl phthalate from naphthalene based chemicals, particularly, phthalic anhydride, which is a coal tar by product.

Background of invention: Dimethyl phthalate is known to be an effective and safe repellent for blood sucking insects like mosquitoes and flies. It finds extensive application as a plasticizer, as a carrier in the dyeing of synthetic polyesters, as a froth flotation agent and an ingredient in hair sprays. Generally, dimethylphthalate is obtained by direct oxidation of hydrocarbons. Reference may be made to "Chemical Abstract (CA) Vol. 43, (1949) 5767a". wherein phthalic anhydride and chloro sulphonic acid were refluxed. But very low yield was the drawback of the process. Reference may be made to Ind. Engg. Chem 40,96 (1948) wherein oxides of aluminium, manganese and lead were used as catalyst. Low yield was the main drawback of the process. Prior art search for producing dimethyl phthalate was made based on literature survey and patent data bases, which did not yield any relevant references.

Summary of the invention :,. The present invention relates to a method of producing dimethyl phthalate. The present invention particularly relates to a method of producing dimethyl phthalate from naphthalene based chemicals, particularly, phthalic anhydride, which is a coal tar by product.

Advantages: Producing dimethyl phthalate from naphthalene based chemicals, particularly, phthalic anhydride, which is a coal tar by product.Product of high purity, of the order of 98%, can be achieved.Economical method as cost of most of the materials is low. No environmental pollution is involved in the process.

Lab	Patent No./Application no. (Date of filing/ Date of grant)	Inventor
CIMFR	IN 225534 - 18/11/2008 US 6,928,936 -16/08/2005	Mukherjee , et al.

Title: Device for feeding pulverized coal to furnace

Field of invention: This invention relates to a device for feeding pulverized coal to a furnace. This invention specifically relates to a system of feeding pulverised coal to a furnace, such as a drop tube furnace.The present invention finds usage in studying chemical reactivity and combustion behaviour of various coals in an experimental furnace such as a drop tube furnace.

Background of invention: Experimental fumaces are generally used to simulate combustion and deposition conditions in pulverised fuel boilers. The essential characteristics of such reactors are heating rate, high temperature, dynamic particle phase and atmosphere simulating conditions. For example, the essential components of an experimental fumace such as a vertical drop tube furnace system include a fuel feeder, a reactor and equipment for sampling and analysis. The drop tube furnace is a valuable tool when attempting to simulate coal combustion on a small scale. In this furnace pulverised coal is carried down through a water cooled feeder into a heated ceramic tube containing pre-heated air. After passing through the tube the particles are collected in a water cooled probe in different zones where the reactions are effectively quenched. The flow of these gases is kept sufficiently low to ensure that laminar flow conditions are met. Turbulent flow would cause the reduction of collection efficiency and the lowering of the sample integrity. The degree of decomposition experienced by the particles depends on conditions within the furnace. The residence time inside the furnace, oxygen content and the temperature can be altered as per the requirements.

Summary of the invention : The present invention provides a device for feeding pulverized coal to a furnace, such as a drop tube furnace. The feeding system consists of a feed hopper, a pneumatic vibrator positioned on the periphery of the feeder hopper, a needle valve arrangement in the said feed hopper, a depth gauge micrometer, a distribution chamber with primary and secondary airline at the bottom of the said feed hopper. Adjusting the pressure of compressed air allows setting of the frequency of vibration of the pneumatic vibrator. The needle valve arrangement in conjunction with the vibratory hopper controls the feed rate. The rate of coal flow is measured by the depth gauge micrometer. The distribution chamber with primary and secondary airline at the bottom of the said feed hopper allows uniform mixing of air with coal before being charged into the furnace reactor.

Advantages: The feeding system provides consistent and accurate feed. It is easy to operate and maintain.

Lab	Patent No./Application no. (Date of filing/ Date of grant)	Inventor
CIMFR	00489DELNP2004 –27/02/2004 US 7,514,559 - 07/04/2009	Dutta , et al.

Title: Catalyst for synthesis of 2- and 4-picolines

Field of invention: The present invention provides a catalyst composite for the synthesis of 2- and 4-picolines. The present invention also provides a process for the preparation of a catalyst useful for the synthesis of 2- and 4- Picolines. The present invention also provides a process for the preparation of 2- and 4- picolines using said novel catalyst. The present invention finds its usage in preparation of various intermediates for pharmaceuticals and agrochemicals. 2-Picoline is one of the main components in manufacture of pesticides. Major outlet for 4- Picoline is for the synthesis of 4-VinylPyridine and Iso-Nicotinic Acid Hydrazide (INH), an anti-tubercular drug.

Background of invention: Commercially important sources of pyridine bases are tar and saturated liquor obtained by the carbonization of coal. However, the stringent specifications laid down for these products in pharmaceuticals and agricultural applications cannot be met from natural sources, namely from coal carbonization byproducts. Amongst the various synthetic routes, the reaction between acetaldehyde and ammonia is the most common one known in the prior art for making pyridine bases.

Summary of the invention : The present invention provides a catalyst useful for synthesis of 2- and 4- Picolines which comprises a heteropoly acid selected from the group consisting of silicotungstic acid, phosphotungstic acid, phosphomolybdic acid and vanadotungstic acid provided on a support.

Advantages: The process is very simple and economic. The catalyst preparation avoids tedious methods in comparison to prior art processes

Lab	Patent no./Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 190436 Date of filing 20/6/1996	Nagappa Gurusiddappa Malleshi, et al.

Title: A process for the preparation of enteral food useful as a food for patients at hypercatabolic state especially the thermally injured patients.

Field of invention This invention relates to a process for preparation of enteral food useful as a food (nutritional support) for patients at hypercatabolic state especially the thermally injured patients.

Background of invention: Proper nutritional support not only helps to cure the disease. But also prevents its recurrence and decreases the mortality and morbidity of hospitalized patients, and also cut down the hospitalization expenses substantially. Very often, hospitalized patients need special nutritional care. Liquid foods or enteral foods are administered orally or through feeding tube to the patients whenever the patient is not able to take normal or even semi-solid foods due to functional or organic disorder, but the gut functions normally. Enteral foods are also given to patients, as a part or total nutritional support to cope up with the extended nutritional requirements in some of the special physiology conditions such as complicated pregnancy, anorexia, burn injury, sepsis, trauma etc.

Summary of the invention: A process is provide for the preparation of enteral food useful as a food for patients at hypercatabolic state especially the thermally intured patients, which comprises: I)Soaking viable seeds of cereals in excess water, II) Germinating the said soaked seeds, III)Drying the germinated cereals, iv) Removing the rootlets, v) Kilning the resultant green malts, vi) Dehusking malted paddy and moistening with additional water and tempering followed by milling and sieving to prepare cereal malt flours, vii) Preparing edible flour from amaranth seeds by so that most of the nutrients of the seed remain in the product, viii) Toasting defatted soy flour, ix) Homogenising together the yolk and the egg white, x) Preparing curd (yogurt), xi) Blending malt flours obtained from different cereals in step vi; with edible amaranth seed flour, soya flour, mashed egg, pasteurized fresh milk, sucrose, fish oil and soya oil.

Advantages: The process enables preparation of enteral food for patients at hyper catabolic state especially the burn or thermally injured patients, based on natural food ingredients, containing easily digestible carbohydrates, proteins of high biological value containing branched chain amino acids and alginine and good sources of soluble dietary fibre. Omega-3 and Omega - 6 fatty acids and the essential vitamins and minerals with special reference to zinc and ascorbic acid. The enteral food prepared reconstitutes well with water, milk or any other potable fluids of choice and forms free flowing homogenous slurry suitable for tube feeding at 1.5-2 Kcal per ml and enables to feed the quantity sufficient to meet the full nutritional requirements of the needy patients.

Lab	Patent no./Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 197274 Date of filing 14/10/1997	Lingamallu Jagan Rao, et al.

Title: A process for the isolation of trans-cinnamyl acetate from the unconventional parts of cinnamon (cinnamomum zeylanicum blume)

Field of invention: The invention relates to a process for the isolation of trans - Cinnamyl acetate from cinnamon [Cinnamomum zeylanicum Blume]. The invention also provides a feasible and viable process for the large scale production of trans - cinnamyl acetate from natural sources.

Background of invention: Trans-cinnamyl acetate is widely used in perfumery because of its excellent sensory and fixative properties. It is used frequently in blossom compositions such as lilac, jasmine, lily if the valley, hyacinth and gardenia to impart balsamic and oriental notes to the fragrance. In addition, it is utilized as modifiers in berry, nut and spice flavour systems. It is used in nonalcoholic beverages, ice-creams, baked goods, chewing gum and in condiments. It is also used in baked goods frozen dairy, meat products, condiment relish, soft candy, gelatin, pudding hard candy. It is used as a modifier for cinnamic alcohol and as a warm-spicy-floral note in heavy florals, hyacinth etc. It can also introduce warmth to rose composition at a discrete levels of concentration. It is used in flavour composition for imitation apple, apricot, berry, cherry, cinnamon, cassia, grape, peach, pineapple, quince, vanilla etc. It is also used as an insect repellent composition.

Summary of the invention: A process for the isolation of trans-cinnamyl acetate from cinnamomum zeylanicum blume which comprises isolating volatile oil from flower/fruits of Cinnamomum Zeylanicum Blume by known methods to obtain volatile oil,impregnating the above volatile oil on an adsorbent using non-polar solvent aseluent to get trans-cinnamyl acetate.

Advantages: Trans-cinnamyl acetate is widely used in perfumery because of its excellent sensory and fixative properties.

Lab	Patent no./Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 191576 Date of filing 28/8/1997	Renu Agrawal, et al.
Title: A process for the production of bicyclo [3-1-1] hept–3 en–2–one using Aspergillus sp.		
Field of invention: The present process deals with the microbial production of bicyclo [3-1-1] hept – 3-en-2-one which has mixed camphor and mint notes and is useful as a flavorant in bakery, confectionery, soft drinks and ice-creams. This compound is a natural component of the oil of verbena, dill, spearmint and eucalyptus oil. The compound is commonly known as verbenone.		
Background of invention: The possibility of utilizing microbes for production of food colors and flavours is attractive from the point of view of process economy. Low cost and readily available precursors can be used as substrates in the process. The flavour compounds used in food industry and obtained from other sources including the synthetic ones are often high prices which justifies the approaches of the microbial bioconversion. Another advantage of the microbial process is the yield of specific enantiomorphs that have desired properties required by food industry. This saves costly chemical seperation.		
Summary of the invention: The present process provides a process for the microbial production of bicyclo [3-1-1] hept – 3-en-2-one, useful as a flavorant in bakery, confectionery, soft drinks and ice-creams. The compound is a natural component of the oil of verbena, dill, spearmint and eucalyptus oil. The compound is commonly known as verbenone.		
Advantages: The organism is capable of converting a relatively low priced substrate in to a high value product that has demand in food industries.		

Lab	Patent no./Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 189039 Date of filing 24/7/1998	Krishnamurthy N., et al.

Title: An improved process for the production of dehydrated green pepper

Field of invention: The present invention relates to improved process for the production of dehydrated green pepper.

Background of invention: India is one of the major producers of pepper. Dehydrated green pepper (DGP) is one of the major pepper products that are exported from India. DGP is widely used in pickles and in garnishing meat products. It is delicacy much appreciated in Europe, America and Australia. DGP is an export-oriented value-added product. A hitherto known process employs sulphur-di-oxide (SO_2) as one of the additives to stabilize the green color and prevent brown discoloration. In the international market there is an increasing resistance for the use of SO_2 in processed foods from an aesthetic point of view and for health reasons. Hence it was felt desirable to develop a method for making DGP without using SO_2 or microwave oven.

Summary of the invention: The principle of the present invention is use of ammonia at a specified temperature, pH and period which helps in inactivating the enzymes and stabilizing the green colour. In this process, commercially available fresh pepper varieties like Karimunda, Panniyur or Balankotta harvested at a tender stage of 7 to 8 months maturity are used. Any other variety having similar characteristics can also be used for this purpose. DGP is obtained with light green or yellowish green colour.

Advantages: It is possible to get dry pepper which is green in colour. The process does not employ any sulphites (SO_2) during processing operations

Lab	Patent no./Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 188758 Date of filing 13/8/1998	Namadev Subbanna Mahendrakar, et al.

Title: A process for the preparation of fermented silkworm pupae silage useful as an ingredient in animal feeds.

Field of invention: The present invention relates to a process for the preparation of fermented silkworm pupae silage useful as an ingredient in the animal feeds.

Background of invention: Sericulture and silk production are well established and are growing industries in India with a high employment potential. A silkworm pupa is a major byproduct generated from these industries. Being rural based industries the difficulties in collection and transport have resulted in rejection of large quantities of silkworm pupae into the manure pit. In some places, silkworm pupae is sun-dried in the open yard, powdered, oil extracted wherever possible and used mainly in chicken feeds. CFTRI, Mysore carried out studies on drying of silkworm pupae, extraction of oil and utilization of silkworm pupae in poultry feed. Discarding silkworm pupae as well as drying of silkworm pupae results into foul smell due to degradation of nutrients. This results into environmental pollution. CFTRI process prevent these degradative changes and preserve/upgrade the nutrients in silkworm pupae with a dual objective of improving the nutritive value of silkworm pupae and minimizing the environmental pollution problem. Ensiling the silkworm pupae with suitable carbohydrate substrate and additives through fermentation could be a cheaper process to preserve / upgrade the nutrients and minimize the environmental pollution problem.

Summary of the invention: Provided herein is a process for the preparation of fermented silkworm pupae silage useful as an ingredient in animal feed, containing 21-23% protein, 8-11% fat, 1.5-2.5 minerals, which comprises homogenizing killed silkworm pupae, obtained after reeling of silk thread, to get a past of said silkworm pupae, adding 8% (w/w) molasses as a carbohydrate substrate, 0.25% (v/w) propionic acid, 0.25% (w/w) sorbic acid as antimycotic agents and 0.01% (w/w) butylated hydroxianiole as an antioxidant to the obtained past, mixing the above ingredients thoroughly and allowing the mixture to ferment under microaerophilic condition at a ambient temperature(26+ 2°C) for a period ranging 48-72 hours, getting desired fermented silkworm pupae silage.

Advantages: Lactic fermentation can be effected in silkworm pupae to prepare fermented silkworm pupae silage without the addition of lactic culture. Fermentation takes place under microaerophilic condition at ambient temperature. Prevents the growth of yeasts and moulds and eliminates spoilage and pathogenic bacteria. Rancidity development is controlled during fermentation. The silage product has a potential use in animal feeds as source of valuable animal proteins and other nutrients

Lab	Patent no./Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 190982 Date of filing 27/5/1999	Nemakal Giridhar, et al.
Title: A process for the preparation of formulation useful in drying of grapes		
Field of invention The present invention relates to a process for the preparation of formulation useful in drying of grapes.		
Background of invention: The formulation is used to prepared a dipping emulsion for treatment of grapes prior to dehydration/drying. This emulsion treatment will help the grape berries in drying at a faster rate compared to the conventional method of drying, thus giving a superior end product (Raisins) which is non sticky and light in color.		
Summary of the invention: Grapes, after trimming are dipped in this emulsion, and after removal are dried. In order to hasten the drying process, the partially dried grapes are sprayed with the above emulsion. This helps in faster drying. This will give a dehydrated raisins of light colored which are non-sticky. In order to get yellow colour, the grapes after dip treatment and before drying are exposed to sulphur dioxide fumes. After drying is complete, the raisins are separated from stalks and are given a quick wash with plain water or a dip to remove the traces of alkali that is present over the skin and further dried to remove the adhering moisture. The raisins are then packed and stored.		
Advantages: There is no need to use tallow in the preparation of mixed esters of fatty acids, and vegetable oil can be used. The formulation is user friendly as it can be stored in bottles for a longer period and also can form a stable emulsion while mixing with an aqueous solution of potassium carbonate before actual dipping of grapes. The method of the formulation involves simple techniques like refluxion, distillation, washing and mixing. The use of this formulation in dehydration of grapes has the advantages of getting non-sticky, light colored raisins.		

Lab	Patent no. /Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN216377 Date of filing 19/03/1999	Kestur Venkatesh Murthy, et al.

Title: A device useful for automatic dispensing of chutney, sauce and other similar products.

Field of Invention: The present invention relates to a device useful for automatic dispensing of chutney, sauce and other similar products. The device of the present invention is particularly useful for dispensing of chutney, sauce and other similar products while serving snack foods such as dosa, idli, chapati, poori etc. The quantity dispensed by using this device is uniform in quantity under hygienic conditions in an intermittent/continuous manner.

Background of Invention: The hitherto known process of serving of chutney, sauce and other similar side dishes are done manually. In manual serving the device consists of a stainless steel spoon and a container. The server uses the spoon for serving the side dish. The drawbacks of manual serving of the side dishes like chutney, sauce and other products are: 1. There is a variation in the quantity served. 2. Manual serving using open vessel and spoon leads to contamination and hygiene problems. 3. The process is labour intensive and human drudgery is very high.

Summary of the Invention: The present invention provides a device useful for dispensing of chutney, sauce and other similar products characterized by a conical bottom vessel (1), having a bottom opening and removable fixed cover plate (2), a solenoid being fixed to the bottom of the said cover plate, the said solenoid being provided with actuating shaft (5) extending thought the bottom opening of the vessel (1), a piston (6) fixed to the aid shaft by lock nut (7)) being provided close to the bottom of the said vessel (1), the said piston being provided with an air vent tube (11) and a split pin vertical movement stopper (8), an annular tube (9) concentrically enclosing the said piston (6) and extending below the bottom of the vessel (1) by nut (10) being provided at the bottom opening of the said vessel (1), the said tube also being provided with radial inlet ports in the inside of the bottom of the said vessel (1), the end of the said extended shaft (5) being provided with a collector cup (12) to cover the bottom of the annular space below the bottom of the vessel (1).

Advantages: The chutney, sauce and other similar products can be automatically dispensed under hygienic condition without contamination. 2) Uniform quantity of chutney/sauce can be dispensed irrespective of the variation in the hydraulic head in the conical vessel. 3) The quantity dispensed can be varied. 4) The device is versatile and can efficiently handle different varieties of chutnies and sauces. 5) Dispensing of the chutney/sauce can be started or stopped at will by the signal to the solenoid through photo-sensor. 6) Operation and maintenance is easy and cost effective too.

Lab	Patent no. /Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN218200 Date of filing 16/3/2000	Timmappaji Shantha, et al.

Title: An automatic device for detoxification of aflatoxin contaminated edible oils by photolysis.

Field of invention: The device of the present invention is useful for detoxification of edible oils contaminated with aflatoxin particularly groundnut oil so obtained by using the device of the present invention is safe for consumption and is obtained continually. The oil so obtained retains all the aroma of the natural oil. The device of the present invention is therefore useful as a tool to detoxify groundnut oil, in particular by photolysis without reducing its aroma. Groundnut oil is produced in the country on a large scale. it is popular in India especially southern part and there is a liking for groundnut oil and is extensively used for deep fat frying, seasoning etc. The main problem of using market edible oil as such is its contamination with aflatoxin and its effects on the human health.

Background of invention: There are a number of physical and chemical methods attempted to reduce aflatoxin levels. However, high temperatures required result in destruction of most nutrients. Oil samples can also be successfully detoxified with refining, filtration and sunlight, but these methods cannot be applied to all food commodities. Use of chemical methods for aflatoxin detoxification is averted as the use of acids and alkalis to convert aflatoxins to less toxic compounds destroys the nutritional value of the food.

Summary of the invention: The device of the present invention consists of an oil reservoir fitted with conventional photo-sensor at the upper end and a solenoid one way valve at the bottom for transmitting oil to a baffle-chanelled rectangular tray made up of material such as food grade polyacrylic, aluminium or stainless steel. The intensity of sunlight being more than 3OOxlO3 Lux units, as sensed by the said photo-sensor activates the solenoid one way valve to regulate flow of oil in the range of 20 to 30 L / H to the said baffle-channelled tray, maintaining oil thickness of 16 mm for the purpose of photolysing it by using sunlight of intensity of greater than 300 X 10 3 Lux. The tray has been channelled with baffles in order to allow the oil to flow in a zig- zag manner to provide residence time of greater than 25 minutes. The tray is also being provided with an outlet at its lower end. The oil flows through baffled channels of the tray at a predetermined residence time and is collected into the receiver. The entire assembly is mounted on a metallic or wooden support.

Advantages: The detoxified oil can be obtained continually. The light intensity can be preset for efficient reduction of aflatoxin contamination in the oil. The feed rate and oil depth can be controlled based on the light intensity. The photo sensor has the ability to track the movement of the sun. Edible oil contaminated with aflatoxin can be Electro – mechanically exposed to sunlight, to the preset light intensity for detoxification. The device is versatile and can efficiently handle different types of oils. Operation and maintenance is easy.

Lab	Patent no./Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 192854 Date of filing 29/3/2001	Renu Agrawal, et al.

Title: A NOVEL BIOTECHNOLOGICAL PROCESS MEDIATED BY A SELECTED FUSANT STRAIN OF ASPERGILLUS NIGER FOR THE PRODUCTION OF VERBENOL

Field of invention The present invention relates to a process for production of verbenol. In particular, the process involves fusion of strains for the production of verbenol. Verbenol is a high valued flavour compound which has wide usage in food industries and used as a food flavour additive.

Background of invention: Verbenol is a high valued flavour compound which has wide usage in food industries and used as a food flavour additive starting from alpha pinene a waste product of eucalyptus peel oil and /or pine bark. Microbial fermentation is regarded as a potential means for producing natural flavour substances and the field has a great deal of interest today. Production of 4,6,6 trimethyl bicyclo 3.1.1 Hept – 2en-2ol by this means is considered as GRAS food additive by the US Food and Drug Administration. It is widely used in flavour industry, for preserving food grains and also as the direct precursor for the manufacture of taxol a natural anticancerous drug. Obtaining high valued flavouring compound is of immense importance as the starting material are low cost and are easily available. It is also economically feasible as a high valued compound is produced.

Summary of the invention The present invention provides a process for the production of verbenol, which comprises the steps of: growing parent culture Aspergillus niger and Penicillium digitatum separately on potato dextrose broth and YMG broth under a shaking condition of 150-200 rpm; isolating protoplast separately from the grown biomass followed by filtration in order to obtain filtrates separately ; mixing the filtrates in a ratio of about 1:1 containing equal number of protoplasts; incubating the mixture in a fusion medium;making serial dilutions followed by plating on to a minimal medium II to facilitate the growth of fusants or heterokaryon ;transferring the grown fusants/heterokaryons to a known complete medium to obtain sporulation which are further grown on a potato dextrose broth ; filtering the biomass and adding it to buffer solution to which alpha pinene is added; and extracting the product in dichloromethane to get verbenol

Advantages: A high yielding strain has been obtained which produces verbenol, through protoplasting and fusion of two different generic strains one A.*niger* and other P. *digitatum.* An economical process to obtain verbenol from biological means. The compound obtained by this means is enantiospecific. The product is classified as natural and comes under GRAS category. The incubation time with the substrate has been reduced to 6 h as compared to 40-44 h

Lab	Patent no./Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 231659 Date of filing 29/3/2001	Renu Agrawal, et al.

Title: A process for the production of verbenol

Field of invention The present invention relates to a process for production of verbenol. In particular, the process involves fusion of strains for the production of verbenol. Verbenol is a high valued flavour compound which has wide usage in food industries and used as a food flavour additive.

Background of invention: Verbenol is a high valued flavour compound which has wide usage in food industries and used as a food flavour additive starting from alpha pinene a waste product of eucalyptus peel oil and /or pine bark. Microbial fermentation is regarded as a potential means for producing natural flavour substances and the field has a great deal of interest today. Production of 4,6,6 trimethyl bicyclo 3.1.1 Hept – 2en-2ol by this means is considered as GRAS food additive by the US Food and Drug Administration. It is widely used in flavour industry, for preserving food grains and also as the direct precursor for the manufacture of taxol a natural anticancerous drug. Obtaining high valued flavouring compound is of immense importance as the starting material are low cost and are easily available. It is also economically feasible as a high valued compound is produced.

Summary of the invention: The present invention provides a process for the production of verbenol, which comprises the steps of: growing parent culture Aspergillus niger and Penicillium digitatum separately on potato dextrose broth and YMG broth under a shaking condition of 150-200 rpm; isolating protoplast separately from the grown biomass followed by filtration in order to obtain filtrates separately ; mixing the filtrates in a ratio of about 1:1 containing equal number of protoplasts; incubating the mixture in a fusion medium;making serial dilutions followed by plating on to a minimal medium II to facilitate the growth of fusants or heterokaryon ;transferring the grown fusants/heterokaryons to a known complete medium to obtain sporulation which are further grown on a potato dextrose broth ; filtering the biomass and adding it to buffer solution to which alpha pinene is added; and extracting the product in dichloromethane to get verbenol

Advantages: A high yielding strain has been obtained which produces verbenol, through protoplasting and fusion of two different generic strains one A.*niger* and other P. *digitatum.* An economical process to obtain verbenol from biological means. The compound obtained by this means is enantiospecific. The product is classified as natural and comes under GRAS category. The incubation time with the substrate has been reduced to 6 h as compared to 40-44 h

Lab	Patent no./Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 231563 Date of filing 27/3/2001	Dittakavi Narasimha Rao, et al.

Title: A process for preparation of buffalo casings

Field of invention: The present invention relates to a process for preparation of buffalo casings. In particular, the present invention relates to a process for preparation and preservation of buffalo casings at ambient temperature.

Background of invention: India has nearly 50% of the world's buffalo population. It is a multipurpose animal and gives milk, meat and draught power. Various by-products are produced during buffalo slaughter. Intestine is one of the important by-products. Intestines can be converted into casings which are used as sausage containers. Casings prepared from the intestines of sheep, goat and cattle are exported from India to Japan, Netherlands, Poland, Germany etc. Buffalo intestines have no food value. At present, they are not properly utilized. Conversion of buffalo intestines into casings is a good approach for value addition and for earning. The main problem with buffalo intestines is that there is a thick fatty layer (encapsulated in collagenous sheeth) adherent to one side of the intestine. There. CFTRI has developed a process for preparation and preservation of buffalo casings at ambient temperature. Buffalo casings will have good potential in export market.

Summary of the invention: The present invention provides a process for the preparation of buffalo casings. In the said process important steps are treating the cleaned intestines with lime powder and allowed at a temperature 20-30 deg C for 2-3 hours; removing adhering fat with blunt knife; washing the defatted intestines in running water followed by reversing and passing through the rollers of the casing cleaning machine; repeating above treatment for four times; reversing the intestine back to normal position and thorough washing by flushing with water followed by draining the water; treating casings with a mixture containing common salt, vinegar and potassium sorbate ; transferring the treated casings to a rigid plastic container (PVC) followed by storing at temperature of 20-30 deg C for 2-3 days; & packing and storing the treated casings in a polythene (high density) bags at temperature of 20-30 deg C for 6-12 months.

Advantages: Buffalo casings are microbiologically safe. The process is easily feasible under commercial conditions in the abattoirs. Buffalo casings can further be utilized as containers for sausages.

Lab	Patent No. /Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN195813 – 21/04/2006	Ragu Sai Manohar et al

Title: A process for the preparation of gluten free bread.

Field of invention: The present invention relates to an improved process for the preparation of gluten free com bread.

Background of invention: Bakery products are quite popular in India and rest of the world because of their ready to eat nature, availability of varieties to suit the palate of different cross-section of population; better nutritional quality and availability at comparatively low cost. Bread is an important bakery product that contribute to the maximum sales in the market. In India out of the total turn over of Rs. 5,000 crore in a bakery industry, bread industry alone is valued at Rs 1500 crores (Vikas Singhal, 1999 Indian Agriculture, Indian economic data research centre, pp 72-83). Recently bakery products are being used as a vehicle for incorporating various nutrients or substances that would improve the nutritional quality of product or health of the consumer. Hence various health products like high fibre bread, low sodium bread and sugar free bread have been produced on commercial scale to persons suffering from diabetes and hypertension patients.

Summary of the invention : An improved process for the preparation of gluten free corn bread consisting of Corn starch, Defatted soy flour, Skim milk powder, Sugar, Fat , Salt, Yeast, Guargum. SSL & Water comprising steps of i) blending the corn starch, defatted and toasted soy flour and skim milk powder ii) preparing the homogeneous suspension or paste of guargum and SSL iii) preparing the wet compressed yeast suspension iv) preparing the aqueous solution of salt and sugar v) mixing the ingredient as obtained in i), ii),iii) and iv) along with fat to get a homogeneous batter, vi) fermentation the batter 20-60 minutes at 28-32°C, vii) remixing for 3-6 minutes, viii) scaling the batter as described herein, ix) proofing for 20-60 minutes at 28-32°C, x) baking the proved bread so obtained in step lix) by conventional manner, at a temperature ranging 190°-210°C for 30 minutes xi) cooling the baked bread at temperature of 25°C-40°C.

Advantages: The use of guargum helped in retaining more moisture and structure to the bread. Inclusion of SSL in the formulation improved the batter consistency and texture of bread. Inclusion of toasted soy flour and skimmed milk powder improved the volume, grain,texture and taste of the product.

Lab	Patent No. /Application No. (Date of Filng/ Date of Publication/Date of Grant)	Inventor
CFTRI	IN 192736 Date of Filing 27/3/2002	Rao Reena, et al.

Title: A process for the preparation of cholesterol lowering structured lipids containing omega 3 polyunsaturated fatty acids and process thereof.

Field of Invention. The present invention relates to cholesterol lowering structured lipids containing omega 3 polyunsaturated fatty acids and a process thereof.

Background of Invention: Structured lipids are triacylglycerols containing mixtures of short-, medium-, and long- chain fatty acids attached to glycerol backbone for specific functionality. Structured lipids are formed by (a) hydrolysis and esterification (b) interesterification (c) lipase-interesterification (d) traditional chemical methods (e) genetic manipulation They are particularly useful because of the way in which they are metabolized. Specific fatty acids can be attached to specific portions of the glycerol backbone to ensure that these fatty acids are absorbed in a specific manner in the digestive process. The process described here finds application in the synthesis of structured lipids designed to impart nutritional and physical benefits.

Summary of the Invention: The present invention provides for unique structured lipids obtained from interestifying coconut oil with free fatty acids obtained from hydrolysis of triglycerides of an animal source, said structured lipids contain up to 14% omega-3-poly unsaturated fatty acid and rich in medium chain fatty acid.

Advantages: The process could be employed for the modification of coconut oil, which is deficient in Essential Fatty Acids (EFA) by effectively incorporating omega 3 fatty acids. The use of natural sources of triglycerides and fatty acids for the acidolysis reaction and the use of immobilized lipase which could be reused up to 25 cycles without loss of activity ensures that the process is economically viable. The structured lipid, rich in Medium Chain Fatty Acids (MCFA) and omega 3 Poly Unsaturated Fatty Acids (PUFA), will provide a lipid source primarily for use in a controlled diet for critically ill patients, which has lauric acid to provide quick energy and the changes in eicosanoid synthesis seen with omega 3 PUFA feeding will prove immunocompetence and a reduced inflammatory response to injury. The structured lipid has a lower melting temperature than unmodified coconut oil thus maintaining them in the lipid state even at low temperatures. Hence the structured lipid at a temperature of 12-15° C remains a liquid without phase separation. The structured lipids of the present invention having a high cholesterol lowering capacity as well as triglyceride levels in the body when compared to the blend of physical mixtures of two oils, having similar acid composition.

Lab	Patent no./Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 202326 Date of filing 28/2/2002	Reddy Y., et al.

Title: A process for preparation of modified non-hydrogenated bakery shortenings and vanaspati

Field of invention The present invention relates to a process for preparation of modified non-hydrogenated bakery shortenings and vanaspati

Background of invention: Currently, fats prepared by hydrogenation are being used in bakery and in traditional sweetmeat industries. Hydrogenated fats normally contain large quantity (40-45%) of trans fatty acids. Although, the nutritional significance of *trans* fatty acids is controversial, it has been found that they are the risk factors involved in coronary heart disease and a comprehensive review concluded that trans fatty acids consumed at 4% or more of total calories may raise plasma lipid levels. Hence, there is a demand for fats having natural fatty acids without any *trans* isomers. Fats papered in the present invention do not contain any *trans* fatty acids and could be utilized in bakery industry for preparation of various types of products such as pastries, biscuit, cakes etc. and also in traditional sweetmeats. The formulations prepared in the present invention did not contain any trans fatty acids and had plasticity similar to those of commercial hydrogenated fats suitable for use in bakery and in other culinary purposes.

Summary of the invention Provided herein is a process for the preparation of modified non-hydrogenated bakery shortenings and vanaspati. The products prepared in the present invention do not contain any *trans* fatty acids and thereby nutritionally they are better than commercially available hydrogenated fats.

Advantages: They consist of natural fatty acids including PUFA. They had consistency and plasticity similar to those of commercial hydrogenated fats required for use in bakery and as vanaspati for culinary usage. The stearin fraction used in the invention is a by-product in palm olein manufacturing industry and hence may be economical.

Lab	Patent No. /Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 231057- 28/02/2009 US 6822003 -23/11/2004	Avinash Prahald Sattur et al

Title: Process for preparation of aldose reductase inhibitor.

Field of invention: The present invention relates to a process for the preparation of a novel aldose reductase inhibitor. More particularly, the present invention relates to a novel aldose reductase inhibitor derived from cultures of Aspergillus niger CFR 1046 and pharmaceutically acceptable derivatives thereof.

Background of invention: Diabetes mellitus and its disabling complications which include blindness, renal failure, limb amputation, myocardial infarction affect millions of people (Schumacher, M.P. Diabetes 44 (1995)1355-1361). In the absence of or in cases of insufficient insulin, glucose accumulates in the blood of diabetics. Certain cells such as those in the peripheral nerves, the lens of the eye, or parts of the kidneys, however, do not need insulin to get glucose. As a result, maximum damage such as blindness, neuropathy and kidney damage occurs in such sites in diabetics. Nerve damage in diabetes is largely caused by loss of the insulating myelin sheath around nerves, which in turn causes message transmission to be erratic and painful, or non-existent. The reason this occurs is that when glucose enters these cells, it is converted into sorbitol by the enzyme aldose reductase (Aldilol:NADP't 1-oxidoredutase, EC 1.1.1.21) which catalyses the NADPH-linked reduction of a broad group of aldoses to respective alduronic acids (Wilson K.W., Boren K.M. and Gahbay K.H., Science 257 (1992) 3). Sorbitol is then slowly converted into fructose by sorbilol dehydrogenase. Neither sorbitol nor fructose can cross the membrothe and leave the cell easily, thereby causing damage as they accumulate. The resulting changes include changes in osmotic pressures, alterations in redox state of pyridine nucleotides (increased NADH/NAD ratio) and depleted intracellular levels of myoinositol (Larson ER, Lipinski CA and Sarges RMed Res Revs 8 (1988) 159-186).

Summary of the invention: These and other objects of the invention are achieved by a novel aldose reductase inhibitor derived through the fermentation of certain microorganisms.Accordingly, the present invention relates to a process for the isolation of a novel aldose reductase inhibitor,2,6,dihydroxy,8,hexoxy, 1,4, naphthaquinone, which comprises, a) culturing Aspergithus niger on known media as herein described for a period of 4 days at30°C to obtain broth,b) treating said broth with ethyl acetate, filtering to remove biomass to obtain organicextract,c) drying, concentrating the organic extract by known methods as herein described to obtaincrude residue,d) purifying the said residue by conventional column chromato graphic methods to obtainthe product, 2,6, dihydroxy, 8, hexoxy, 1,4, naphthaquinone.

Advantages: A new natural source for aldose reducatase inhibitors that is more economical and shows better activity. Provides new aldose reductase inhibitors that show improved actuivity and are obtained from natural sources. The process for the extraction of aldose reductase inhibitors is economical and more efficient.

Lab	Patent No. /Application No. (Date of filing/ Date of publication/Date of grant)	Inventor Date of Publication
CFTRI	IN 195819 - 21/04/2006	Nasirullah et al

Title: A process for the preparation of a kit for rancidity evaluation of deep fried snacks.

Field of invention: The present invention relates to a method for rancidity evaluation of deep fried snacks. A rancidity shelf life evaluation kit is invented which is capable of assessing the oxidative status and shelf life of deep fat fried products such as khara sev, khara boondi, potato chips and salted ground nuts on the shelf in the market place away from the laboratory.

Background of invention: Realizing the severity of the problem some of the industries have started packing their products under nitrogen atmosphere which invariably escalates the cost of the product and forces the consumer to go for cheaper, unbranded, items which do not display history of the product. Methods are available based on primary and secondary oxidation products for detection of oxidation in oils and fats. We also have well laid out procedure for assessment of oxidative stability and self-life of oils/fats as such. But there is no clearcut protocol developed so far to evaluate shelf life of deep fried snacks/products away from the laboratory, within minutes.

Summary of the invention : The present invention provides a process for the preparation of a kit for rancidity evaluation of deep fried snacks comprises of solution A containing ethyl alcohol and methyl alcohol, solution B containing de-ionized water and solid crystals D of potassium halide, where solution A,B and liquid C are provided in 10 ml ampules separately while solid D (20-lOOmg) is provided in a pouch for one time use, which can be utilized for preparing the reagent by way of mixing solutions A and B and subsequently adding crystal D in a glass beaker E (50ml capacity) generating a straw colour solution, liquid C is taken in a second glass beaker (50ml capacity) as it is, when a small portion (l-5gm) of fried product like khara sev, khara boondi, potato chips, fired salted groundnut, noodles or any other starch based low moisture fried product is dipped in the reagent beaker E for one minute, taken out, air dried for one minute on a watch glass G and dipped in liquid C in second beaker F, development of blue colour instantaneously on the surface of the product indicates the product is rancid and shelf life is between two and eight weeks, which is directly related to the deterioration of fat in the product.

Advantages: . A kit provided to the industry and consumer to evaluate rancidity and the shelf life of fried products and determine whether the snack is good or bad for consumption before it is sold or purchased. Ingredients of the reagent are provided separately in the kit which is for one time use. Reagent can be prepared at the time of use and later discarded. Hence, there is no problem of expiry of reagent. Product can be evaluated fairly accurately away from the laboratory without use of any form of energy The kit along with the shelf life also gives information regarding the oxidative status of the oil present in the product.

Lab	Patent no./Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 194993 Date of filing 15/3/2002	BabyLatha Rangasamy, et al.

Title: A process for the preparation of soy-based dry-mix formulation useful for the preparation of *sambar* like gravy mix

Field of invention: The present invention relates to a process for the preparation of soy-based dry-mix formulation useful for the preparation of *sambar* like gravy mix.

Background of invention: Sambar is a traditional Indian food item based on pulses like red gram splits (tur dal) and vegetable. It has a fairly thick but free flowing consistency, contains a combination of roasted and powdered spices. Sambar is mainly consumed along with staple dish such as cooked rice. Commercial instant mix for sambar is in ready to reconstitute form containing spice mixture with or without processed tur dal. Soy based sambar like gravy mix is ready-to-reconstitute convenience product in the form of dry powder similar to commercial product.

Summary of the invention: In the present invention, defatted soy flour, which is not common ingredient in Indian foods, has been used as a major component of the gravy mix. In the present gravy mix defatted soy flour replaces the more expensive red gram splits (tur dal) and hence offers a better nutritive value in terms of higher protein content. The gravy mix is made into ready-to-eat soup/gravy/sambar by adding required quantity of boiling water and pre cooked vegetables and continue boiling for 5 min. The gravy mix has a shelf life of 4 months and can be stored under ambient condition.

Advantages: Red gram splits (tur dal) a major ingredient is totally replaced with defatted soy flour. High level (45-48%) defatted soy flour rich in protein content (46-52%) is used in the formulation, which in turn will result in higher levels of protein (24-27%) in the instant mix. The mix is made ready to eat by boiling with water. Hence the mix can be used in hostels, and canteens, requiring less energy and short time for preparation. Mix prepared by this process is less expensive compared to commercially available instant sambar mix. The method of preparation consists of simple processing steps requiring common equipment.

Lab	Patent no./Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 225145 Date of filing 27/3/2002	Krishnoji Rao Muktha Bai

Title: A novel synergistic rodent repellent liquid formulation

Field of invention The present invention relates to a novel synergistic rodent repellent liquid formulation, more particularly based on plant materials and non-lethal chemical compounds. The main utility of the formulation is to protect the food materials stored in gunny or jute sacs when treated/sprayed to prevent or reduce the rodent (rate & mice) attack.

Background of invention: Rodents frequently damage various types of packaged materials, sacked grains and stored materials when they seek food, shelter and nesting. To help conserve food, reduce cost and maintain or raise sanitation standards proper protective measures must be available. However, methods now available and widely used include the use of poisons and traps. Although use of repellents would be more appropriate in most of the situations for preventing damage to stored materials, packed foods, storage structures, newly shown seeds etc., due to non – availability of repellents which are effective, economical and safe other methods of controlling these rodent pests are followed. So far, the work carried on rodent repellency is based on the use of chemical compounds to a large extent. The information also indicates that though compounds viz. cycloheximide and tributylin acetate are most effective in repelling rodents, could not be used in the field due to their toxicity and high cost.

Summary of the invention: The present invention relates to a novel synergistic rodent repellent liquid formulation.The formulation is based on plant materials and non-lethal chemical compounds. The main utility of the formulation is to protect the food materials stored in gunny or jute sacs when treated/sprayed to prevent or reduce the rodent (rats & mice) attack. A novel synergistic rodent repellent liquid formulation comprises: Pongamia oil ranging from 20-50 weight %, Citronella oil 1-3 weight %, Methyl anthranilate 12-14 weight %. Turpentine or deodourised kerosene 38-65 weight %.

Advantages: Use of Pongamia oil as a rodent repellent has been reported / explored for the first time. The property of formulation to repel rats a major rodent pest of our country.

Lab	Patent no./Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 199736 Date of filing 26/3/2002	Dittakavi Narasimha Rao, et al.

Title: A process for preparation of microbiologically safe marinated chicken pickle with enhanced shelf life

Field of invention: The present invention relates to a process for preparation of microbiologically safe marinated chicken pickle with enhanced shelf life.

Background of invention: Pickling is traditionally followed since times immemorial for preserving the meats. Pickles are generally used as adjuncts along with bland foods such as rice, bread, roti, chapathi (Indian stable food) etc. Pickled products are common in Indian dietary and are very much relished by Indian population and by ethnic groups abroad. Microorganisms are mainly responsible for the spoilage and extend the shelf life meat. Preservation of chicken meat by pickling technique us ideally suited for semitropical and tropical countries since refrigeration facilities are inadequate in these countries. Though few investigations have been on pickling of chicken, application of new hurdles to inhibit the microbial growth would further improve the quality of the product. There is limited information on the shelf-stable chicken pickle. The objective is to develop a process for enhancing the shelf life of chicken pickle. Chicken pickles will have good potential both in domestic and export markets.

Summary of the invention:A process is provided consisting of the treatment of de-boned chicken meat with common salt, vinegar, spices and oil leads to enhancing shelf life of chicken pickle. The invention treatment consists of calculated quantities of salt, vinegar, sugar, spices and oil. The process includes marinating, frying, conditioning and storage under defined conditions.

Advantages: Process resulted in enhancing the shelf life of chicken pickle and the product is storable at ambient temperature for longer duration. The treatment resulted in pH 322(4.1 –4.4) required for the stability of the chicken pickle at ambient temperature. Coliforms, S. Aureus and Salmonella are absent and hence the product is microbiologically safe. Treatment of chicken pickle with common salt, vinegar, spices, sugar and oil is easily feasible under commercial conditions in the existing processing plants. Ingredients used are safe and natural.

Lab	Patent no. /Application No. (Date of Filing/ Date of Publication/Date of Grant)	Inventor
CFTRI	IN 194986 Date of filing 15/3/2002	Chetana Ramakrishna, et al.

Title: A process for preparation of low-fat butter jam substitute and a product thereof

Field of invention The present invention relates to process for preparation of low-fat butter jam substitute and a product thereof.

Background of invention: Since long butter is considered to be the best fat spread used with many food products. Normally butter along with fruit jam are applied on bread, sandwiches as spreads. However, due to dietetic considerations and due to poor spreadability at low temperatures, butter substitutes, especially of low fat type spreads came into market. However, the spreads which simulated both butter and fruit jam(sweetness) characteristics are not available in the market nor reported in the literature.

Summary of the invention The present invention related to a process for preparation of spreadable low fat sweet spread, which simulated butter and jam like characteristics with low calories and suits for application with bread, sandwiches, biscuit as well as with traditional snack food. Hence, the product of the present invention is advantageous of simulating both butter and jam like characteristics with low fat and hence could be consumed even by health conscious consumers. The product being smooth, butter like, low in fat can be used as spread on bread, sandwiches, snack foods, etc and has good spreadability even at low temperatures unlike butter.

Advantages: The spread with 20-30% fat consists of sugars as well, to impart sweetness and hence could simulate butter and jam characteristics normally applied on bread and hence advantageous. Being low in fat, the product provides less calories and could be consumed by health conscious consumers as well. The spread suits as a spread on bread or other bakery products as well as other snack foods. It can replace both butter and fruit jam to spread on bread as it has both sweetness and fat. The product is low in water, smooth consistency with no phase separation and hence has long shelf-life. The product has better spreadability at low temperatures unlike butter hence could be used even at low temperatures as a spread.

Lab	Patent No. /Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 212549-04/12/2007 US 6866880-15/03/2005	Suvendu Bhattacharya et al

Title: A process for the preparation of high protein rich cereal grits.

Field of invention: The present invention relates to a process for the preparation of protein rich cereal grit. The present invention particularly relates to a process for the preparation of high protein rich cereal grits having the following composition cereal 70-80%, Maltodextrin 7-10%, soyabean flour 10-20% and protein content 10-20%.

Background of invention: Traditional food products are preferred by most of the people because of product famililarity, known taste, attractive texture, and in several cases it is just a traditional item.However, traditional foods can be used as a 'carrier of nutritional ingredients' provided they do not alter or affect the popular acceptance of such products. In Oriental countries, the semolina of wheat is used in preparing a sweet product like halwa (sweet dish) or kesari bhath or sweet soji (savory dishes) and a salty product like upmav (breakfast savory dish), whereas rice flour is used for making gruel or porridge-like products.

Summary of the invention : A process for the preparation of high protein rich cereal grits having the following composition cereal 70-80%, Maltodextrin 7-10%, soyabean flour 10-20% and protein content 10-20% and process comprising the steps of roasting cereal grits in a conventional roaster at a temperature in the range of 70 to 180°C for a period of 10 to 80 minutes, preparing an aqueous solution containing maltodextrin under constant stirring at a temperature of 60-70°C, coating the roasted cereal grit with a solution sprinkling the protein rich flour and drying the mix at a temperature of 55 to 65°C for a period of 60-70 min to obtain protein rich cereal grits.

Advantages: The cereal grit, though they are too small in size, can be coated with still smaller particles such as defatted soy flour using an appropriate technology. Use of commonly available materials and processing equipment. Cost-effective easy-to-adopt processing system for the development of high protein foods. Less time of processing or cooking at the consumers' end. Suitable as a convenience and/or supplementary food for nutritional intervention programme, and for making several foods such as health food, as a breakfast (Ex.upmav, puliogare), as sweets like kesari bath, halwa, keer, rava laddu), as porridge and as speciality foods for patients, sports persons, etc. Quick reconstitution of the developed product prior to further use or consumption. Long shelf-life.

Lab	Patent no./Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 222111 Date of filing 26/3/2002	**Padmanabhan Sharda Rajini, et al.**

Title: A process for the preparation of an agro-based stored grain protectant.

Field of invention: The present invention relates to a process for the preparation of an agro-based stored grain protectant, which relates to the use of a vegetable waste by-product, potato peel. The process involves optimizatioin of different parameters in the preparation of an effective protectant against stored grains.

Background of invention: Many plants manufacture chemicals that protect them against insect attack and the extract from these plants affect the response in insect species other than those attacking the plant from which the chemical was derived. Use of plants and or their extracts for pest infestation control in stored grains therefore seems to offer desirable solutions. Potato peel is rich in polyphenols and in potato tuber, the peel offers resistance against insect attack. The present invention provides a safe, economical alternative for the storage of grains relatively free of insect pests without the use of synthetic chemical insecticides. The process employs a plant-based, agro-waste, which is absolutely risk-free, non-residual and non-toxic on consumption.

Summary of the invention: The present invention provides a process for the preparation of an agro-based stored grain protectant, which comprises: a) washing the potato peel may be effected with water, b) drying the washed peel may be effected in a conventional oven at a temperature ranging between 60 and 70°C for a period in the range of 5 to 6 hours, c) pulverizing the above said dried peel may be effected by a mechanical device to obtain a powder of mesh size ranging between 50 and 100 microns, d) extracting the pulverized peel powder may be effected with distilled water in the range of 1 to 15% (w/v) for a period ranging from 5 to 10 min to obtain peel extract, e) filtering the above said peel extract may be effected by using Whatman No.1 filter paper to obtain a filtrate, f) lyophilizing the above said filtrate may be effected under vacuum for a period in the range of 4 to 6 hours and g) dissolving the lyophilized powder may be effected in 30-60% ethyl alcohol solvent at a ratio ranging from 0.1:10 to 1.5:10 to obtain the desired product.

Advantages: The process employs a simple, inexpensive, ecofriendly, non-toxic, edible vegetable product for the protection of stored grains from insect infestation. It provides a safe alternative to toxic synthetic chemical insecticide. The preparation reduces oviposition and multiplication in both the species of insect pests tested.

Lab	Patent No. /Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 222209 -28/07/2008	Ramakrishnan et al

Title: A process for the preparation of garcinia extract powder from *G. pedunculata.*

Field of invention: The present invention relates to a process for the preparation of Garcinia extract powder from *G.pedunculata.* The present invention provides a process for the preparation of Garcinia extract powder from *G.pedunculata*, comprising extracting the pieces of *G.pedunculata* with water by autoclaving for a period of 20 to 50 minutes at a pressure ranging between 5 to 20 psi.

Background of invention: As dietary supplement, HCA is an effective addition to any weight management program. Allison et al.(Nutr.Res,1988,8,209-212) has reviewed the use of HCA as one of the alternative treatments for weight loss. The derivatives of HCA have been incorporated into many pharmaceutical preparations in combination with other ingredients for the purpose of enhancing weight loss, cardioprotection, correcting the conditions of lipid abnormalities and endurance(Jena et al., 2002 ,J. Agric. Food Chemistry, 50,10-22).

Summary of the invention : The present invention provides a process for the preparation of Garcinia extract powder from G.pedunculata, comprising extracting the pieces of G.pedunculata with water by autoclaving for a period of 20 to 50 minutes at a pressure ranging between 5 to 20 psi.

Advantages: The Garcinia extract powder obtained here is from a newer source, that is, newer species of Garcinia pedunculata.This Garcinia extract powder is in its native form with out being any of its derivatives like Sodium, potassium and calcium salts. Hence it will have better bioavailability.The powder obtained in this process is free from any filler matenals The Garcinia extract powder obtained from the present process is highly soluble in water.The Garcinia extract powder has higher HCA content (64%) compared to the existing product.

Lab	Patent No. /Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 199475-24/11/2006	Babasaheb B. Borse et al

Title: A process for preparation of stabilized rose flavoured beverage.

Field of invention: This invention relates to a process for preparation of stabilized rose flavoured beverage. The process in particular, describes the method of stabilization of water immiscible rose flavour using approved food grade flavour carrier and its application in dry beverage mix.

Background of invention: The usage of rose flavour in foods and fragrances is well known. The rose flavour is available mostly in liquid form and is susceptible to spoilage during storage. The liquid flavour also poses problem of miscibility and dispersibility in aqueous products. These problems limit the use of liquid flavours on account of convenience, handling, transportation and shelf life. Reference can be made to a U.S. Patent No. 4285983 (1981) by Saldarini, et al. wherein 'Fixing of volatile flavouring agent in starch hydrolysate' is described. This invention relates to a process for fixing or entrapping a fixable agent, such as acetaldehyde, in a carrier matrix, such as starch hydrolysates having a dextrose equivalent of not more than about 28, to impart a stable free flowing particulate configuration to the carrier-fixed agent. This invention differs from the present invention with respect to heat application and spraying the flavour on a bed of carrier. The drawback here is the process control with respect to final product size (particles/ microcapsules) since the flavour is spread on a carrier bed.

Summary of the invention : A process for preparation of stabilized rose flavored beverage which comprises, a) soaking 10-40% carrier wall material such as herein described, in water b) adding atleast 2.5 times volume by volume of water and filtering to remove the insoluble by known method, c) adding liquid rose flavor at a concentration ranging from 0.10-1.00% and emulsifier such as Tweens at a range of 0.01-0.50% to the above said solution, d) homogenizing of the above said material solution by using mechanical ho,ogeniser at a speed ranging between 15000-19000 rpm for a period of 8-15 min, e) spray drying the above said homogenized emulsion at an air inlet temperature ranging from 115-185°C, at an outlet temperature ranging from 95-125°C and at a feed rate ranging from 60 - 100 ml/min to obtain the stabilized rose flavor and f) adding 100-120g of powdered sucrose 0.1-1.5g of Organic acid such as herein described, 0.02-0.06g of colur, l-2g of anticaking agent such as herein described , to 0.5-5.0g of above said rose flavour to obtained the desired rose flavored beverage.

Advantages: The stabilization of a synthetic liquid rose flavour in a very convenient form having better dispersibility and extended shelf life and also its application in the preparation of beverage dry mixes.

Lab	Patent no./Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	411/DEL/2003 Date of filing 26/3/2003	Murthy; Kestur Venkatesh, et al.

Title: Continuous bio-plate casting machine

Field of invention The present invention relates to a continuous bio-plate casting machine for the preparation of articles from plant parts. The present invention particularly relates to a continuous bio-plate casting machine for the preparation of articles such as cups, saucers, plates etc. from plant parts such as leaves/sheaths. The articles thus prepared are useful for various purposes, particularly for serving food or holding food articles. The invention relates to a device useful for making the articles employing the process mentioned above.

Background of invention: Traditionally plant residues such as leaves, areca palm sheaths have been used in India forming into different shapes such as plates, cups, saucers, etc. for serving of foods. Normally these are formed by stitching the leaves /sheaths into desired shapes by stapling several leaves together by using split plant stems made as pins. A simple pedal operated leaf cup machine was developed by CFTRI nearly 30 years back and this machine has become very popular. A continuous bio-plate casting machine useful for making articles for variety of purposes, particularly for serving or holding of food is developed recently at the Institute and this machine has got definitely better advantage than using the pedal operated units. The machine is composed of 2 units viz. sheet blanking machine and die casting machine for the plate making.

Summary of the invention: Provided herein is a continuously operating pressing machine for the manufacture of biodegradable plates made from plant parts. The machine particularly relates to the continuous preparation of articles such as cups as cups, saucers, plates etc. from plant parts such as leaves/sheaths. The articles thus prepared are useful for various purposes, particularly for serving food or holding food particles.

Advantages: It has got the mechanical advantage and improves the efficiency of workers. The leaf cup machine can be made into operation as an industry and continuous production can be achieved. Stream lining of the bio-plate making can be achieved by using these units.

Lab	Patent No. /Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 228714- 10/02/2009	Ayappankave Venkatadri Narayan et al

Title: A process for the preparation of oryzanol flakes from the oryzanol enriched saponifiable fraction of rice bran oil.

Field of invention: The present invention relates to a process for preparation of oryzanol flakes from oryzanol enriched saponifiable fraction of rice bran oil (RBO) which can be obtained by leaching of saponified and dehydrated rice bran oil soapstock.

Background of invention: Now the utility of soapstock is to generate the soap for toiletries and detergent industries. This application does not fetch lucrative price for soapstock. Rice bran oil soapstock contains nutritionally important health promoting component like ory/anol. Hence, there is need to develop a simple cost competent separation processes for the-isolation of oryzanol from rice bran oil soapstock. Attempts in the direction for effective utilization of the byproduct of RBO refining (soapstock) for value addition will definitely improve the economics of RBO refining. Oryzanol is gaining importance in food, pharmaceutical and cosmetics due to its increasing applications. The beneficial and nutritional effects of oryzanol on human health are well discussed (Pikonen et al., 2000, Plant sterols.

Summary of the invention: The present invention provides a process for the preparation of oryzanol Hakes from the oryzanol enriched saponifiable fraction of rice bran oil (RBO) soapstock wherein the oryzanol shows purity and yield as ranging between 60-65% and 70-75% respectively the said process comprising steps of: a) leaching the saponified and dehydrated rice bran oil soapstock to obtain oryzano! enriched unsapomfied fraction, (b) dissolving the unsaponified fraction of step (a) in a mixture of organic solvent selected from mixture of acetone and methanol in a ratio ranging between 1:3 tol:4 at a reflux temperature, (c) cooling the mixture of step (b) gradually to a temperature in the range of 25 to 30C allowed to stand at this temperature for a period of 30 to 120 minutes to precipitate mucilaginous impurities. d) separating the mucilaginous impurities of step (c) to obtain a clarified supernatant, e) crystallizing the supernatant of step (d) at a temperature range of 5 to 10°C over a period of 10 to 16 hours to obtain crystallized oryzanol,f) separating and desoivating the crystalline oryzanol of step (e) to obtain flakes of oryzanol, andg) micronizing the orazonal flakes of step (f) to obtain flavouring powder.

Advantages: Process enables to obtain free flowing highly purified powder of oryzanol in much simpler manner.Process is easy to scale-up and versatile enough to accommodate the changes in processing conditions.Process enables partial fractionation of mucilaginous interfering impurities, which makes size reduction of final product easy. Process enables to obtain an unsaponifiable fraction of rice bran oil soapstock devoid of acid and basic residues.

Lab	Patent No. /Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 224736- 22/10/2008 US 10/540196 - 17/06/2005	Pullabhatla Srinivas et al

Title: A process for the stabilization of 2-acetyl-1-pyrroline.

Field of invention: The present invention relates to a process for stabilization of 2-acetyl-l-pyrroline'. The compound is principle aroma component of basmati and other varieties of scented rice and also of processed cereal and grain products.

Background of invention: Scented rice is one of the varieties of rice1-6 having a characteristic, strong aroma when cooked. Varieties of Basmati in Southeastern Asia, Delia in America, Milagrosa in Philippines, 'Khao Dawk Mali 105' in Thailand, 'Seratus Malam' in Indonesia and Heiri in Japan are the major scented rice varieties. In certain parts of the world where these varieties are cultivated, scented rice is highly desired and sometimes used for special purposes.2-acetyl -1-pyrroline was first identified in rice by Buttery et al 7-8 . in 1982. Its odor is described as that of cooked rice and popcorn-like. A method of its synthesis is described starting from 2-acetylpyrrole9. A method for its quantitative analysis has been developed by Buttery ET al10 and later refined by Tanchotikul et al11. This compound is found in all scented rice varieties in various quantities, which is more than that found in non-scented varieties of rice.

Summary of the invention : The present invention relates to 'A process for stabilization of 2-acetyl-l-pyrroline'. The compound is principle aroma component of basmati and other varieties of scented rice and also of processed cereal and grain products. Synthesising 2-acetyl-l-pyrroline by a known method, incorporating the flavor in a binding material like a gum or starch from a vegetable source in water emulsion using an emulsifier followed by drying the mixture by either vacuum shelf drying at temperatures of 30-60°C or spray drying at inlet air temp. 140°C, outlet temp. 80°C and a feed rate of 80 ml / min and obtaining the flavor in an easily dispersible dry powder form for flavoring rice and related products.

Advantages: It provides an improved process for stabilization of 2-acetyl-l-pyrroline, a principle basmati aroma component.

Lab	Patent No. /Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 225361-11/11/2008 PCT/IN03/00086- 26/03/2003	Ramakrishnan et al

Title: A process for the encapsulation of garcinia extract.

Field of invention: The present invention relates to a process for the encapsulation of Garcinia extract. The present invention particularly relates to a process of obtaining Garcinia extract in powder form by encapsulation using whey protein.

Background of invention: As dietary supplement, (-)-Hydroxycitric acid (HCA) is an effective addition to any weight management program. Allison et al. (Crit.Rev.Food Sci.Nutr.2001, 41,1-28) has reviewed the use of HCA as one of the alternative treatments for weight loss. The derivatives of HCA have been incorporated into many pharmaceutical preparations in combination with other ingredients for the purpose of enhancing weight loss, cardioprotection, correcting the conditions of lipid abnormalities and endurance (Jena et al., 2002, J. Agric. Food Chemistry, 50,10-22). So far, HCA has been found in the fruits of certain species of Garcinia, which includes G. cambogia, G. indica, G.atroviridis and G. cowa (Lewis, Y.S. 1969, Methods in enzymology, 13, 613-623; Jena et al., 2002, J. Agric. Food Chemistry, 50,10-22). The chemistry and biochemistry of HCA has been discussed recently (Jena et. al., 2002, J. Agric. Food Chemistry, 50,10-22). During extensive animal studies, HCA has been proven to effectively curb appetite, suppress food intake, increase the rates of hepatic glycogen synthesis, reduce fatty acid synthesis and lipogenesis and decrease body-weight gain.

Summary of the invention : The present invention relates to a process for the encapsulation of Garcinia extract powder.There is no report on the encapsulation of hyroxycitric acid in its native form. The process steps are: (a) collecting the fruits from the species of Garcinia, (b) cutting the rinds of the fruits manually, (c) extracting with de-ionized water at a volume ratio of 1:4 for a period of 15-35 min at 110-130°C, (d) filtering the extract using filter cloth, (e) mixing of the Garcinia extract with 5-20 % (w/w) whey protein and (f) spray drying the above mixture to obtain the product in powder form.

Advantages: This is a simple process for obtaining the encapsulated Garcinia powder. This encapsulated of Garcinia powder is in its native form without being any of its derivatives like sodium, potassium and calcium salts. Hence, it will have better bioavailability. Recovery of final product is high, because it is less hygroscopic.

Lab	Patent no./Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 232004 Date of filing 27/3/2003	BabyLatha Rangasamy, et al.
Title: A process for the preparation of roasted and oleoresin flavored nut		
Field of invention: The present invention relates to a roasted or fried nut formulation and a method of preparing such formulation. The present invention particularly relates to application of oleoresin on roasted or fried nuts thereby providing uniform coating of the oleoresin on the nuts and retaining the flavor of the nuts.		
Background of invention: Major limitations of flavouring of nuts such as deep fat fried/dry roasted cashew nuts / peanuts with powdered spices are: 1. Presence of thermo resistant bacterial load, which creates safety problems during storage. 2. Non-uniformity of the flavour quality 3. Reduced impact of natural spice flavour and 4) rapid loss of aroma during storage and presence of intense colored spots randomly distributed throughout the surface of the nut. In order to sustain a continuous demand for spiced nuts it is necessary to develop alternate flavorings as well as methods of application. The problems encountered by using spice oleoresins to flavor the processed nuts. By definition, the oleoresin is the total soluble extractives of a material in a specified solvent. In flavor work the best oleoresin is that which is a concentrate of all the flavor components (aroma, taste, pungency, and related sensory factors) and which truly recreates, when diluted, the sensory quality of the original natural material.		
Summary of the invention: The present invention relates to a flavored nut formulation comprising deep fat fried/dry roasted cashew kernels/peanuts/almonds in the range of 90 98%, salt 1.5 3.0%, oleoresin 1.0 3.0% diluted with 8 12 folds of absolute ethyl alcohol and a process of preparing a flavored nut formulation.		
Advantages: Instead of powdered spices, oleoresins are used resulting in uniform coating. Diluted oleoresin when applied to the kernel does not require any binding agent whereas while adding powdered spices binding agent is needed for better adhesion. Since the flavouring is in the liquid form, the problem of separation of flavoring during handling and storage is totally avoided. Spice oleoresin coated as a thin film all over the kernel gives uniform color to the surface. In the case of fried kernels the coating of oleoresin offers protection to the surface oil.		

Lab	Patent No. /Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 226611- 22/12/2008 US 7501141- 10/03/2009	Jarpla Pura Naik et al

Title: A process for the preparation of colorant from oleoresin.

Field of invention: The present invention relates to a process for the preparation of colorant with enhanced color value from chili oleoresin. In particular the process is to extract the colorant from pungency-free chilli oleoresin and paprika oleoresin.

Background of invention: Chillies are the dried ripe red fruits of the genus capsicum. The two well-known species are Capsicum annum L. and Capsicum frutenscens L. India is the largest producer and exporter of chillies. The estimated export of dry chillies from India was 75,000 MT tonnes valued Rs 25580 lakhs in 2001-02. Pungency and colour are the two main quality attributes in chillies. The red colour of chillies is due to the presence of carotenoid pigments like capsanthin, (major pigment, 35 %) capsorubin, zeaxanthin, violaxanthin, cryptoxanthin, (3-carotene etc. These pigments are present in chillies mainly the esterified form, and to a small extent in non-esterified forms.

Summary of the invention : The present invention relates to a process for the preparation of colorant with enhaneed color value from commercially available pungent free chilli oleoresin by extracting the pungent free oleoresin with any one of alcoholic solvent, mixture of alcoholic solyents. mixture of alcohol-ketonic solvent or aqueous ketonic solvent, separating the oleoresin layer and the solvent layer, pooling the solvent layer obtained and separating the final oleoresin layer, and distilling the final oleoresin layer of step (c) to obtain pungen free oleoresin with enhanced color value.

Advantages: The process is amenable for scale-up to larger level of handling as a batch or semi-continuous method.The process can be carried out in an enclosed system, keeping the evaporation losses to the minimum.The desolventisation is carried out at reduced temperatures to minimize the pigment degradation.

Lab	Patent No. /Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 222015-15/07/2008	Pasupuleti Vijayanand et al

Title: A process for the preparation of ripe banana powder.

Field of invention: The present invention relates to a process for the preparation of ripe banana powder. The present invention particularly provides a process for preparation of ripe banana powder with better color, flavor and sensory characteristics.

Background of invention: Banana is an important tropical fruit and is cultivated widely in India. Banana leads the total fruit production. A number of Cultivar varieties are available of which cavendish is the most common variety. The banana fruits are ripened and consumed widely fresh for table purpose. Banana is a rich source of nutrients viz., sugars, carotenes, minerals such as potassium, calcium, vitamin A and C. The fruit is also a good source of dietary fiber which is found to be very important for the digestion and bowl movement. The bananas are also processed into various processed products such as banana puree, banana juice, dried banana, banana powder etc., The process developed in the present invention facilitates the preparation of banana powder by spray drying and drum drying.

Summary of the invention : The present invention relates to a process for the preparation of ripe banana powder. The novelty and inventive steps of the process of the present invention is it provide a process for the preparation of banana powder by spray drying or drum drying. The banana is ripened to a particular stage to obtain the desired color and flavor. The peeled fruits are treated in a solution containing organic acid or calcium salt or a mixture of these. The banana pulp is added with suitable additives at a particular concentration to prevent browning during pulping. The additives used for drying are made in to a slurry, preheated mixed with the banana pulp and homogenizing the mixture.

Advantages: . The process developed in the present invention facilitates preparation of ripe banana powder by spray drying with better color and flavor. The banana powder developed in the present invention is shelf stable and can be used in the preparation of weaning foods, custard powder, ice creams and desserts. The banana powder obtained has the natural color, flavor, pH and free from any off flavor.

Lab	Patent no./Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
CFTRI	IN 238965 Date of filing 28/2/2002	Tumkur Ramachandriah Shamala, et al.

Title: A process for the production of sediment free clarified fruit juices

Field of invention The present invention relates to an improved process for the production of sediment free clarified fruit juices. The main usage of the invention will be in the quick enzymatic processing of fruit pulp from banana, litchi and guava to a completely clarified juice, which is free from any sedimentation after bottling.

Background of invention: Fruit pulp of banana, litchi and guava is processed quickly to a highly clarified juice without haze formation in the product by application of suitable hydrolytic enzymes, controlled and programmed heat treatment schedule for processing. The juice after initial clarification still carries remnants of cell wall material, which is not visible in the clarified juice but coagulates and precipitates due to the heat applied for bottling followed by cooling and results in the formation of the haze. The cell wall, which contains cellulose, hemicellulose, protein and pectin collapses completely on treatment with cellulase because of hydrolysis of cellulose microfibrils which are cross linked to these components, resulting in coagulation and heavy precipitation after heat and cold cycle. Hence cellulase treatment can also be effectively used to aid in the formation of the precipitate, which can be filtered from the juice.

Summary of the Invention: The present invention relates to a process for the clarification of fruit pulp of banana, litchi and guava, without haze formation in the product by application of suitable hydrolytic enzymes, controlled and programmed heat treatment schedule for processing.

Advantages: Shortening of processing procedures used in the hydrolysis of fruit pulp, which is important for the viability of the process. Shortening of the process by 5-10 h also leads to elimination of contamination which otherwise may occur during lengthy hydrolysis method. In the present method the crude juice is heat processed, cooled to room temperature for completion of sedimentation and filtered immediately to obtain clarified juice in a shorter period. The bottled juice is free from sediment.

Lab	Patent No. /Application No. (Date of Filing/ Date of Grant)	Inventor
CGCRI	IN 231616 - 06/03/2009 USA 7014771 - 21/03/2006 USB 7309425 -18/12/2007	Bandyopadhyay, et al.

Title: Process for preparing water having an arsenic level of less than 10 PPB.

Field of Invention: The present invention relates to a process for the preparation of arsenic free water and an apparatus therefor. The present invention also relates to a porous ceramic useful for pressure filtration in order to produce arsenic free water. The present invention particularly relates to a process for preparing arsenic free (<10 ppb) water from arsenic contaminated ground water and an equipment therefor.

Background of invention: Ground water drawn from intermediate aquifers of various parts of West Bengal and Bangladesh was found to contain arsenic above the permissible limit of 0.05 ppm. The WHO recommended limit being 0.01 ppm. Thus the water from tube wells and hand pumps is unsuitable for drinking purpose. Arsenic contamination of ground water therefore assumed a serious public health issue as ground water serves more than 80% of the drinking water needs primarily in the rural sector.

Summary of the invention : The present invention provides a process for preparing arsenic free (<10 ppb) water from arsenic contaminated water, which comprises mixing arsenic contaminated water with a homogeneous suspension in aqueous medium essentially containing fine particles of size below 20 .mu.m of arsenic adsorbing media, circulating the resultant mixture under pressure in the range of 0.1 to 3 Kg/cm.sup.2 through one or more porous ceramic pressure filtration tubes of pore size in the range 1 to 10 .mu.m having a precoating of thickness of at least 10 .mu.m of the said arsenic adsorbing media.

Advantages: Cheaper raw materials Easy fabrication process requiring minimum investment Feasibility of scaling-up upto 1000 1200 mm long tube of different porosity Lower cost of production.

Lab	Patent No. /Application No. (Date of Filing/Date of Grant)	Inventor
CGCRI	IN 01839DELNP2003 - 06/11/2003 USA 6889528 -10/05/2005 USB 6851281 -08/02/2005	Sen, et al.

Title: Process of making rare earth doped optical fiber.

Field of Invention: The present invention relates to a process of making rare earth doped optical fiber.

Background of Invention: High silica based optical fibres are firmly established as the most efficient interconnection media for optical telecommunication networks. The fibres are used as the passive transmission media to guide optical signals over long distances. In contrast, rare-earth (RE) ions if doped into the core of such fibres, make them optically active due to the characteristic emission of the RE when pumped at suitable wavelengths. Because of this property RE doped fibres have shown great potential for use as active devices for photonic applications like optical amplifiers and fibre lasers at various wavelengths. The fibres are also found to be promising candidates for their application as sensors for monitoring temperature, radiation dose etc. Solution-doping technique for fabrication of rare-earth-doped optical fibre wherein the Modified Chemical Vapour Deposition (MCVD) process is used to fabricate the preform with a step index profile and desired core-clad structure while solution doping is adopted for incorporation of the active ion. Fabrication of rare-earth-doped optical fibre wherein the substrate tube with the porous core layer is soaked in an aqueous or alcoholic solution containing a nitrate or chloride of the desired RE ion. The fabrication, assessment and optical properties of high-concentration Nd^{3+} and Er^{3+} doped silica based fibres wherein optical fibres based on $Al_2O_3—P_2O_5.—SiO_2$ host glass doped with high concentrations of Nd^{3+} and Er^{3+} have been fabricated by solution method and quantified. Erbium doped fiber amplifier wherein the fibre for the optical amplifier comprises a single mode fibre doped with erbium in the core having a distribution profile of the RE ion. Solution doping of a silica with erbium, aluminium and phosphorus to form an optical fiber.

Summary of the Invention: The novelty of the present invention lies in eliminating the step of the formation of porous soot layer at high temperature (1000.degree. C. or above) by CVD process inside a fused silica glass tube for formation of the core. Instead a thin silica gel coating containing other dopants in desired proportions is applied through a silica sol at ambient temperature. The above method ensures a better control of the characteristics of the coated layer and uniformity along the length of the tube. The inventive step further includes elimination of the step of the incorporation of the rare-earth ions into the porous soot layer following the solution-doping technique.

Advantages: This method ensures a better control of the characteristics of the coated layer and uniformity along the length of the tube. No need of the incorporation of the rare-earth ions into the porous soot layer following the solution-doping technique. It prevents change in composition including variation of RE concentration in the core and also reduces the possibility of formation of RE dip at the core centre. The RE incorporation efficiency is much higher than the conventional processes.

Lab	Patent No. /Application No. (Date of Filing/ Date of Grant)	Inventor
CGCRI	IN 236314 - 21/10/2009 US 7291572 - 06/11/2007	Debnath R, et al.

Title: Synergistic composition for preparing high concentration fullerene (c60) glass and a method for preparing the glass in bulk monolith.

Field of invention: The present invention relates to a synergistic composition for preparing high concentration fullerene (C.sub.60)-glass and a method for preparing glass doped with fullerene (C.sub.60) in bulk monolith using the synergistic composition. The glass thus obtained is useful as a nonlinear photonic material and more particularly as a nonlinear optical medium and optical limiter.

Background of invention: There are number of reports of carrying out experiment for encasing fullerene C.sub.60 and C.sub.70 in glassy hosts with limited success. In most of these cases, fullerene was tried to incorporate in silica host by sol-gel methods, e.g. methods described by B. R. Mattes, W. Duncan, J. M. Robinson, A. C. Koskelo and S. P. Love in U.S. Pat. No. 5,420,081 dated May 30, 1995 and by Sheng Dai, R. N. Compton, J. K. Young and G. Mamantov in J. of Am Cer. Soc. 75 (1992) 2865. In all these cases, preparation of thin films/plates of dimensions not larger than 13-15 mm.times.0.5 mm having clusters of C.sub.60 or C.sub.70 fullerene dispersed in the host, were reported. In some cases, certain derivatives of fullerene were used to prepare silica-C.sub.60 fullerene composite by sol gel method (R. Signorini et at SPIE vol. 2854, page 130). In all these above mentioned composites, a major drawback is represented by the fact that fullerene is not totally protected from the environmental degradation by the water associated with the hosts.

Summary of the invention: The present invention provides a synergistic composition for preparing high concentration fullerene (C.sub.60)-glass useful as a nonlinear photonic material in general and particularly in device applications as nonlinear optical medium and optical limiter, which comprises: 30-50 mole % of boron oxide (B.sub.2O.sub.3), 10-45 mole % of bismuth oxide (Bi.sub.2O.sub.3), 0 -5 mole % of silicon dioxide (SiO.sub.2), 0-1 mole % of aluminium oxide (Al.sub.2O.sub.3), 0-30 mole % of zinc oxide (ZnO), 0-45 mole % of lead oxide (PbO) and 0.02-0.20 (wt) % of fullerene C.sub.60.

Advantages: 1. The prescribed composition is suitable for dissolving high concentration of fullerene (C.sub.60) in the glass through interactions between glass and fullerene. 2. It is superior to our previously disclosed compositions of Indian patent No. 622/DEL/2001 in respect of efficiency in dissolving fullerene (C.sub.60) in high concentration through interaction with the latter. 3. The present method for preparing fullerene (C.sub.60) glass can be used to prepare bulk monolith in dimensions useful in actual device applications. 4. The method is superior to sol-gel process both in respect of homogeneous dispersion and protection of fullerene (C.sub.60) from environmental degradation. 5. The method is simple and cost effective for commercial exploitation.

Lab	Patent No. /Application No. (Date of Filing/ Date of Grant)	Inventor
CGCRI	IN 225750- 27/11/2008 US 7368405 - 06/05/2008	Chakrabarti; et al.

Title: Process of making silicon--silicon carbide ceramic using biopreform, silicon--silicon carbide ceramic obtained thereby.

Field of Invention: The present invention relates to a process of making silicon-silicon carbide ceramic using biopreform derived from monocotyledonous caudex plant stem. The present invention also provides a silicon-silicon carbide ceramic made using a biopreform derived from monocotyledonous caudex plant stem.

Background of Invention: The duplex silicon (Si)-silicon carbide (SiC) ceramic, hereinafter designated as Si-SiC, shows excellent physico-chemical properties like high oxidation, corrosion and thermal shock resistance, superb high temperature strength and toughness together with other related properties, e.g., Young's modulus, hardness, etc., and therefore, is of great technological importance. These properties can be exploited during the applications of the material in the fields of kiln furniture particularly for heating sanitary wares, saggers, and crucibles for calcining fluorescent powder in fluorescent lamp industries, high speed and high service life domestic and industrial burners, rocket nozzles, recuperators for waste heat utilization in industrial furnaces, heat-exchangers for indirectly fired open/combined cycle gas turbines to generate electric power, ceramic seals for pumps handling corrosive fluids, wear inserts, etc.

Summary of the Invention: The present invention provides an improved process for preparation of bulk Si--SiC ceramic composite following rapid infiltration of liquid silicon into biopreforms derived from stems of monocotyledonous caudex plant, such as coconut (Cocos nucifera), palmyra palm (Borassus flabellifer), date palm (Phoenics dactylifera). The novelty of the present invention is that such duplex Si--SiC ceramic composite is made with maintenance of cellular features of the said biopreforms, and, hence of precursor plant, and therefore, is a completely new ceramic composite material with unique macro- and microstructural characteristics nearly isomorphous to the precursor plants.

Advantages: The main advantages of the present invention are: a) cheap and easily available raw materials of local/native origin and of renewable and non-polluting sources b) relative easiness in fabrication technique because of complete avoidance of complex powder processing and difficult shape making c) increased shape capability because of usage of readily machinable biopreforms d) near-net-shape formation capability e) simple and faster fabrication technique coupled with easy and instantaneous means of unloading, without requirement of costly instrumentation and expensive equipment g) less-expensive eco-friendly process.

Lab	Patent No. /Application No. (Date of Filing/Date of Grant)	Inventor
CGCRI	IN 228675 - 06/02/2009 USB 11/347602 - 03/02/2006	Chakrabarti op et al.

Title: Process for making biopreform from monocotyledonous caudex plant stem, biopreform obtained thereby and use thereof.

Field of Invention: The present invention relates to a process of making biopreform from monocotyledonous caudex plant stem. More particularly, the present invention relates to a process for making a biopreform from monocotyledonous caudex plant stem that is suitable for liquid infiltration and gaseous transportation processing of materials. The present invention also relates to a ceramic composite material prepared using the biopreform of the invention.

Background of Invention: Synthesis of materials from naturally grown plant structures has recently received interests. Plants often possess natural composite structures and exhibit high anisotropic mechanical strength, low density, high stiffness, elasticity and damage tolerance. These advantages are because of their hierarchically built anatomy developed and optimized in a long-term genetic evolution process. There is a possibility of producing novel materials using preforms derived from naturally grown plant structures. The bio-structure derived preforms would have tremendous potential for synthesis of numerous materials with tailorable properties with a unique microstructure pseudomorphous to that of parent plants.

Summary of the Invention: The present invention provides a process of making a biopreform from monocotyledonous caudex plant stem that preserves the microstructural, structural and anatomical features of the plant precursor, which comprises preheating a piece of stem of a monocotyledonous caudex plant at a temperature in the range of 50 to 90°C, maintaining the preheated stem piece at the peak temperature, followed by heating the preheated stem piece in a closed container provided with a vent at a temperature in the range of 350 to 1000°C, maintaining the stem piece at the peak temperature under self-generated ambient atmosphere, followed by furnace cooling to obtain the biopreform.

Advantages: (i) cheap and easily available raw materials of local origin and of renewable and non- polluting sources for making biopreform (ii) increased shape capability because of usage of readily machinable biopreform (iii) low temperature and ambient atmosphere pyrolytic transformation facility (iv) the biopreform enables further synthesis of numerous important materials including ceramic composites, with unique macro-and microstructure nearly isomorphous to the cellular structure of the parent plants, such as, (a) carbon-carbon composites, (b) carbon-epoxy composite, (c) silica-silicon carbide composite, (d) silicon nitride-silicon carbide composite, (e) silicon-silicon carbide composite, (f) transitional metal (such as Mo, Zr, Ti, Ta, Fe) silicides-silicon carbide composites, (g) alumina-aluminium nitride composite, (h) copper-silicon carbide composite, (i) aluminium-silicon carbide composite, (j) metal matrix composite such as carbon- magnesium and carbon-aluminium (j) porous cellular silicon carbide material.

Lab	Patent No. /Application No. (Date of Filing/Date of Grant)	Inventor
CGCRI	IN 222256 – 04/08/2008 US 7314593 - 01/01/2008	Bandyopadhyay, et al.
Title: Process for preparing improved silicon carbide powder.		
Field of Invention: The present invention relates to a process for the preparation of improved silicon carbide powder.		
Background of Invention: Silicon carbide powder finds wide usage in the manufacture of products suitable for refractory and engineering applications. Silicon carbide powder is useful for the preparation of products suitable for refractory and engineering applications. It is known in the art to prepare silicon carbide powder by firing an intimately mixed green mixture of fine silica (SiO.sub.2) with carbon (C) under flowing argon gas atmosphere by following the equation as follows: SiO.sub.2+3C=SiC+2CO (1)		
Summary of the Invention: The present invention provides to a process for the preparation of improved silicon carbide powder by carbothermal reduction of silica by inventive steps of introducing .beta.-SiC powder simultaneously with iron in the starting composition resulting into a precursor powder which after complete reduction contains at least 90% SiC preferably rich in the .beta.-phase. The main advantage, among others, is cost effectiveness. Silicon carbide powder finds wide usage in the manufacture of products suitable for refractory and engineering applications. Thus, any improvement in the economy of the process is important and desirable.		
Advantages: 1. The complete reduction is possible under lower reaction temperature thereby making the process cost effective. 2. The process allows the use of starting silica which may be prepared only by grinding of naturally occurring and abundantly available silica in a mill rather than fine silica produced from a sol-gel technique thereby making the process still economic. 3. The process allows the use of starting carbon with surface area only in the range of around 35 m.sup.2/g in comparison to that in the range of 150-650 m.sup.2/g used in majority of the prior arts thereby making the process further economic. 4. The process allows the use of lower amount of iron which is beneficial so far as the quality of the produced powder is concerned. 5. The obtained precursor powder is sinterable with appropriate additives to produce dense material suitable for use in refractory and other applications.		

Lab	Patent No. /Application No. (Date of Filing/Date of Grant)	Inventor
CGCRI	IN 234885-18/06/2009 US 7109138-19/09/2006	Bandyopadhyay, et al.
Title: Composition for preparation of silicon carbide powder.		
Field of Invention: The present invention relates to a synergistic composition useful for the preparation of improved silicon carbide powder.		
Background of Invention: Silicon carbide powder finds wide usage in the manufacture of products suitable for refractory and engineering applications. Silicon carbide powder is useful for the preparation of products suitable for refractory and engineering applications. It is known in the art to prepare silicon carbide powder by firing an intimately mixed green mixture of fine silica (SiO.sub.2) with carbon (C) under flowing argon gas atmosphere by following the equation as follows: SiO.sub.2+3C=SiC+2CO (1)		
Summary of the Invention: The present invention provides a synergistic composition useful for the preparation of improved silicon carbide powder, wherein the composition consists of a synergistic mixture of a source of pure silica such as silicon dioxide, a source of carbon such as activated charcoal, .beta.-silicon carbide and a source of iron such as ferric nitrate. Accordingly, the present invention provides a synergistic composition useful for the preparation of improved silicon carbide powder, which comprises: source of pure silica: 41 to 53 weight %; source of carbon: 26 to 35 weight %; .beta.-silicon carbide (.beta.-SiC): 3.5 to 14 weight %; source of iron: 12 to 26 weight %.		
Advantages: Provides a synergistic composition, wherein ground naturally occurring and abundantly available silica is used rather than fine silica produced from a sol-gel technique. Provides a synergistic composition, wherein the surface area of carbon used is of the order of only 35 m.sup.2/g in comparison to that in the range of 150 to 650 m.sup.2/g used in majority of the prior art. Provides a cost effective synergistic composition useful for the preparation of improved silicon carbide powder, which obviates the drawbacks of the hitherto known prior art. Provides a synergistic composition useful for the preparation of silicon carbide powder containing at least 90 wt. % of the phase, which obviates the drawbacks of hitherto known prior art.		

Lab	Patent No./Application No. (Date of Filing/ Date of Grant)	Inventor
CGCRI	IN 234988 - 23/06/2009 US 7109139 - 19/09/2006	Bandyopadhyay, et al.

Title: Process for manufacture of dense neodymium stabilised beta-silicon nitride - alpha-sialon composite.

Field of invention: The present invention relates to a process for the manufacture of dense neodymium stabilised .beta.-Si.sub.3N.sub.4-.alpha.-SiAlON composite. Dense .beta.-Si.sub.3N.sub.4-.alpha.-SiAlON composite manufactured by the process of the present invention will find usage in low temperature applications such as wear parts like bearing and roller materials and particularly for grinding and milling operations like grinding balls.

Background of invention: It is known in the art to hot pressing green mixtures of Si.sub.3N.sub.4, AlN, Al.sub.2O.sub.3 and Nd.sub.2O.sub.3, at a temperature in the range of 1550.degree. to 1750.degree. C., and at a pressure of about 20 MPa (Wang et al. in Mater. Res. Soc. Symp. Proc., Vol. 287, 1993, pp. 387 392 titled "Formation and densification of R-.alpha.' SiAlONs (R=Nd,Sm,Gd, Dy,Er,Yb)"). Shen et al. (J. Am. Ceram. Soc., Vol. 79, No. 3, 1996, pp. 721 32 titled "Homogeneity region and thermal stability of neodymium--doped .alpha. SiAlON ceramics") teach hot pressing to fabricate the material as stated above.

Summary of the invention: The present invention provides a process for the manufacture of dense neodymium stabilised .beta.-Si.sub.3N.sub.4-.alpha.-SiAlON composite, which comprises preparing a homogeneous powdered mixture essentially consisting of: 49 to 63 mole % Si.sub.3N.sub.4, 2.5 to 3.5 mole % Al.sub.2O.sub.3, 29 to 43 mole % AlN, 2.1 to 2.9 mole % SiO.sub.2 and 3.1 to 4.9 mole % Nd.sub.2O.sub.3, mixed in proportion to make a total of 100 mole to obtain a mixed powdered batch, passing the powdered batch through 100 mesh followed by drying, pressing the sieved and dried powder to form green compacts, subjecting the green compacts so obtained to sintering to obtain the dense neodymium stabilised .beta.-Si.sub.3N.sub.4-.alpha.-SiAlON composite.

Advantages: The sintered material prepared using this process displays high hardness which makes it ideal for use as engineering components in areas where abrasive wear is dominant. The sintered material prepared using this process possesses other important mechanical property like fracture toughness which is acceptable for the use as engineering components.

Lab	Patent No. /Application No. (Date of Filing/ Date of Grant)	Inventor
CGCRI	IN 233977 -24/04/2009 US 7129191-31/10/2006	Bandyopadhyay, et al.

Title: Composition useful for preparation of dense neodymium stabilised beta-silicon nitride-alpha-siaion composite.

Field of Invention: The present invention relates to a synergistic composition useful for the preparation of dense neodymium stabilised .beta.-Si.sub.3N.sub.4-.alpha.-SiAlON composite. Dense .beta.-Si.sub.3N.sub.4-.alpha.-SiAlON composite finds usage in low temperature applications such as wear parts like bearing and roller materials and particularly for grinding and milling operations like grinding balls.

Background of Invention: It is known in the art to hot pressing green mixtures of Si.sub.3N.sub.4, AlN, Al.sub.2O.sub.3 and Nd.sub.2O.sub.3, at a temperature in the range of 1550.degree. to 1750.degree. C., and at a pressure of about 20 MPa (Wang et al. in Mater. Res. Soc. Symp. Proc., Vol. 287, 1993, pp. 387 392 titled "Formation and densification of R-.alpha.' SiAlONs (R=Nd,Sm,Gd,Dy,Er,Yb)"). Shen et al. (J. Am. Ceram. Soc., Vol. 79, No. 3, 1996, pp. 721 32 titled "Homogeneity region and thermal stability of neodymium-doped .alpha. SiAlON ceramics") teach hot pressing to fabricate the material as stated above.

Summary of the Invention: The present invention provides a synergistic composition useful for the preparation of dense neodymium stabilised .beta.-Si.sub.3N.sub.4-.alpha.-SiAlON composite, wherein the composition consists of a synergistic mixture of Si.sub.3N.sub.4, Al.sub.2O.sub.3, AlN, SiO.sub.2 and Nd.sub.2O.sub.3. Accordingly, the present invention provides a synergistic composition useful for the preparation of dense neodymium stabilised .beta.-Si.sub.3N.sub.4-.alpha.-SiAlON composite, which comprises: Si.sub.3N.sub.4: 49 to 63 mole %, Al.sub.2O.sub.3: 2.5 to 3.5 mole %, AlN: 29 to 43 mole %, SiO.sub.2: 2.1 to 2.9 mole %, and Nd.sub.2O.sub.3: 3.1 to 4.9 mole %.

Advantages: Provides a synergistic composition, useful for the preparation of dense neodymium stabilised .beta.-Si.sub.3N.sub.4-.alpha.-SiAlON composite. Provides a synergistic composition, useful for the preparation of dense neodymium stabilised .beta.-Si.sub.3N.sub.4-.alpha.-SiAlON composite, wherein the composition displays easier densification under normal sintering conditions. Provides a synergistic composition, wherein a cheaper additive oxide such as neodymium oxide in comparison to other oxides such as dysprosium oxide or ytterbium oxide, makes the composition economic. Provides a synergistic composition which does not require hot pressing thereby providing a cost effective method for the preparation of .beta.-Si.sub.3N.sub.4-.alpha.-SiAlON material.

Lab	Patent No. /Application No. (Date of Filing/Date of Grant)	Inventor
CGCRI	IN 05433DELNP2005 - 25/11/2005 US 7645314 - 12/01/2010	Nisha Biswas, et al.

Title: Composition useful for making slow release nitrogen free phosphorous, potassium and sulfur oxide glass and a process of making glass therefrom.

Field of Invention: The present invention relates to a composition useful for making slow release nitrogen free phosphorous, potassium and sulfur oxide glass and a process of making glass therefrom.

Background of Invention: It is known that fertilizer elements, i.e., the elements that provide the nutrients required for the growth of crops, are divided into three categories; major elements, i.e.; nitrogen (N), Phosphorous (P) and Potassium (K); Secondary elements, i.e.; calcium (Ca), magnesium (Mg) and sulfur (S); and micronutrient elements, i.e., boron (B), cobalt (Co), copper (Cu), iron (Fe), manganese (Mn), molybdenum (Mo) and Zinc (Zn). With continuous application of sulfur free inorganic fertilizer and use of high yield variety seeds significant sulfur deficiency in soil is observed. Sulfur is recently accepted as the fourth major nutrient element that is essential for plant growth. This division is based on the amount of element absorbed by the crops, not on their function, since all these elements are equally indispensable for the balanced growth of plants.

Summary of the Invention: Di-ammonium phosphate, murate of potash and gypsum are the conventional phosphorous, potassium and sulfur fertilizers respectively. Application of gypsum to soil can cause an increase calcium load on soil and polluted surface and underground water. The most successful technique is application of phosphorous-potassium-sulfur glass which can be added directly to the soil. Main feature of the present invention is formulation and making of a composition of high phosphorous, potassium and sulfur containing glass free from alkali like Na.sub.2O, Li.sub.2O and ZnO, which are toxic to the plants. Such glasses are capable of slow release of phosphorous, potassium and sulfur required in the area of agriculture, fungicide, pesticide and weedicides etc. The present invention also emphasize optimization of nutrient content, reduction of calcium load on the soil, minimization of surface and under-ground water pollution and maintenance of acidic environment near the plant roots in the soil.

Advantages: It provides a provision for obtaining controlled release of nutrients. Thus preventing wastage of nutrients in wet conditions or damage to plants due to excessive nutrient concentrations.

Lab	Patent No. /Application no. (Date of Filing/Date of Grant)	Inventor
CGCRI	IN 1759DEL2007- 20/08/2007 US 12/175812-18/07/2008	Chakraborty, et al.

Title: Process for the preparation of protein mediated calcium hydroxyapatite (hap) coating on metal substrate.

Field of Invention: The present invention relates to a process for the preparation of protein mediated calcium hydroxyapatite (HAp) coating on metal substrate.

Background of Invention: Calcium hydroxyapatite [HAp, Ca.sub.10(PO.sub.4).sub.6(OH).sub.2], the main inorganic component of the hard tissues in bone and teeth, is a member of the apatite family. Biological apatite comprises the mineral phase of calcified tissues (enamel, dentin and bone) and is observed to be carbonate substituted, calcium deficient. Insertion of a biomaterial in a living tissue creates an artificial interface between the living tissue and the biomaterial that may render primary or secondary reactions leading to changes in the biological system and the implant material. Under such circumstances, porous hydroxyapatite coatings that are osteoconductive increase the speed and strength of bone attachment compared to uncoated implants of the same design.

Summary of the Invention: The present invention provides a process for the preparation of protein mediated calcium hydroxyapatite (HAp) coating on metal substrate and the said process comprising the steps of: a) roughening and ultrasonic cleaning the surface of the metal substrate by using acetone, ethanol and water by known method to obtain a cleaned metal substrate; b) drying the above said cleaned metal substrate, at a temperature in the range of 50-60degC, for a period of about 1-2 hours and immersing it in an aqueous solution of protein of concentration in the range of 4-10 wt %, at a temperature in the range of 40-50degC at pH in the range of 6.5-7, for a period of about 2-4 hours, followed by washing repeatedly 3-4 times with water and drying it at a temperature in the range of 20-30degC, for a period of about 1-2 hours to obtain the dried surface treated metal substrate; c) immersing the above said dried surface treated metal substrate in a simulated body fluid [SBF(N)], for a period of 1-2 days, at a temperature of 35-37degC, at a pH in the range of 6.5-7 to obtain the nucleated hydroxyapatite coated metal substrate, followed by washing with deionised water for 3-4 times and drying the washed hydroxyapatite nucleated metal, at a temperature in the range of 20-30degC for a period of about 1-2 hours to obtain the dried hydroxyapatite nucleated metal substrate; d) immersing the above said dried hydroxyapatite nucleated metal substrate in another simulated body fluid [SBF (O)], for a period in the range of 2-4 days, at temperature of 35-37degC, at a pH in the range of 6-6.5, following by washing with deionised water for 3-4 times and drying it at a temperature of 20-30degC, for a period of 1-2 hours to obtain the desired protein mediated calcium hydroxyapatite (HAp) coating on hydroxyapatite nucleated metal substrate.

Advantages: A substantial reduction of the time in the surface treatment step required for coating of HAp on metal substrates particularly on stainless steel (316L) by biomimetic route. A multifold increase in the coating thickness. Increase in crystallinity of the HAp phase of the coating with alteration in the crystal geometry showing preferred orientation of crystal growth. Uniform porosity and coverage. Improvement in biocompatibility.

Lab	Patent No./Application no. (Date of Filing/ Date of Grant)	Inventor
CGCRI	IN 0609DEL2009-27/03/2009 PCT/IN2010/000201 - 29/03/2010	Sen et al.

Title: An improved method for fabricating rare earth (re) doped optical fiber using a new codopant.

Fleid of invention: The present invention relates to an improved method for fabricating rare earth (RE) doped optical fiber using a new codopant.

Background of Invention: Rare-earth (RE) doped optical fibers have found promising applications in the field of optical amplifiers, fiber lasers and sensors. The RE elements doped into the core of such fibers act as the active medium. Different REs like Er, Nd, Yb, Sm, Ho and Tm can be doped to get lasing and amplification covering a wide range of wavelengths. Er doped fiber amplifier (EDFA) due to its high quantum efficiency and broad gain bandwidth shows tremendous application in communication field meeting up the huge bandwidth requirement in internet services and information technology. RE-doped fiber lasers are replacing gas based or solid state lasers in most of the applications due to their compactness, excellent beam quality and easy handling capability. As a result, there has been a tremendous growth in the market with the overall sales predicted to touch $2.8 billion industrial laser market by 2010. Fiber laser devices are suitable for a variety of applications viz. material processing (cutting, grinding and engraving), range finding, medical and military applications. Thus fabrication of RE doped fibers with varied designs, compositions and appropriate RE concentration attracts a lot of research interest. The improvement in the properties of the fibers and increase in the process reproducibility remain the prime objective

Summary of the Invention: The present invention provides an improved method for fabricating rare earth (RE) doped optical fiber using a new codopant to control the RE incorporation and provide smooth core clad interface.

Advantages: Ba acts as an alternate co-dopant and different RE ions are incorporated with varying concentration without any problem. The use of Al or P selected as codopants in the known techniques is avoided. The process provides smooth core-clad boundary, without generation of star-like defects which appear for use of Al-oxide as a codopant in silica. The defect at core-clad interface is also eliminated for Al-doped germano-silicate core fibers where the defect generation takes place even for lower concentration of Al-oxide.

Lab	Patent No./Application No (Date of filing/ Date of grant)	Inventor
CIMAP	IN 192834 - 14/11/2005 USB 6831100 -14/12/2004	Khanuja , et al.

Title: Menthyl benzoate formulations for external UV protection

Field of invention: The present invention relates to the development and use of a novel bacterial system based protocol to screen the efficacy of the chemical compounds for Ultraviolet radiation protection. Preferably, the invention relates to a new use of the compound menthyl benzoate suitable for providing protection against the harmful effects of ultraviolet radiation.

Background of invention: The exposure to sunlight can pose a variety of damages to the skin and the damaging effects may result in hazardous effects like sunburn which primarily result from exposure to UVB radiation within the sunlight spectrum having a wavelength of about 290 to 320 nm. But continuous exposure over the long run may also lead to malignant cancerous cells on the skin surface. Studies have demonstrated a strong relationship between sunlight exposure and human skin cancer. Other hazards of ultra violet radiation exposure include premature aging of the skin, which is primarily caused by the UVA radiation having a wavelength of from about 320 nm to about 400 nm. The present procedure is rapid, novel, most convenient and environmentally compatible not requiring human or animal subject and/or complexities of cell culture in skin testing. Results can be obtained overnight and are 100% interpretable as evident from the control compounds and additionally provide quantifiable data on extent of protection.

Summary of the invention :. The present invention describes a novel and very quick bacterial system based screening protocol to detect UV protectant molecules and determining their efficacy for the extent of protection against Ultraviolet radiation in biological systems, identifying a new use of the compound menthyl benzoate as efficient UV protectant suitable for providing protection against the harmful effects of ultraviolet radiation and the extent of protection provided by menthyl benzoate.

Advantages: The process of the invention provides a new alternative and quick protocol to screen large number of compounds for UV protection.The compound of the invention was found to be safe to the bacterial system as found out in our invention which as such does not kill the bacterial cell and the cfu remain the same for treated and untreated cultures and no decrease of titre was observed by growing the bacteria in presence of the compound.The present procedure is rapid, novel, most convenient and environmentally compatible not requiring human or animal subject and/or complexities of cell culture in skin testing. Results can be obtained overnight and are 100% interpretable as evident from the control compounds and additionally provide quantifiable data on extent of protection.

Lab	Patent No./Application No (Date of filing/Date of grant)	Inventor
CIMAP	IN 191626 - 30/06/2004 US 6337095 - 08/01/2002	Jain , et al.

Title: Process for the isolation of compound scopoletin useful as nitric oxide synthesis inhibitor

Field of invention: The present invention relates to a process for the isolation of compound scopoletin useful as a nitric oxide synthesis inhibitor from the plant Artemisia annua and other plant families. Scopoletin belongs to the coumarin group of compounds. Scopoletin (7-hydroxy-6-methoxy coumarin is a derivative of benzo-.alpha.-pyrone coumarin and is found in plants both in the free state and glycosides.

Background of invention: Coumarins exhibit numerous pharmalogical and physiological activities such as antibacterial, vasoditory and diuretic effects, anticoagulant properties, hepatoprotective and respiratory stimulation. Scopoletin showed very good growth inhibitory properties. In general isolation of coumarins depends initially upon successive extraction of dried plant with commonly used solvents of increasing polarities (pet ether, benzene, ether, acetone or methanol). The conventional method used for the isolation of the coumarins used dried powder material extracted with 95% methanol/ethanol, and the concentrated extract was treated with 10% alkali solution. However, the method of isolation of coumarin through acid based treatment is not ideal because it is hardly possible to avoid some degradation of the coumarins which lead to the isolation of artefacts rather than the original compound or the loss of the compounds. In another process purification done by sublimation may involve thermal degradation with formation of artefacts. The overall yield of recovery is reduced. As such no plant with high content of scopoletin for commercial exploitation or any large scale process for the isolation of scopoletin has been reported.

Summary of the invention :. Present invention deals with a process for the isolation of compound scopoletin useful as nitric oxide synthesis inhibitor from the plant Artemisia annua, and other plant families, which comprises the extraction of the powder plant parts with an aqueous acetonitrile solvent, partitioning with a chlorinated solvent, evaporating the solvent, crystallizing a residue from the solvent and employing chromatography to yield pure scopoletin.

Advantages: Acid base treatment is avoided in this process which can reduced the content of scopoletin. The extraction with aqueous acetonitrile solvent is economic and higher yield of scopoletin.The amount of silica gel has reduced due to 50% of scopoletin crystallized before chromatography. The process allowed the reuse of solvents.The selection of plant part stem for the extraction improved the yield of scopoletin and reduced the cost of production

Lab	Patent No./Application No (Date of filing /Date of grant)	Inventor
CIMAP	IN 227551 - 13/01/2009 US 6488733 - 03/12/2002	Kalra , et al

Title: Method for the faster multiplication of earthworms, and production of vermicompost from the distillation waste of industrial aromatic crops

Field of invention: Present invention relates to a method for the faster multiplication of earthworms. More particularly, it relates to production of vermicompost from the distillation waste of industrial aromatic crops

Background of invention: Most of the biodegradable organic wastes can be converted in to vermicompost and these include agricultural wastes like weeds, husks, straw, stubble, dung and bio-gas; urban solid wastes like kitchen wastes, waste from vegetable and fruits market yards; agro industry waste like unused pulp and peels of fruits, press-mud, seed husk etc.. However, no information is available on production of vermicompost through utilization of wastes of essential oil bearing plants. This is imperative and important in view of the fact that some lakh hectares of land is already under essential oil plant crops and the area under such crops is expected to further grow in near future. Most of the organic wastes can be converted into vermicompost, utilization of distilled wastes of essential oil crops would be a better option for converting this into vermicompost as the same has no or limited economic use, is not consumed by animals as feed and during the process of distillation there is a complete degradation of the plant material and does not require predecomposition. Experiments have been carried out and a process has been developed for the faster multiplication of earthworms and production of superior quality compost from distilled waste of industrial aromatic crops like scented geranium (Pelargonium graveolens), lemongrass (Cymbopogon flexuosus), citronella (C. winterianus), and menthol mint (Mentha arvensis). The compost produced from the distillation waste of said crops is of good quality, at par or even better than the vermicomposts produced from other agricultural wastes.

Summary of the invention :,. The present invention deals with a preparation of superior quality vermicompost from the distillation wastes of aromatic crops said method comprises drying of distillation waste for 24 to 72 hours, obtained after the distillation of herbage for 2-3 h. at 20-25lbs of steam pressure, chopping the waste into small pieces, transferring this material into compost pits containing about 7-10 cm layer of partially rotten cowdung and 400-450 earthworms (Perionyx excavatus)/m.sup.3, daily watering of the pits to keep the plant material moist and covering them with gunny bags to check the loss of humidity, reloading the pits (20-30 cm layer) with the chopped distilled waste after 30-35 days, restricting watering after complete degradation of the added material, harvesting of the dried material and shade drying the same for 4-5 days, and sieving the harvested compost to remove earthworms.

Advantages: Superior quality compost rich in organic carbon, nitrogen phosphorus, potassium and some micronutrients like iron is produced from the distillation waste especially that from Mentha arvensis and Pelargonium graveolens.

There is a faster multiplication of worms if distillation waste of several crops like C. winterianus, C. flexuosus and Mentha arvensis are used.Distillation waste retains their nutritive value except essential oil.

Lab	Patent No./Application No (Date of filing/ Date of grant)	Inventor
CIMAP	IN 2563DELNP2004- 01/09/2004 US 6833249 - 21/12/2004	Khanuja , et al.

Title: Quick and sensitive method of quantifying mycolic acid to develop anti-microbial agents and a diagnostic kit thereof

Field of invention: The present invention relates to a rapid, sensitive, simple, and cost-effective spectrophotometric method of detecting and quantifying mycolic acid in a mycolic acid-fuschin dye complex with absorbance maxima ranging between 490-500 nm in the presence of various test compounds, for screening mycolic acid biosynthesis inhibitors useful as anti-microbial agents and a diagnostic kit thereof.

Background of invention: The current method of detection is by determining the mycolic acid patterns from clinical isolates of sputum, cerebrospinal fluid, bronchial washing, corneal ulcer, and bone marrow, as well as from acid-fast stain smear-positive clinical specimens. The protocols for extraction, isolation of mycolic acid and detection of bacteria-producing mycolic acid through acid fast staining are known in the art. But the system as a whole is inefficient and requires a microscope to detect the presence of the bacteria-producing mycolic acid. Extraction, isolation and characterization of mycolic acid is carried out through different methods of chromatography and IR, NMR spectroscopy. The emphasis of the present invention was to generate a system to screen a large amount of plant extracts and compounds with potential mycolic acid biosynthesis inhibiting activity, rapidly and with a low cost.

Summary of the invention :. The present invention relates to a rapid, sensitive, simple, and cost-effective spectrophotometric method of detecting and quantifying mycolic acid in a mycolic acid-fuschin dye complex with absorbance maxima ranging between 490-500 nm in the presence of various test compounds, for screening mycolic acid biosynthesis inhibitors useful as anti-microbial agents and a diagnostic kit thereof comprising basic fuschin dye in the concentration ranging between 0.1-1.0 gm/100 ml, phenol and 95% ethanol in the ratio ranging between 1:4 to 2:1 (v/v), and phenol and distilled water in the ratio ranging between 1:14 to 1:25.

Advantages: This system may look simple but has tremendous importance and potential as millions of compounds and extracts are to be screened to arrive in a potential non-toxic drug formulation. The commercial potential of the invention may also be exploited in form of a kit to detect mycolic acid that will have an immediate impact in detection of mycobacterium

Lab	Patent No./Application No (Date of filing/ Date of grant)	Inventor
CIMAP	IN 231854 - 12/03/2009 US 6676974 - 13/01/2004	Khanuja , et al.

Title: Bioactive hexane fraction from Vetiveria zizanioides

Field of invention: The present invention relates a hexane bioactive fraction and obtained from the roots of an aromatic plant named Vetiveria zizanioides commonly found in India for inhibiting the growth of drug resistant bacterial infections in humans and animals. The invention also relates to a pharmaceutical composition comprising the bioactive extract with other additives for inhibiting the growth of drug resistant bacterial infections in humans and animals.

Background of invention: All the antibiotics in clinical use today can be grouped or classified according to their structure or functional groups. Streptomycin, kanamycin, tetracycline some of the well-known examples are aminoglycosides whereas penicillin and its derivatives are beta-lactam antibiotics. One of the commonly used antibacterials are quinolones or fluoroquinolones such as nalidixic acid, ciprofloxacin, norfloxacin etc. Fluoroquinolones are now widely used to treat urinary tract infections, upper respiratory tract infections, and tuberculosis, which are resistant to first-line drugs. However, many of the pathogenic bacteria such as Haemophilus influenzae, Neisseria Sp., Staphylococcus aureus, Escherichia coli are developing resistance to fluoroquinolone class of antibiotics limiting their clinical usefulness. Since, the mechanism of action of all the quinolones against bacteria is similar, development of resistance to one of the quinolone antibiotic would confer simultaneous cross-resistance to almost all the other quinolones also. A semi-synthetic plant compound .alpha.-arteether which is capable of specifically killing quinolone drug resistant bacterial infections has been indentified in prior art. In our effort to isolate and identify more potent plant compounds which are active against quinolone resistant bacteria we carried out a systematic bioactivity guided fractionation of the ethanolic extract prepared from the roots of Indian medicinal plant Vetiveria zizanioides.

Summary of the invention :. The present invention provides a bioactive hexane fraction named as CIM 109 obtained from the roots of plant Vetiveria zizanioides for inhibiting growth of multidrug resistant bacterial pathogens. The present invention also provides a pharmaceutical composition comprising bioactive fraction CIM 109 or plant extract or lyophilised extract to provide anti bacterial activity.

Advantages: A novel anti bacterial agent inhibiting the growth of multi drug resistant bacterial pathogens.

Lab	Patent No./Application No (Date of filing/ Date of grant)	Inventor
CIMAP	IN 232584 - 19/03/2009 US 6884908 - 26/04/2005	Srivastava , et al.

Title: Process for isolation of hepatoprotective agent "oleanolic acid" from *Lantana camara.*

Field of invention: The present invention relates to a process for isolation of hepatoprotective agent "oleanolic acid" from *Lantana camara.*

Background of invention: Oleanolic acid [(3-O-β-hydroxy-olea-12-en-28-oic acid is a triterpenoid compound, which exist widely in natural plants in the form of free acid or aglycones for triterpenoid saponins. Oleanolic acid, have hepotoprotective activity. It is also important to note that oleanolic acid also inhibits tumor initiation and tumor promotion. Oleanolic acid also showed significant hypolipidemic and anti-atherosclerotic properties. Cosmetic and pharmaceutical preparations of oleanolic use in skin care and non-lymphatic leukemia. It also shows antiulcer, antimicrobial, hypoglycaemic activity, protection against cyclophosphamide induced toxicity, anticarcinogenic and antifertility activities etc. It was observed that sugar beets may be an inexpensive, easily available source of oleanolic acid. An extraction procedure for oleanolic acid from Sugar beet involves crude oleanolic acid preparation by extracting with MeOH, but major disadvantage of this process is that it exhibits very low yield of oleanolic acid saponin in both leaf and roots of sugar beets. Further, oleanolic acid is obtained after an extra and tedious acid hydrolysis step, which reduces the recovery of bioactive constituent. Moreover, it utilizes column chromatographic separation for the isolation of oleanolic acid using various mixture of eluting solvents resulting in a tedious, time taking and expensive process for the isolation of oleanolic acid. Prior art processes suffer a number of disadvantages. These processes use rootlets and root barks of *L. camara*. The rootlets are very small and few in *L. camara*, hence can not be obtained in sufficient amount for commercial purpose. Further, it utilizes mixture of three solvents for the extraction of plant material, which neither can be used again nor can be recycled. It also utilizes repeated column chromatography on silica gel for the isolation of oleanolic acid using mixtures of eluting solvents, thus resulting in a tedious, time taking and enormous expensive procedure, which can not be economically viable.

Summary of the invention :,. Present invention deals with a process for isolation of hepatoprotective agent "oleanolic acid" from *Lantana camara.*Accordingly comprising drying, grinding and defattening of *Lantana camara* roots with light petroleum followed by over night extraction at room temperature with a single solvent, removal of solvent under vacuum and precipitation of crude extract and repeated partial crystallization of precipitate with a single solvent resulting in the isolation of oleanolic acid with 1% yield

Advantages: This process uses simple precipitation and crystallization processes for the isolation of oleanolic acid which are easy, less time taking and highly inexpensive.The present invention involves single solvent useful for the extraction of oleanolic acid the plant material, which can be reused and/or recycled.It completely omits the use of highly tedious, time taking and expensive repeated column chromatographic purification process.Present invention provides an economical process.

Lab	Patent No./Application No (Date of filing/ Date of grant)	Inventor
CIMAP	IN 234974 - 23/06/2009 US 6858588 - 31/03/2003	Khanuja , et al.

Title: Nitrile glycoside useful as a bioenhancer of drugs and nutrients, process of its isolation from moringa oleifera

Field of invention: The present invention relates to a nitrile glycoside useful as a bioenhancer of drugs and nutrients. More particularly, it relates to a process of isolation of said compound from moringa oleifera.

Background of invention: Concerted and systemic programs to discover and develop new antibiotics and antifungals have been driven to a considerable extent by the development of resistance by these organisms to the drugs commonly used against them. However, due to the indiscriminate use of antibiotics resistance to even relatively new antibiotics such as vancomycin and methicillin are already reported in Enteroccocci and Staphylococci respectively. According to the Pharmaceutical Research and Manufacturers of America (PhRMA) there were 27 antibiotics and 12 antifungals under development in 1998 against bacterial and fungal infections in all stages of clinical development. At present, about 100 or so antibiotics are in the clinic. A key challenge to the antibiotic industry is that constant innovation is necessary not only because of resistance, but also because of side effects. Use of erythromycin a well-known macrolide antibiotic used as an alternative to patients, who are allergic to penicillins, exhibit strong gastrointestinal problems and also interact with the liver drug metabolizing enzymes. However, derivatives of erythromycin named azithromycin, dirithromycin are devoid of these problems. So, it is often possible to develop multiple analogs of successful antibiotics that achieve the same results with less adverse side effects. On the other hand these devices may increase the cost of chemotherapy. The clinical situation is much more complicated in cases where the chemotherapy has to be sustained for a longer duration (6-8 months) such as in antituberculosis therapy.. Gastric irritation, hepatitis, is some of the major side effects of nifampicin. Natural products especially from plant sources have played an important role in drug development of communicable diseases. Either the isolated plant biomolecules or its semi synthetic derivatives have provided useful clues in the production of medicinesFor instance, berberine and antimicrobial alkaloid isolated from Berberis fremontii has very weak antimicrobial activity in solution. However, in combination with other compound 5-Methoxy hydnocarpin (5-MHC) the antimicrobial activity of berberine is increased by 200 folds against Staphylococcus aurues.sup.23. Another interesting observation is the combination of piperine isolated from Piper nigrum

Summary of the invention :. The present invention deals with a new nitrile glycoside, niaziridin has been isolated by bioactivity-guided fractionation from the pods of Moringa oleifera, which was able to increase the bioactivity of commonly used antibiotics such as rifampicin, tetracycline and ampicillin against Gram (+) and (-) bacteria. Further the molecule enhances the activity of antifungal drugs against C.albicans and increases the absorption of antibiotics and nutrients through gastro-intestinal membrane. Therefore, niaziridin can be used in combination therapy with antibiotics resulting in reduced drug associated toxicity, reduced cost and duration of chemotherapy

Advantages: It provides a new compound nitrile glycoside useful as a bioenhancer of drugs and nutrients.

Lab	Patent No./Application no. (Date of filing/ Date of grant)	Inventor
CLRI	IN 185743 - 09/11/2001	Thotapalli P. Sastry et al

Title: A process for the preparation of a novel fibrin sheet for medical applications.

Field of invention: The present invention relates to a process for the preparation of a novel fibrin polyacrylate preferably in the form of powder or sheet for medical applications. The fibrin sheet finds potential use as a dressing aid in the treatment of various external wounds of different nature, which include external injury, cut wounds, burn wounds and even ulcers in animals and human being. The fibrin sheet,applied on a wound, not only stops further loss of electrolytes from the wound by acting as a haemostatic agent, but also prevents any air borne infection.

Background of invention: Raw blood is defibrinated by vigorous churning for the purpose of isolating various biochemicals like haemoglobin.The crude fibrin, separated from raw blood during the preocess of defibrination, does not produce good film. Even after drying, this fibrin cannot be used for wound dressing due to its britttle nature. This crude fibrin is either rejected usually as waste or used sometimes as plant-fertiliser. Laki (Fibrinogen, Marcel Dekker,Inc., New York, 1968) mentioned that fibrin could be isolated from fibrinogen and be made in the form of sponge, film, powder, fibrin glue etc. Fibrinogen is isolated from blood using centrifugation in combination with either cryoprepcipitation or other precipitating agents like ethanol, ammomium sulfate or polyethylene glycol.

Summary of the invention : The present invention provides a process for thepreparation of a novel fibrin polyacrylate preferably in the form of powder or sheet for medical applications.

Advantages: Crude fibrin, which is usually discarded as waste, is used as the raw material, thereby suggesting an economical method for the disposal of the same. Grafting of biocompatible polymers onto fibrin improves the function of the product. Since a biocompatible hydrophilic monomer is graft copolymerised with fibrin, the sheet absorbs the wound exudate readily to keep the wound clean and dry, there by preventing any possible infection. Number of dressings can be reduced with this novel, sheet. Since shelf life is more, storage of the sheet maybe stored for a longer time. Polymerisation reaction takes place at comparatively. Lower temperature, thereby making the temperature management much easier. Plasticiser, incorporated in the reaction mixture, provides flexibility to the film enabling the sheet to be applied around the wound like a bandage.

Lab	Patent No./Application no. (Date of filing /Date of grant)	Inventor
CLRI	IN 187089 - 23/08/2002	Thotapalli P. Sastry et al

Title: A process for the preparation of a novel fibrin powder for medical applications.

Field of invention: The present invention relates to a process for the preparation of a novel fibrin powder for medical applications. The fibrin powder finds potential use as a dressing aid in the treatment of various wounds of different nature, which include external injury, cut wounds, burn wounds and even ulcers in animals and human being.

Background of invention: As reported by Styler (Biochemistry, W.H.Freeman & Co., New York,1988),fibrin monomers spontaneously assemble into ordered fibrous arrays called fibrin.Bleeding from any wound in an animal body stops automatically due to the natural process of blood clotting, which is caused by the conversion of fibrinogen, present in blood, into fibrous netlike fibrin in presence of thrombin, a proteolytic enzyme. It has also been confirmed by Bergel (Deut. Med. Wochsch.,35, 663, 1909) and Piechotta et al (Aesthetiic plast.surg,17,263,1983), that fibrin possesses good haemostatic and wound healing properties. Although the net like structure of natural fibrin film arrests the blood cells, which cannot come out, serum still oozes out along with electrolyte and thereby causes microbial infection. It is therefore necessary to dress the wound externally to accelerate the healing process.

Summary of the invention : A process for the preparation of a novel fibrin powder for medical applications which comprises i) purifying, bleaching and masticating crude fibrin in a known manner to form a paste, ii) graft copolymerising the said fibrin present in the paste, with an acrylic monomer in presence of redox initiator and a known crosslinker at a temperature of around 40-65°C over a period of 2-4 hrs., iii) optionally reacting with drugs containing NH2, OH, COOH groups to be coupled to the graft copolymer, as formed in step (ii), then drying the resulting copolymer, iv) pulverizing the dried copolymer, as formed in step(iii), to a particle size of 75-750 microns, v) sterilizing the powder, as formed in step (iv), by conventional gamma irradiation.

Advantages: Crude fibrin, which is usually discarded as waste, is used as the raw material, thereby suggesting an economical method for the disposal of the same. Grafting of biocompatible polymers onto fibrin improves the function of the product. Since a hydrophilic and biocompatible monomer is graft-copolymerised with fibrin, the powder absorbs the wound exudate readily to keep the wound clean and dry, thereby preventing any possible infection. This novel powder can be applied to deep wounds, stab wounds and ulcers upon which a sheet cannot be applied. The powder may be stored for a longer time. Polymerisation reaction takes place at comparatively lower temperature, thereby making the temperature management much easier.

Lab	Patent No./Application no. (Date of filing/ Date of grant)	Inventor
CLRI	IN 199851 - 06/10/2006	Thotapalli P. Sastry Et Al

Title: A process for the preparation of a novel fibrin sponge for medical applications.

Field of invention: The present invention relates to a process for the preparation of a novel fibrin sponge for medical applications. The fibrin sponge has potential use as a haemostatic agent for bleeding wounds. It finds application as a dressing aid in the treatment of various wounds of different nature, which include external injury, cut wounds, burn wounds,ulcers and even internal scission in animals and human being. It cay be used for surgical application to seal anastomoses in various tissues, vascular grafts,leaks and anastomoses in common bile duct, superficial and deep hepatic injury and haemorrhage, splenic injury, enterocutaneoue fistulae, renal injuries and uteral anastomoses.

Background of invention: Laki (Fibrinogen, Marcel Dekker.Inc., New York, 1968) mentioned that fibrin could be isolated from fibrinogen and be made in the forn of sponge, filn, powder, fibrin glue etc. Fibrinogen is inolated from b1ood using centrifugation in coabination with either cryoprepcipitation or other precipitating agents like ethanol, anmomium sulfate or polyethylene glycol. Concentrated solution of isolated fibrinogen is diluted and nixed with thronbin in aqueous nediun to forn fibrin suspension,which is frozen and subsequently lyophilized to prepare natural fibrin sponge

Summary of the invention : A process for the preparation of a novel fibrin sponge for medical applications. The invention discloses a process wherein bleached fibrin is used as starting material. pH of the bleached past of fibrin is adjusted in the range of 2 - 9 and then 0.01,to-0.1% by weight of a crosslinking agent is reacted with the said fibrin for a period of 15 - 60 minutes, at a specific temperature range to get the fibrin sponge.

Advantages: Crude fibrin, which is usually discarded as waste, is used as the raw eaterial,thereby suggest ing an economical method for the disposal of the same. Since purified fibrin is used for making the sponge, efficacy of the product is better compared to other available sponges used for wound-dressing. Crosslinking of fibrin improves improves the efficacy as well as the stability of the sponge eaterial. Number of dressings can be reduced with this novel sponge. Crosslinking is done almost at ambient temperature, thereby making the temperature management much easier. Enough care is taken to ensure that the sponge is biocompatible and non-toxic and hence the product does not produce any irritation on skin. It is very useful in veterinary surgery for amputation of horn, tail etc.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
CLRI	IN 191707	Elden BerlaThangam et al
Title: A process for the production of an alkaline protease.		
Field of invention: A process for the production of an alkaline protease.		
Summary of the invention : A process for the production of an alkaline protease, which comprises: (i) inoculating bacterial strain of genus Alcaligenes, in a conventional nutrient medium comprising of mineral salt and supplemented with source of protein in a known manner optionally under continuous shaking for at least 8 hrs. (ii) separating the supernatant from biomass by conventional methods, (iii) recovering crude protease from the supernatant by known precipitation technique by known precipitation technique and optionally purifying by known dialysis method, followed by lyophilisation to get alkaline protease.		

Lab	Patent No./Application no. (Date of filing /Date of grant)	Inventor
CLRI	IN 195225 - 18/09/2007	Hemachander et al

Title: A process for the production of novel lipase.

Field of invention: The present invention relates to a process for the production of a novel lipase. The lipase of the present invention is produced by using a new bacterial strain for industrial applications. This enzyme so obtained has higher stability over a wide range of pH of 2 to 10, temperature of 4 to 80°C. It has shelf life upto 90 days having
potential use in leather industry as a degreasing agent for beamhouse processing. It may also be used as an additive to laundry detergent formulations.

Background of invention: Lipase is widely distributed in vertebrates, plants and microorganisms. The natural substrates for lipase, as stated by Tombs (Biotechnology in food industry, Edited by MP Tombs, Prentice Hall, New Jersey, pp 127-146, 1991), are triacyl glycerols having very low solubility in water. Under natural conditions, lipase catalyses the hydrolysis of ester bonds at the interface between an insoluble substrate phase and the aqueous phase in which the enzyme is dissolved. As reported by Macrae and Hammond (Biotechnology Genetic Engineering Reviews, 3, 193-219, 1985), under certain experimental conditions such as in the absence of water, lipase is capable of reversing the reaction. The reverse reaction leads to esterification and formation of glycerides from fatty acids and glycerol.

Summary of the invention : The present invention relates to a process for the production of a novel lipase. The lipase of the present invention is produced by using a new bacterial strain for industrial applications. This enzyme so obtained has higher stability over a wide range of pH of 2 to 10, temperature of 4 to 80°C. It has shelf life up to 90 days having potential use in leather industry as a degreasing agent for beam house processing, It may also be used as an additive to laundry detergent formulations. The enzyme is a potential hydrolyzing agent for industrially important fats and oils while producing fatty acids. It may find use in esterificaiton, transesterification and inter esterification reactions. Moreover, resolution of racemic mixtures is possible by using this enzyme. It has also a potential use in pharmaceutical industry as a digestive aid.

Advantages: Unlike the conventional lipase, the enzyme of the present invention has wider stability in the pH range 2 to 10 and temperature in the range of 4°C to 80°C. This enzyme has been found to be stable in the presence of different commercial detergents like aerial, surf-ultra at a concentration of 7mg/ml. The lipase of the present invention has been found to be able to remove olive oil from cotton fabrics with better efficiency in the presence of available detergents. The enzyme of the present invention can be used for degreasing greasy pelt either individually or as an additive to an available commercial detergent based degreasing agent. It provides degreasing of about 70% at a concentration of 250Units per 30g of the pickled skin,

Lab	Patent No./Application no. (Date of filing /Date of grant)	Inventor
CLRI	IN 232726 - 20/03/2009	Numbi Ramudu Kamini et al

Title: An improved process for the production of stable lipase.

Field of invention: The present invention relates to an improved process for the production of stable lipase. The lipase of the present invention exhibits wide thermal stabilty between 4°-60°C and it is also stable in the wide pH range of 2.0-11.0. More particularly, it is produced from a fungal source using solid state fermentation technique. It has wide ranging industrial applications. The enzyme of the present invention may be used as a degreasing agent in leather tanning industry. It has enormous potential applications as an additive to laundry detergent formulations in detergent industry. It may also be used for the production of industrially important fatty acids from fats and oils in oleochemical industry.

Background of invention: Lipases, chemically known as triacylglycerol acylhydroiases, belong to the class of serine hydrolases. The natural substrates of lipases are triacylglycerols, having very low solubility in water. Under natural conditions, they catalyse the hydrolysis of ester bonds at the interface between an insoluble substrate phase and the aqueous phase in which the enzyme is dissolved. As reported by Macrae and Hammond (Biotechnology Genetic Engineering Reviews, 3, 193-219, 1985), they are capable of reversing the reaction in the absence of water. The reverse reaction leads to esterification and formation of glycerides from fatty acid and glycerol. The usual industrial lipases are special classes of esterase enzymes that act on fats and oils, and hydrolyse them initially into the substituted glycerides and fatty acids, and finally on total hydrolysis into glycerol and fatty acids as reported by Iwai and Meiko (Yushi, 32, 84-91, 1989) and Bjorkling at al (Trends in Biotechnology, 9, 360-363, 1991).

Summary of the invention : The invention relates to a process for production of stable lipase in which a novel solid substrate medium containing wheat bran and gingelly cake oil in the ratio ranges between 1:0.11 to 1:9.0, preferably in the range of 1:0.14 to 1:3.0 is used for growing a strain of Aspergillus niger, deposited at CLRI and having accession no. CLRI BTFL by which more active and stable lipase is extracted.

Advantages: This Aspergilhis niger CLRI BTFL strain shows enhanced lipase production within short time compared to other strains. The cost of the substrates used in the production of lipase makes this SSF process economically viable. The enzyme exhibited broad pH and temperature stabilities in the range of pH 2.0-11.0 and temperature 4°-60°C. Stability of the enzyme is good in presence of different commercial detergents and organic solvents. The lipase is effective as an additive in laundry formulations for the removal of fat based stains in laundries. The enzyme is found to be effective hi the hydrolysis of oils and fats to yield optimum amount of free fatty acids.

Lab	Patent No./Application no. (Date of filing/ Date of grant)	Inventor
CLRI	IN 216818 - 01/09/2000	Chellan Rose et al

Title: An Improved Process For The Preparation Of A Novel Protein-Acrylate Graft Copolymer Having Molecular Weight Upto 300 000.

Field of invention: The present invention relates to an improved process for the preparation of Protein acrylate novel graft copolymer having molecular weight upto 300 000. More particularly, the present invention relates to a process for the preparation of a protein-acrylate graft copolymer for application as thermostable binder in leather finishing and coating in printing industry. The binder of the present invention has potential application in leather finishing to get a very good lusture without masking the grain pattern. It may be used for the formulation of leather finishing formulation to be used either for glazed finish or resin finish.

Background of invention: As reported by Wurtele (Grebbereiwiss Prax, 28 (1), 107, 1976), methyl methacrylate polymer used for the purpose of leather finishing formed a very good film on the leather surface imparting high wet rub fastness. Anbazhagan et al (Journal of Applied Polymer Science, 30, 391 - 400, 1985) prepared a binder for leather finishing by graft copolymerising chlorinated rubber with ethyl acrylate, n-butyl methacrylate in toluene medium under nitrogen atmosphere at a temperature of 80°C in the presence of benzoyl peroxide as initiator. Since the binders containing only synthetic polymers are not biodegradable, they contribute significantly to the environmental pollution by way of posing the problem of waste disposal. Moreover, the resin binders cannot withstand the temperature of glazing and hence are not suitable for glaze finished leather, which require thermostable protein binder in the finishing formulation.

Summary of the invention : An improved process for the preparation of a novel graft copolymer having molecular weight upto 300 000 is provided using serum, a hitherto known waste material, as the proteinous source, thereby suggesting an economical option of waste utilisation, whereby the resulting copolymer finds potential application as binder in leather industry.

Advantages: The present invention provides a process to use a source of hitherto discarded waste material, which would otherwise pollute the environment; this is used for the preparation of a useful finishing auxiliary for leather industry, thereby suggesting even a simple commercially feasible process for the effective disposal of the said waste source. Since the present invention has identified serum, a hitherto known waste material, for its effective use in leather industry, the suggested process is much cheaper in cost compared to those where the costly conventional proteins like collagen, casein are used. It provides an economical process to prepare a film forming binder from a non-film forming proteinous source, thereby widening the potential source for the preparation of binder. The binder prepared by the process of the present invention can be used for both glaze finish as well as resin finish.

Lab	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
IGIB	US6967104 - 22/11/2005	Kalia VC et al

Title: Rapid method for estimation of Chemical Oxygen Demand.

Field of invention: The present invention relates to a rapid method for estimation of Chemical Oxygen Demand (COD) of water and wastewater. It particularly relates to determination of COD. of industrial waste or domestic waste water or for determining the degree of pollution or develop designs for effluent treatment plants or efficiency of treatment plants or quick, rapid and onsite estimation of COD of water and wastewater or in untreated municipal wastewater or activation and pre-clarification tank inlets or cooling water and storm water reservoirs.

Background of invention: Oxygen demand is a significant parameter for determining the effect of organic pollutants in water. As microorganisms in the environment ingest the organic material, oxygen is depleted. This in turn can be harmful to fish and plant life. (http://www.spectronic.com/spectron/spctech2.htm). Wastewater from food processing is non-toxic but organic. High concentration of nutrients can be harmful for the environment. Extra quantities of nitrogen, fat and phosphorus require more oxygen for bacteria to decompose. If Chemical Oxygen Demand (COD/Biochemical oxygen demand (B.O.D) content of the water is excessive, the oxygen supply in the water may be depleted below the level required to sustain aquatic life. (Ref: http://info.rfisk.is/verkefni/1077/hfe 4f2.htm).

Summary of the invention: The present invention has solved the problem of longer duration and consumption of large quantities of chemicals in COD estimation. The method of the invention has removed the need for heating the reaction mixture for nearly 2 h at 148.degree. C., which is conventionally employed by standard methods and other commercially available kits. One mL of sample solution is mixed with three reagents, consisting of 0.02 g mercuric sulphate, 0.5 mL of 0.25 N potassium dichromate solution and 1.5 mL of sulphuric acid--silver sulphate in a sequential manner. Its COD is checked with the help of color chart. Sample(s) showing a COD value of more than 10000 mg/L are diluted. After establishing its approximate COD value, the sample is diluted further, if necessary, to achieve a COD value in the range of 300 to 500 mg/L. Reagents listed above are added to these diluted sample and read its OD at 585 and 635 nm. These OD values are used for calculating precise COD values by comparing it with standard glucose solution.

Advantages: The test can be carried out rapidly. The test does not require any major instrument. The test is very cheap. The test requires very small amount of reagents. The test is easy to perform. The test can be done without the need for specially trained technician.

Lab	Patent No. /Application No. (Date of filing /Date of grant)	Inventor
IGIB	IN 224359 - 13/10/2008 US 7282580 - 16/10/2007	Singh Y et al.

Title: Protein molecule useful for inhibition of anthrax toxin.

Field of invention: The present invention relates to a novel molecule useful for anthrax toxin inhibition in vivo and also provides a method for in vivo inhibition of anthrax toxin action using the new molecule.

Background of invention: Anthrax is a bacterial disease caused by Bacillus anthracis. The disease primarily affects herbivores but humans can also get infected while dealing with such animals. B. anthracis is a potential agent of bio-terrorism. Main symptoms comprise dizziness, fever, edema followed by death. The toxic action of anthrax has been attributed to anthrax toxin produced by the bacterium. The toxin can be resolved into three distinct protein components protective antigen (PA), lethal factor (LF) and edema factor (EF). The combination of EF and PA (edema toxin) produces skin edema, while LF and PA (Lethal toxin) are lethal to animals. The three proteins are individually non-toxic. EF is a calcium and calmodulin dependent adenylate cyclase that acts by increasing the intracellular cAMP levels in eukaryotic cells and LF is a Zn.sup.2+ dependent metalloprotease that leads to increase in IL-1 and TNF-.alpha. production by susceptible cells and cleaves several MAP Kinase Kinases (MKK 1, 2 and 3) (Leppla, 1999).

Summary of the invention: The present invention relates to a novel molecule useful for the inhibition of anthrax toxin. The invention also provides a method for inhibition of anthrax toxin action using the new molecule. The main utility of the invention is to develop a candidate molecule for anthrax toxin inhibition and for providing a method for inactivation of toxic activity of a toxin of the nature of anthrax toxin. This molecule has potential for use as A therapeutic agent in neutralizing anthrax toxin action in individuals infected with Bacillus anthracis.

Advantages: It provides a candidate molecule for anthrax toxin inhibition and a method for inactivation of toxic activity of a toxin of the nature of anthrax toxin.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IGIB	US 7363166-22/04/2008	Brahmachari, et al.

Title: Computational method for the identification of candidate proteins useful as anti-infectives.

Field of invention: The present invention provides a novel method for the identification of candidate proteins in pathogens useful as anti-infectives. More particularly, the present invention relates to candidate genes for these proteins. The invention further provides new leads for development of candidate genes, and their encoded proteins, and the study of their functional relevance to predictive, preventive or curative approaches. This computational method involves calculation of several sequence attributes and their subsequent analysis, leading to the identification of some outlier proteins in different pathogens. Thus, the present invention is useful for identification of some of the outlier proteins in pathogenic organisms. These outlier proteins are either virulence proteins or antigens or they may be used as drug targets. The outlier proteins from different genomes constitute a set of candidates for functional characterization through targeted gene disruption, microarrays and proteomics.

Background of invention: The progress in genome sequencing projects has generated a large number of inferred protein sequences from different organisms and, it is likely to increase in the coming years. The availability of complete genome sequences offers an opportunity for increased understanding of the biology of these organisms because it not only provides biological insights on any given organism, but also provides substantially more information on the physiology and evolution of microbial species through comparative analysis (Fraser et al. 2000). The set of microbes whose genomes have been sequenced so far is a diverse one, ranging from organisms living under extreme condition of environment to model organisms of biology, and to some of the most important human pathogens (see, U.S. National Center for Biotechnology Information, U.S. National Institutes of Health, website).

Summary of the invention : The present invention relates to a computational method for the identification of candidate proteins useful as anti-infectives. The invention particularly describes a novel strategy to identify outlier proteins in different genomes of pathogens. These anti-infectives are vaccine candidates, diagnostics or drug targets.

Advantages: The method of the invention for identifying unique protein sequences useful as antiinfectives is ab initio. It does not need a teaching data set. These anti-infectives are useful as vaccine candidates, as diagnostics, and in studying drug responses. The method uses sequence attributes instead of sequence patterns. The invention is generally applicable to all genomes and is easy to implement in any setting. This approach results in reproducible results as the method does not depend on variable biochemical characterization of proteins. However, functional information from other systems is helpful in aiding testable predictions. The method of the invention can be used for newly sequenced pathogens to provide a set of candidates for rapid evaluation for the development of anti-infectives.

Lab	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
IGIB	IN223563-13/09/2008 US6905863 -14/06/2005 PCT/IB03/05875- 09/12/2003	Kumar R, Sharma P, et al.

Title: Aerobic method of removing total dissolved solids (TDS) from tannery wastewaters.

Field of invention: The present invention relates to a bacterial strain of accession No MTCC 5097 useful for reducing the Total dissolved solids (TDS) levels from both raw as well as electrofloated tannery effluents, a process of preparing inoculum of the strain for reducing the Total dissolved solids (TDS) levels from both raw as well as electrofloated tannery effluents and an aerobic method of reducing Total Dissolved Solids (TDS) from Tannery effluents using the said strain.

Background of invention: The fact that the discharge of wastewaters containing hazardous compounds into natural environments, contributes heavily to the accumulation of bioaccumulative and recalcitrant pollutants, is well known. The tanning industry is designated as "Red Industry" due to the high pollution contributed by its solid and liquid wastes. It generates wastes that frequently accumulate in the environment despite controlled efforts. Therefore, our environment is under increasing pressure from solid and liquid wastes emanating from the leather industry.

Summary of the invention: The present invention relates to a bacterial strain of accession No MTCC 5097 useful for reducing the Total dissolved solids (TDS) levels from both raw as well as electrofloated tannery effluents, a process of preparing inoculum of the strain for reducing the Total dissolved solids (TDS) levels from both raw as well as electrofloated tannery effluents and an aerobic method of reducing Total Dissolved Solids (TDS) from Tannery effluents using the said strain.

Advantages: The isolated bacterium is capable of reducing the TDS levels of the tannery effluents in a reproducible manner. The naturally isolated bacterium is non-pathogenic and can be cultured on simple nutrient media without any economic burden. This kind of bacterial reduction of TDS reduction from raw as well as tannery effluents is novel.

Lab	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
IGIB	IN 224060-26/09/2008 US 6896806 - 24/05/2005 PCT/IB03/05863 - 06/12/2003	Kumar R, Kumar A, et al.

Title: Biological process for color reduction of pulp and paper effluent.

Field of invention: The present invention relates to a bacterium strain of accession no. MTCC 5099, a process for the preparation of inoculum of the said strain, and a process for the reduction of colour from pulp mill effluent using the above said inoculum, which comprises steps of inoculating appropriate aliquots of the pulp and paper mill effluent with the cell slurry obtained, incubating the mixture at about 37.degree. C. at about 100 rpm for time duration ranging between 24-48 hours, assessing colour and total lignin levels to determine the colour removal efficiency of the above said bacterium.

Background of invention: The problem of colour removal from pulp and paper mill waste has been a subject of great consideration and investigation in the last few decades. An estimated two trillion gallons of wastewaters are discharged annually by the pulp and paper industry in major paper-producing countries and much of this effluent is highly coloured. (Joyce et al., 1983). The brownish colour of the wastewater is mainly organic in nature and primarily attributable to lignin degradation products formed during various pulping and bleaching operations (Srivastava et al., 1984, Dilek et al., 2000). The other colour-imparting agents are wood-extractives, tannins, resins and synthetic dyes.

Summary of the invention: The present invention relates to a bacterium strain of accession no. MTCC 5099, a process for the preparation of inoculum of the said strain, and a process for the reduction of colour from pulp mill effluent using the above said inoculum, which comprises steps of inoculating appropriate aliquots of the pulp and paper mill effluent with the cell slurry obtained, incubating the mixture at about 37.degree. C. at about 100 rpm for time duration ranging between 24-48 hours, assessing colour and total lignin levels to determine the colour removal efficiency of the above said bacterium.

Advantages: The isolated bacterium is capable of reducing the colour of the pulp mill effluent in a reproducible manner. The isolated bacterium remains viable even after the completion of the experiment suggesting its reusability in next set of experiment. The naturally isolated bacterium is non pathogenic and can be cultured on simple nutrient media without any economic burden. This kind of bacterial reduction of colour from pulp mill effluents is novel.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IGIB	IN 0132DEL2003 - 17/02/2003 US 7381527 - 03/06/2008	Sarma, et al.

Title: Method of detection of SP-A2 gene variants.

Field of invention: The present invention relates to a method for predicting the susceptibility of an individual to pulmonary tuberculosis. The utility of the invention lies in applications such as molecular diagnosis, prediction of an individual to disease susceptibility and genetic analysis of a population for pulmonary tuberculosis. The invention also provides primer sequences useful in detecting polymorphic variations in the SP-A2 gene and their use in diagnosis and prediction of an individual's susceptibility to pulmonary tuberculosis

Background of invention: Tuberculosis (TB) is caused by Mycobacterium tuberculosis [Grange J M and Bishop P J. A tribute to Robert Kosh's discovery of the tubercle bacillus. `UberTuberkulosis` 1982; 62:1-17]. M. bovis and M. africanum which are closely related organisms, can also infect human beings [Young L S. Mycobacterial diseases and the compromised host. Clin Infect Dis 1993; 17:8436-8441]. In addition, there are other human pathogens belonging to the genus Mycobacterium which are related to M. tuberculosis, such as M. avium and M. leprae, that represent important pathogens. There is a growing concern about the worldwide increasing incidence of TB, a leading killer disease [Raviglione M C, Snider D E Jr, Kochi A. Global epidemiology of tuberculosis. Morbidity and mortality of a worldwide epidemic. JAMA 1995; 273:220-6]. It kills three million people all over the world annually. One third of the world population is estimated to be infected with M. tuberculosis asymptomatically, and in the year 1995, more people died of TB than in any earlier year in the history of mankind [Kochi A. WHO report on tuberculosis epidemic. 1996].

Summary of the invention: The present invention relates to allelic variants of human SP-A2 gene and provides specific primers suitable for detecting these allelic variants for applications such as molecular diagnosis, prediction of susceptibility of an individual to pulmonary tuberculosis, and/or the genetic analysis of SP-A2 gene in a population.

Advantages: The invention shall be useful to establish genotype or base variation of SP-A2 gene. The information may be useful for molecular diagnosis, prediction of an individual's disease susceptibility to pulmonary tuberculosis, prognosis and/or the genetic analysis of SP-A2 gene in a population. The frequency of these variants can also be used to predict the prevalence of pulmonary tuberculosis disease among various populations.

Lab	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
IGIB	IN231224 -03/03/2009 US7022511 -04/04/2006 PCT/IB03/05026 - 07/11/2003	Kumar R, Kumar A

Title: Process for the isolation and acclimatization of bacteria for lignin degradation.

Field of invention: Present invention relates to a novel, aerobic biological process for the degradation of lignin using the defined consortium of ligninolytic bacteria isolated from the specific site.

Background of invention: Lignin is the most abundant aromatic polymer in the biosphere. It is found in the cell wall of all vascular plants in association with cellulose and hemicellulose. Because inter-unit bonds in lignin are not hydrolysable, lignin is difficult to degrade either chemically or biologically. Lignin surrounds cellulose in the plant cell wall forming a matrix, which is itself resistant to degradation. Lignin biodegradation is responsible for much of the natural destruction of wood in use, and it may have an important role in plant pathogenesis. On the other hand, potential applications utilizing lignin-degrading organisms and their enzymes have become attractive, because they may provide environmentally friendly technologies for the pulp and paper industry. To date, only a few groups of organisms are capable of degrading complex lignin polymers, and they are best exemplified by the white rot fungi. Most of the research concerning biodegradation of lignin has been centered on some fungi only such as Phanerochaete chrysosporium, Streptomyces viridosporus, Pleurotus eryngii, Trametes trogii, Fusarium proliferatum (Regaldo et al., 1997) etc. (1)

Summary of the invention: The present invention provides a novel consortium of ligninolytic bacteria for degradation of lignin and also a biological process for the degradation of lignin using said consortium of ligninolytic bacteria. Ligninolytic bacteria were isolated from a specific Indian site where sawdust continually accumulated over the long period. The said bacteria were acclimatized to improve their capability to degrade lignin and finally formulated in a consortium to degrade the lignin.

Advantages: Degradation of lignin by bacteria has tremendous significance for the bioremediation of pulp and paper industrial wastewater. Bacterial degradation of lignin confers a new understanding of conversion of industrial lignin waste into useful commodities.

Lab	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
IGIB	IN 221931 -10/07/2008 US 7018510 -28/03/2006 PCT/IB03/05847 - 09/12/2003	Kumar R, Kumar A

Title: Process for bio-bleaching of Kraft pulp using bacterial consortia.

Field of invention: The present invention relates to an environment friendly, safe, and efficient four-step method of bio-bleaching Kraft pulp using bacterial strains of accession no. MTCC 5096, MTCC 5094, MTCC 5095, and MTCC 5098, a microbial consortium comprising a synergistic mixture of ligninolytic bacterial isolates of accession no. MTCC 5094, MTCC 5095, and MTCC 5098, bacterial strains of accession Nos. MTCC 5096, MTCC 5094, MTCC 5095, and MTCC 5098, and a process of preparing an innoculum of the bacterial isolate of accession no. MTCC 5096.

Background of invention: The process of lignin removal from chemical pulps to produce bright or completely white finished pulp is called `Bleaching`. It is necessary for aesthetic reasons and for improvement of paper properties, because the left over residual lignin after pulping imparts an undesirable brown color to paper. The present day bleaching of Kraft pulp uses large amounts of chlorine based chemicals. The use of these chemicals generates chlorinated organics, which being highly toxic cause various health hazards. Thus, an alternative and cost effective method i.e. the use of microbes and enzymes, has provided a very simple and economic way to reduce the use of chlorine and other bleaching chemicals.

Summary of the invention: The present invention relates to an environment friendly, safe, and efficient four-step method of bio-bleaching Kraft pulp using bacterial strains of accession no. MTCC 5096, MTCC 5094, MTCC 5095, and MTCC 5098, a microbial consortium comprising a synergistic mixture of ligninolytic bacterial isolates of accession no. MTCC 5094, MTCC 5095, and MTCC 5098, bacterial strains of accession Nos. MTCC 5096, MTCC 5094, MTCC 5095, and MTCC 5098, and a process of preparing an inoculum of the bacterial isolate of accession no. MTCC 5096, further, a process for the preparation of a consortium comprising the ligninolytic bacterial isolates of accession nos. MTCC 5094, MTCC 5095, and MTCC 5098, in addition, a process for the preparation of pulp suspension for the bio-bleaching.

Advantages: The developed four stage biobleaching process replace the use of chlorine and chlorine dioxide in pulp and paper mill. Thus, there is no generation of toxic chlorinated organics such as dioxin, biphenyl etc. The prepared bacterial suspension and consortium cuts the CD stage of chemical bleaching in pulp mill when they act synergistically. In comparison to chemical bleaching, the developed process is highly economical. The developed biobleaching process is environmentally safe because there is no generation of chlorinated pollutants. The developed process is highly competitive in term of technology, feasibility, and applicability.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IGIB	US 7629016 -08/12/2009	Nahar et al.

Title: Process for photochemical activation of polymer surface and immobilization of biomolecules onto the activated surface.

Field of invention: The invention relates to a rapid and simple process for activation of inert polymer surface for immobilization of biomolecule. The activated surface can be used in clinical diagnostics, molecular biology, agriculture, environmental science, chemical or biochemical industry and many other related fields. Immobilization of biomolecules onto natural or synthetic polymer is of particular interest because of their application in clinical laboratories, biosensors, membrane bioreactors, diagnostics and many other relevant fields.

Background of invention: Immobilization of enzymes to synthetic polymer is of particular interest because of their application in clinical laboratories, biosensors, membrane bioreactors and diagnostics [Krysteva, M. A., Shopova, B. L., Yotova, I. Y., and Karasavova, M. I. (1991) Biotechnol Appl Btochem. 13, 106-111; Pandey, P. C., Kayastha, A. M., and Pandey, V. (1992). Appl. Biochem. Biotechnol. 33, 139-144]. There are different methods for immobilization of biomolecules on to a polymer surface e.g. entrapment, encapsulation, adsorption, covalent binding etc. Covalent immobilization is often necessary for binding molecules that do not adsorb, adsorb very weakly, or adsorb with improper orientation and conformation to polymer surfaces. This may result in better biomolecule activity, reduced nonspecific adsorption, and greater stability [Bangs, L. B., and Meza, M. B. (1995) Microspheres, part 2: Ligand attachment and test formulation. MD & DI's IVD Technol. 20-26; Larsson, P. H., Johansson, S. G. O., Hult, A., and Gothe, S. (1987) J Immunol Meth. 98, 129-135; Rasmussen, S.R., Larsen, M. R., and Rasmussen, S. E. (1991) Anal Biochem. 198, 138-142; Chevrier, D. Rasmussen, S. R., and Guesdon.

Summary of the invention: The present invention provides a process for the preparation of activated polymer surface capable of forming a covalent bond with the biomolecule which comprises coating the surface of a polymer by a photolinker more particularly by 1-fluoro-2-nitro-4-azidobenzene and subjecting the dry photolinker-coated polymer surface to light irradiation preferably by UV light or sunlight for a period ranging from 1 second to 60 minutes followed by removing the unattached compound by washing thoroughly with a organic solvent preferably methanol and drying at an ambient temperature.

Advantages: A simple, rapid and efficient method is invented for the preparation of an activated polymer surface. Any polymer having a C--H bond can be activated by the invented method. Using the invented method activation can be carried out under sunlight, which is abundant, freely available, non-hazardous and environmental friendly. Activation of polymer can be carried out in a large scale by the invented method. The invented activated surface can be used for immobilization of molecules, preferably biomolecules. The invented activated surface can potentially be used in ELISA and other clinical diagnostics, molecular biology, proteomics, genomics, agriculture, environmental science, chemical or biochemical industry and many other related fields.

Lab	Patent No. /Application No. (Date of filing /Date of grant)	Inventor
IGIB	IN03502DELNP2004 - 09/11/2004 US10/814002 -30/03/2004 PCT/IN04/00081 - 31/03/2004	Ghosh, et al.

Title: Gene variants of signal transducer and activator of transcription-6 (STAT 6) variants and process of detection the same.

Field of invention: The present invention is concerned with the detection and utilization of the allelic variants of the human STAT6 gene with the aim of predicting an individual's susceptibility to develop asthma. More specifically, the present invention relates to allelic variants of the human Signal Transducer and Activator of Transcription-6 (STAT6) gene and provides primers and methods suitable for the detection of these allelic variants for the prediction of an individual's disease susceptibility, and /or the genetic analysis of the STAT6 gene in a population.

Background of invention: The genomic DNA of all organisms undergoes spontaneous changes in the sequence (termed as mutation) in the course of their continuing evolution thereby generating variant forms of progenitor sequences, which may lead to various evolutionary advantages or disadvantages to the survival of the organism. If such effects of the mutations or variations are not seen then they are termed as neutral changes/mutations. If the mutation is lethal then it is not transmitted to the following generations and thus the mutation is lost from the gene pool of that organism. A variant form may also confers an evolutionary advantage to the species and is eventually incorporated into the DNA of many or most members of the species, and hence, effectively it becomes the progenitor form. In many instances, both progenitor and variant form(s) survive and co-exist in the gene pool of the species. This coexistence. of multiple forms of a sequence gives rise to polymorphisms. Commercial seed business of about US$ 15 billion.

Summary of the invention: Atopic diseases are a clinically heterogeneous group of diseases characterized by elevated serum IgE levels and varying phenotypic expressions such as asthma, allergy and atopic dermatitis. Various genetic and environmental factors are known to affect the disease process. Thus for such complex disorders it is thought that there are numerous factors that contribute to cause the disease. These interactions may be synergistic, antagonistic, epistatic etc. Of the genetic factors human signal transducer and activator of transcription 6 gene (STAT6) is an important candidate gene for causation of susceptibility and/or pathogenesis. It is the primary molecule through which the signaling pathway of atopy-related genes and proteins is executed.

Advantages: The present invention provides novel gene variants of Signal Transducer and Activator of Transcription-6 (STAT 6) gene responsible for atopic disorders. It also detecting the predisposition to atopic disorders by STAT-6 gene variants in a population.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IGIB	IN 233304 -28/03/2009 US 7335644 -26/02/2008	Pasha, et al.

Title: Anti-hypertensive molecules and process for preparation thereof.

Field of invention: The present invention relates to novel anti-hypertensive molecules. The present invention also provides a process for the preparation of novel antihypertensive molecules. The present invention particularly relates to the preparation of novel Angiotensin Converting Enzyme Inhibitors (ACEI) with prolonged activity. ACE inhibitors play an important role in Renin-Angiotensin-Aldosteron system (RAAS) by inhibiting the activity of Angiotensin Converting Enzyme (ACE) and therefore are used to regulate blood pressure. ACE inhibitors synthesized by the process of present invention have a peptide moiety and nonpeptide moiety. ACE inhibitors, synthesized by this present invention, show enhanced bioavailability and fewer side effects.

Background of invention: Hypertension has assumed the form of a grave problem all over the world. In US 23% people are suffering from hypertension. Over three-quarters of women aged 75 or over and 64% of men aged 75 or over have hypertension. (Health, United States, 2002, Table 68). Annually, hypertension cause 23,761 deaths and there are 8.6 deaths per 100,000 population in 2000 (National Vital Statistics Report, Vol. 50, No. 15). In India, it has been estimated that 10-20% people suffer from hypertension and with increasing urbanization, problem is compounding. Even in India, According to analysis, the prevalence of Hypertension among adults in India is 11%. There is increasing trend in the prevalence of hypertension especially of systolic level. The incidence is more in urban than in rural population. Prevalence is slightly more in women (Gupta, 1997). Cardiovascular deaths in India are estimated to be 2.5 million per year and by 2020 it will be the leading cause of death (Enas et al 1996). This provides window to our future as we urbanize and adopt unhealthy life styles.

Summary of the invention: The present invention provides a process for the preparation of novel antihypertensive molecules which comprise (a) Designing of novel ACE inhibiting antihypertensive molecules designated as peptidomimimcs compound wherein the heterocyclic or unusual amino acid, present at antepenultimate position, is coupled to a dipeptide with amino acids present at ultimate position and penultimate position. (a) synthesis of dipeptide on solid support by known methods of coupling and deprotection. (b) coupling of heterocyclic or unusual amino acid to deprotected dipeptide at the N-.alpha. terminal of dipeptide. (c) cleaving of the synthesized peptidomimic compound of step (c) from solid support by known methods followed by purification and characterization by known methods. (d) in-vitro evaluation of synthesized peptidomimics for ACE inhibiting potency by using synthetic substrate. (e) in-vivo evaluation of synthesized peptidomimics for its ACE inhibiting efficacy in animal.

Advantages: It provides a process for the preparation of novel antihypertensive molecule. It provides a process for the synthesis of peptidomimics that can act as ACE inhibitors. It provides a process to synthesize ACE inhibitors that have better bioavailability in comparison to available inhibitors. It provides a process to synthesize ACE inhibitors that can strongly ligate the Zn present in the active site in such a way that it can not compete with and carry out the hydrolysis of substrate.

Lab	Patent No. /Application No. (Date of filing/Date of grant)	Inventor
IGIB	IN 239741 - 31/03/2010 US 7638309 - 29/12/2009 PCT/IB03/05767 -09/12/2003	Das, et al.

Title: Method for detecting pathogenic mycobacteria in clinical specimens.

Field of invention: The present invention relates to detection of pathogenic mycobacteria in clinical specimens such as sputum, cerebrospinal fluid, gastric lavage and tissue biopsies etc., wherein the novel stretch of DNA that lies in the intergenic region between methyl mycolic acid synthase genes mmaA1 and mmaA2 and the flanking region in mmaA1 and mmaA2 genes and is the invention uses a pair of designed oligonucleotide primers that specifically amplifies the target DNA from the clinical specimens.

Background of invention: Tuberculosis is the number one killer disease. Every year it kills largest number of people due to a single infectious disease. According to a World Health Organization Report (WHO) over 8 million cases of tuberculosis are reported every year with over 2.9 million deaths

Tuberculosis deaths were gradually declining till early 90's by the virtue of availability of potent anti-tubercular drugs. The tuberculosis cases and deaths are again on rise mostly because of synergistic effect of co-infection with human immuno-deficiency virus (HIV)(Hopewell, P. C et al., 1992) and emergence of multiple drug resistant (MDR) strains of M. tuberculosis (Bloom, B. R, and C. L. Murray, 1992) and involvement of so called non tuberculous mycobacteria.

Summary of the invention: Present invention relates to detection of pathogenic mycobacteria in clinical specimens such as sputum, cerebrospinal fluid, gastric lavage and tissue biopsies etc. Novelties of the invention lie in novel stretch of DNA that lies in the intergenic region between methyl mycolic acid synthase genes mmaA1 and mmaA2 and the flanking region in mmaA1 and mmaA2 genes. This test uses a pair of oligonucleotide primers that specifically amplifies the target DNA from the clinical specimens. The invention describes a method of DNA extraction from clinical specimen, which is safer and yields more DNA from clinical specimens than the existing methods. Present invention also describes DNA amplification method that results in specific amplification of the target amplicon without use of expensive reagents thus making the test economical. Present invention elucidates a method for differentiation of different species of pathogenic mycobacteria in the clinical specimen by restriction fragment length polymorphism (RFLP) analysis of the amplified PCR product.

Advantages: The said method removes the isolation and provides clean DNA for PCR. Selection of oligonucleotide primers for specific amplification of the target DNA stretch specific to pathogenic mycobacteria. The primer pair very unique to pathogenic mycobacteria and is able to specifically amplify a stretch of DNA from the pathogenic mycobacteria and not from other mycobacteria as is reported for many of the available primers. It does not use expensive reagents for PCR amplification of the target sequence in a stringent condition to achieve specific amplification as this increase the cost of the test. This method instead uses unique cycling condition to achieve specific amplification of the target DNA. So the cost of the test is reduced by approximately 10-20%.

Lab	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
IGIB	IN02935DELNP2004 - 29/09/2004 US7005297 -28/02/2006 PCT/IN03/00418 - 30/12/2003	Abhay Sharma et al

Title: Use of neuroactive compounds.

Field of invention: The present invention relates to a novel use of neuroactive compounds in producing inheritable change in behavior. More particularly, the present invention relates to a novel use of neuroactive compounds in producing inheritable change in the locomotor behavior of the fruitfly Drosophila melanogaster.

Background of invention: The Lamarckian theory of inheritance of acquired characters has mostly remained unaccepted in mainstream biology due to the lack of irrefutable experimental evidence as well as insufficient explanatory support against the Weismann's doctrine of isolation of the germ line from soma (1 3). Interestingly, there has been of late a revival of interest in some sort of Lamarckism (4, 5). Recently, pattern of gene expression regulated by chromatin factors has been found to be inherited through germ line (6). Both repressing and activating modes of gene regulation are inherited mitotically throughout development as well as through meiosis. Further, alteration in chromatin state induced by a drug that reduces function of a heat-shock chaperone protein has most recently been found to be inheritable and to underlie morphological alterations in Drosophila (7). The present work is based on the concept that drug induced behavioral alteration in an established model organism like Drosophila may suitably be used as an adaptive response to test the validity of Lamarckism.

Summary of the invention: The invention relates to a novel use of neuroactive compounds by treating the fruitfly Drosophila melanogaster adult males with fly medium containing either of the neuroactive compounds strychnine, pentylenetetrazol, tetraethylammonium chloride, lithium carbonate and nicotine, crossing the drug treated males with untreated females to obtain progenies and self-crossing the progenies to obtain grand progenies, observing the locomotor behavior of the parents and their progenies and grand progenies in terms of height climbed in a negative geotaxis assay, wherein an altered height climbed by parents and their progenies and grand progenies, compared to those of normally fed males, demonstrates that the neuroactive compounds produce inheritable behavioral change.

Advantages: The novel use of neuroactive drugs in producing inheritable change in behavior provides for the first time a tool to produce non-genetically yet inheritably altered organism. An epigenetic diversity of characteristics can be produced in the absence of availability of genetic diversity in the species. Desirable behavioral characteristics can be potentially incorporated in an organism through appropriate breeding strategy. Unlike genetically modified organism, epigenetically altered organism produced using the present strategy does not suffer from the serious concern about horizontal gene transfer and the associated hazard.

Lab	Patent no./Application No. (Date of filing/ Date of publication/Date of grant)	Inventor
IGIB	IN038DEL2004-04/06/2004 US11/145772 – 06/06/2005	Sarma; Puranam Usha; et al.

Title: Prediction and predisposition of MBL gene to bronchial asthma with allergic rhinitis.

Field of invention: The present invention relates to detection of allelic variants of MBL gene useful for prediction of predisposition to bronchial asthma with allergic rhinitis. The invention also provides for detecting allelic variants in MBL gene and their use in diagnosis and prediction of an individual's susceptibility to bronchial asthma with allergic rhinitis. The utility of the invention is in applications such as molecular diagnosis and prediction of an individual's susceptibility to bronchial asthma with allergic rhinitis.

Background of invention: Asthma is a disease of multiple origins characterized by reversible airway obstruction, eosinophil infiltration into the lung, airway hyper-responsiveness, epithelial damage and mucous secretion. It is a complex genetic disorder with a heterogeneous phenotype, largely attributed to the interactions among many genes and between these genes and the environment. Allergic rhinitis (or commonly called hay fever) is an inflammation or irritation of the mucous membrane that line the nose. Asthma and allergic rhinitis are manifestations of a single syndrome, the chronic allergic respiratory syndrome, occurring in two parts of the respiratory tract, nasal and the lower airways. Once manifested, the two conditions track in parallel in terms of severity [Bousquet et al, 2001]. Allergic rhinitis is an important risk factor for asthma [Guerra et al, 2002, Halpern et al, 2004] that patients who have both allergic rhinitis and asthma suffer more debilitating chest symptoms than patients with asthma alone.

Summary of the invention: The present invention relates to novel polymorphism of human MBL gene and provides specific primers suitable for detecting the polymorphism for applications such as molecular diagnosis and prediction of an individual's disease susceptibility to bronchial asthma with allergic rhinitis or otherwise, and/or the genetic analysis of MBL gene in Indian population. The invention also relates to the association of MBL gene variants in the patients with high MBL levels and activity in the plasma. Asthma, a chronic inflammatory disorder of the airways, represents a complex interplay of genetic susceptibility and environmental exposures. Recent evidence indicates that, in addition to IgE and T.sub.H2 mediated events; the complement system is also involved in modulating susceptibility to asthma. Complement derived inflammatory mediators; C3a and C5a anaphylatoxins are able to mimic the hallmarks of bronchial asthma, which includes early-phase bronchoconstriction with subsequent eosinophil infiltration. The interaction of these complement fragments with their corresponding receptors on basophils provide critical immunomodulatory signals to the adaptive immune system, resulting in the production of IL-4, IL-13 and the cysteinyl leukotrienes, leading to potent bronchoconstriction and development of allergic inflammation. Allergens activate all the three complement pathways, classical, alternative and lectin pathway. The role of classical and alternative pathways in bronchial asthma has been assessed.

Advantages: The invention shall be useful to establish genotype or base variation of MBL gene. The information may be useful for molecular diagnosis, prediction of an individual's disease susceptibility to bronchial asthma with allergic rhinitis.

LAB	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
IGIB	IN1037DEL2004-06/06/2005 US11/146381-06/06/2005	Ghosh; Balaram; et al.

Title: Transforming growth factor beta 1 (TGFbeta1) haplotypes and prediction of susceptibility for immunological disorders.

Field of invention: The present invention is related to the haplotypes of human Transforming Growth Factor Beta1 (TGF.beta.1) and prediction of susceptibility for immunological disorders. More particularly the present study is the first study in any population, identifying novel protective and risk haplotypes of the TGF.beta.1 gene The present invention also relates to allelic variants of the human Transforming Growth Factor Beta1 (TGF.beta.1) gene.

Background of invention: The genomic DNA of all organisms undergoes spontaneous changes in the sequence (termed as mutation) in the course of their continuing evolution thereby generating variant forms of progenitor sequences, which may lead to various evolutionary advantages or disadvantages to the survival of the organism. If such effects of the mutations or variations are not seen then they are termed as neutral changes/mutations. If the mutation is lethal then it is not transmitted to the following generations and thus is lost from the gene pool of that organism. A variant form may also confer an evolutionary advantage to the species and is eventually incorporated into the DNA of many or most members of the species, and hence, effectively it becomes the progenitor form. In many instances, both progenitor and variant form(s) survive and co-exist in the gene pool of the species. This coexistence of multiple forms of a sequence gives rise to polymorphisms.

Summary of the invention: Asthma is a chronic lung disorder characterized by inflammation as a result of complex interactions between cells, their mediators and tissues in the airways. Various genetic and environmental factors are known to affect the disease process. Of the genetic factors, human Transforming Growth Factor Beta1 (TGF.beta.1) is an important candidate gene for causation of susceptibility and/or pathogenesis. TGF.beta.1 plays a dual role. On one hand, where it suppresses inflammation and decreases airway hyper reactivity in lungs, it also has a pro-inflammatory role where it is one of the mediators involved in subepithelial fibrosis, which is a fundamental feature of the remodeled airway in chronic asthmatics. The present invention is related to the haplotypes of human Transforming Growth Factor Beta1 (TGF.beta.1) and prediction of susceptibility for immunological disorders. The present invention also relates to allelic variants of the human Transforming Growth Factor Beta1 (TGF.beta.1) gene.

Advantages: The advantage of the present invention is to provide novel protective and risk haplotypes of the Transforming Growth Factor Beta 1 (TGF.beta.1) for prediction of susceptibility to immunological disorders. invention provides a method for screening disease prone individuals in a given population by screening for the TGF.beta.1 gene variants.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IGIB	IN0816DEL2005 - 31/03/2005 US 7396671 - 08/07/2008 PCT/IN04/00421 -28/12/2004	Kumar, et al.

Title: Biotechnological process for neutralizing alkaline beverage industrial waste water.

Field of invention: The present invention relates to a bacterial isolate, Exiguobacterium sp. (MTCC 5183) deposited at International Depository IMTECH, Sector 39A, Chandigarh, India recognized by Budapest Treaty, More particularly, the present invention relates to a process of preparing bacterial isolate, Exiguobacterium sp., useful in neutralization of highly alkaline waste water from beverage industry deposited at International Depository IMTECH, Sector 39A, Chandigarh, India recognized by Budapest Treaty.

Background of invention: Stringent laws and frequent checks by the authorities reflect environmental concerns now held by society. Thus, for insane now pH of wastewater of industries such as beverages may only deviate minimally from neutral point when discharged into a receiving watercourse or sewerage system. Various chemicals are available to neutralize the highly alkaline beverage industrial wastewater depending upon the application. In most cases, Sulfuric Acid (H.sub.2SO.sub.4) is used. The end user must consider the concentration to be used, must carefully analyze all the chemistries involved, must review manufacturers' warnings and instructions, and must consider common safety measures for hazardous liquids. The process of treating wastewaters comprises treating with chemicals which can be either acids or bases or capable of forming acids or bases on addition to wastewater. Various chemicals are available for industrial neutralization depending upon the application and whether neutralization of an acidic or basic solution is being carried out.

Summary of the invention: The present invention provides a bacterial isolate, Exiguobacterium sp. (MTCC 5183) deposited at International Depository at IMTECH Sector 39A, Chandigarh, India, as recognized by Budapest Treaty from beverage industrial waste water. This bacterial strain is capable to bring down the pH of waste water from 12.00-7.00 units within two hours. The neutralization of alkaline beverage industrial waste water by such biotechnological process is highly effective and economical as compared to conventional neutralization process by chemical means.

Advantages: The neutralization of alkaine beverage wastewater using Exiguobacterium sp. is an economical and effective process. In conventional acid-neutralization process, tones of acid are used for the neutralization while in the developed biological process decrease the cost drastically. The neutralization of alkaline beverage wastewater by biological mean is quite safe process as the utilization of acid in large quantities for the neutralization of wastewaters is not safe for the industry as the strong acid has dangerous effect on the health of workers as well as on the industrial processes. Besides this, use of large quantity of acid also increases the volume of industrial wastewaters to be drained out in the main stream.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IGIB	US 7456309 -25/11/2008	Kumar, et al.

Title: Reusable universal polymer support for repetitive oligonucleotide synthesis.

Field of invention: The present invention relates to a reusable universal polymer support for repetitive Oligonucleotide synthesis and a method of synthesis thereof. More precisely, the invention relates to a process to employ the reusable universal polymer support for carrying out oligonucleotide synthesis repeatedly.

Background of invention: Synthetic oligonucleotides and their modified analogous are finding numerous applications in diagnostics, therapeutics, molecular biology and agricultural sciences (Beaucage and Iyer, Tetrahedron, 1992, 48, 2223; Pon et al., BioTechniques, 1994, 17, 526; Agrawal, Methods in Molecular Biology: Protocols for Oligonucleotides and Analogs. Humana Press, Totowa, N.J., Vol. 20, 1993; Eckstein, Oligonucleotides and Analogues: A Practical Approach. IRL Press, Oxford, UK, 1992). Recently, the use of modified oligonucleotides as antigene as well as antisense agents (inhibitors of gene expression at transcription and translation stages) has opened up the doors to design and develop cost effective and rapid protocols for their synthesis and purification. In order to meet the current requirement of the oligonucleotides, the present day methodology is not viable and requires considerable attention to develop rapid and cost-effective methods. Recently, with the advent of labile protecting groups (phenoxyacetyl for adenine and guanine and isobutyryl or acetyl for cytosine; dimethylformamidine for adenine, guanine and cytosine; p-tert-butylphenoxyacetyl for adenine, cytosine and guanine), better coupling reagents, shorter coupling times, faster deprotection conditions, universal polymer supports and automated systems for their assembly have simplified the synthesis of a large number of oligonucleotides.

Summary of the invention: In the present invention, a mercaptoalkylated support is generated followed by its activation with a thiol specific reagent, 2,2'-dithiobis(5-nitropyridine). Subsequent steps involve reactions with DMTrO(CH.sub.2).sub.6SH and 3% trichloroacetic acid to generate hydroxylated polymer support. Coupling of 2(3)-O-dimethoxytrityl-anhydroerythritol-3(2)-O-succinate with hydroxy-terminated support yields a universal polymer support, which may be used for oligonucleotide synthesis. An important feature of the synthesized polymer support is that the support obtained after cleavage of oligonucleotide chains may be refunctionalized and used for another cycle of synthesis of oligonucleotide sequence. Likewise, it may be used repeatedly for carrying out the synthesis process and this is for the first time that a polymer support could be used for 26 cycles of synthesis.

Advantages: The process is simple and does not require expensive reagents and chemicals. The process is clean and does not result in any side product formation. The employment of universal linker avoids the need to prepare a large number of pro derivatized polymer supports. A non-ammoniacal cleavable linker prevents the erosion of glass based supports during cleavage of oligonucleotide chains from the support in aq. Ammonium hydroxide.The fully deprotected oligonucleotides compare well with the standard oligonucleotides in respect to their retention time on HPLC and mass

Lab	Patent no./Application No. (Date of filing/Date of grant)	Inventor
IGIB	US11/004263- 02/12/2004	Pasha; Mohammad Abdul Qadar ; et al.

Title: Method of detection of predisposition to emphysema in chronic obstructive pulmonary disease.

Field of invention: The present invention relates to a method of detection of predisposition to emphysema in chronic obstructive pulmonary disease (COPD). It particularly relates with the regulation of the key molecular and biochemical components of the pathway leading to the manifestation of emphysema in COPD.

Background of invention: Chronic Obstructive Pulmonary Disease (COPD) is a detrimental disorder that causes exorbitant human suffering (Snider G 1989). The World Health Organization predicts that by 2020, COPD will rise from its current ranking as the 12.sup.th most prevalent disease worldwide to the 5.sup.th and from the 6.sup.th most common cause of death to the 3.sup.rd (Mannino D M 2002). The most important risk factor for COPD is cigarette smoking (Snider G 1989). However, it has been estimated that only 10% of chronic heavy smokers develop symptomatic COPD suggesting that genetic factors are likely to be an important determinant of which cigarette smokers are at risk (Bascpne R 1999). Observed differences in clinical presentations and severity of the disease between racial and ethnic groups together with familial clustering favor a significant hereditary predisposition to the disease (Cohen B H et al 1977). It is more likely that genetic variants reflecting in difference in biochemical parameters are associated with the disease.

Summary of the invention: The present invention relates to a method of detection of predisposition to emphysema in chronic obstructive pulmonary disease (COPD). It particularly relates with the regulation of the key molecular and biochemical components of the pathway leading to the manifestation of emphysema in COPD. COPD is characterized mainly by three pathophysiological ailments, namely endothelial dysfunction, inflammation and chronic bronchitis that leads to emphysema. Along with that oxidant/antioxidant imbalance in the favor of oxidants impart oxidative stress in the disease. The present invention relates to a method of detection of predisposition to emphysema in COPD and it comprises of the regulation of key molecular and biochemical components of a pathway leading to the manifestation of emphysema in COPD.

Advantages: The components of a novel pathway for the detection of predisposition to emphysema in COPD. Novel maker regions containing the -786T/C and 4B/4A polymorphisms. Novel primer sequences responsible for amplification of PCR product containing the polymorphisms. A significant association of -786 C allele of eNOS gene with COPD. A significant association of 4A allele of eNOS gene with COPD. A novel biochemical marker of increased endogenous nitrite level in COPD patients.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IGIB	IN 2534DEL2004- 21/12/2005 US 10/579695 - 03/03/2006 PCT/IN05/00429 -22/12/2005	Sarma; Puranam Usha; et al.

Title: Pharmaceutical composition useful for the treatment of invasive pulmonary aspergillosis.

Field of invention: The present Invention relates to a pharmaceutical composition useful for the treatment of invasive pulmonary aspergillosis in a subject. Further, the present invention also relates to a method of treating invasive pulmonary aspergillosis in a subject. More particularly, it relates to a method of treating invasive pulmonary aspergillosis in a subject using human mannan-binding lectin (MBL) protein.

Background of invention: Mannan-binding lectin (MBL), an important constituent of innate immunity, belongs to the collectin family of proteins like the human lung surfactant proteins and bovine conglutinin. Structurally, it is composed of trimeric subunits with a N-terminal collagenous section and a C-terminal globular carbohydrate-recognizing domain (CRD). MBL recognizes and binds to non-host carbohydrate structures expressed on the surfaces of various pathogens such as yeast, bacteria and viruses via its CRD and the collagenous domain reacts with the C1q receptor (collectin receptor) found on many cells including phagocytes, thus acting as an opsonin. It is known to enhance opsonophagocytosis (Jack et al, 2001) by binding to a wide range of clinically relevant organisms (Neth et al, 2000). After binding to its target, MBL initiates the lectin pathway of complement activation, which is independent of C1q and antibody and has been described as a key mechanism for the mammalian acute phase response to infection [Matsushuita et al, 1992].

Summary of the invention: The present invention deals with a pharmaceutical composition for the treatment of invasive pulmonary aspergillosis. It also provides. a method of treating invasive pulmonary aspergillosis in a subject using human MBL protein. It may be useful for the treatment of individuals who are likely to contract such a condition due to treatment known to be associated with the occurrence of an immunosuppressed condition or otherwise. Examples of such treatments are e.g. chemotherapy and radiation therapy such as e.g. x-ray treatment. MBL is believed to exert its antimicrobial activity mainly through its opsonizing activity. This activity is dependent on activation of complement after binding of MBL to the microbial surface and deposition of C4b and C3b on the microorganism. MBL can also promote the direct complement-mediated killing of the microorganism through the activation of the terminal lytic pathway of complement and insertion of the membrane attack complex (MAC) in the membrane.

Advantages: The present invention provides the pharmaceutical composition useful for the treatment of invasive pulmonary aspergillosis.

Lab	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
IGIB	IN1536DEL2005-10/10/2006 US11/552769 -25/10/2006 PCT/IB06/02963 - 25/10/2005	Ghosh; Balaram; et al.

Title: Genetic Variants Of Human Inositol Polyphosphate-4-Phosphatase, Type I (Inpp4a) Useful For Prediction And Therapy Of Immunological Disorder.

Field of invention: The present invention relates to the genetic variants of human Inositol polyphosphate 4-phosphatase (INPP4A) gene useful for the prediction and therapy of immunological disorders. More particularly, the present invention relates to genetic and splice variants of the coding sequence of the human Inositol polyphosphate 4-phosphatase (INPP4A) gene.

Background of invention: Asthma is a common chronic airway disease, with considerable heterogeneity both in its phenotype and in the underlying pathophysiology. It affects 15-18% of the world's population. Both intrinsic and extrinsic cases of asthma are known. Intrinsic asthma is mainly childhood disorder though the age of onset can vary and is seen to be 35-45 years in the general population; whereas extrinsic asthma is observed where the age of onset is above 45 yr. and is mainly due to the age induced changes in the lung function. Recent studies have demonstrated that airway inflammation is a principal feature in the pathophysiology of asthma (Gern et al. 1999). The disorder is multifactorial (in both initiation and progression) because of the involvement of numerous resident and recruited inflammatory cells. T cells and IgE-mediated responses are known to be a key factor in the allergic response (Elias et al. 2003). Asthma is a T helper type 2 (Th2) mediated disorder with cytokines such as interleukin-4, interleukin-5, interleukin-13, implicated in the deviation of the immune system towards atopicity. Increased levels of these cytokines lead to elevated total serum IgE levels, eosinophil recruitment, and bronchial hyper-responsiveness that ultimately culminate in asthma pathogenesis.

Summary of the invention: Atopic asthma is a chronic, inflammatory lung disease characterized by recurrent breathing problems in response to an allergen. Platelets play an important role in this allergic inflammatory process, by releasing preformed mediators like platelet factor 4 (PF4) and regulated upon activation in normal T cells expressed and secreted (RANTES) upon activation causing eosinophil chemotaxis. The present invention relates to allelic variants of the human Inositol polyphosphate 4-phosphatase (INPP4A) gene and splice variants of the coding sequence, which encodes INPP4A enzyme known to be an important regulator of platelet activation; and provides primers and methods suitable for the detection of these allelic variants for applications such as molecular diagnosis, prediction and therapy of an individual's disease susceptibility, and/or the genetic analysis of the INPP4A gene in a population.

Advantages: The advantage of the present invention is to provide genetic variants of human Inositol polyphosphate 4-phosphatase (INPP4A) gene useful for prediction and therapy of immunological disorders including atopic asthma. Another object of the present invention is to provide a method for predicting an individual's susceptibility for immunological disorders particularly asthma by screening for INPP4A gene variants.

Lab	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
IGIB	IN1537DEL2005- 10/10/2006 US11/585924- 25/10/2006 PCT/IB06/02962-23/10/2006	Arora; Naveen; et al.

Title: Recombinant 12-KDA protein useful for the detection of respiratory allergies.

Field of invention: The present invention relates to a recombinant 12 kDa protein useful for the detection of respiratory allergies. The invention particularly relates to detection of the respiratory allergies caused by fungal spores and grass pollen using the said protein.

Background of invention: Allergy is detected clinically by skin testing and ELISA. The fungal extracts generally used for skin testing are complex mixture of proteins, carbohydrates, pigments, toxins, etc. They contain both relevant and non-relevant components that might sensitize the patient and eventually evoke anaphylaxis. Another factor that adds complexities to diagnosis of fungal allergy is cross-reactivity among allergens from different sources. Cross reactivity is due to the presence of similar protein components and/or epitopes shared by different fungal species. Studies on cross reactivity have shown antigenic/allergenic relationship among species of fungi such as Curvularia, Cladosporium, Fusarium, Pencillium and Aspergillus. Curvularia lunata has been shown to be an important allergy causing fungi also responsible for life threatening Allergic bronchopulmonary aspergillosis (ABPA) like symptoms in many patients.

Summary of the invention: The invention discloses the detection of respiratory allergies using a recombinant 12-kDa protein. The present invention is based on the fact that there is a need of a single cross-reactive protein capable of replacing large number of extracts used for detection of raised IgE levels in allergy by ELISA, immunoblotting and the likes. It is further based on the realization that such a cross-reactive protein will reduce the number of pricks, a patient gets during allergy skin testing, thus providing a single representative of large number of allergen extracts used. It is further realized that production of such a protein by recombinant methods can lead to its availability in pure form and bulk amounts required for routine diagnosis. In extension to the fact mentioned above, the resemblance of such a recombinant protein to its native form is an additional benefit forming the basis of its use clinically.

Advantages: The advantage of the invention is to provide a recombinant 12 K-Da protein useful for the detection of respiratory allergies. The present invention provides a method for detection of respiratory allergies using the said recombinant 12 kDa protein.

Lab	Patent no. /Application no. (Date of filing/ Date of grant)	Inventor
IGIB	IN2729DEL2005-10/10/2006 US11/545280 -10/10/2006 PCT/IB06/02802-09/10/2006	Brahmachari et al.

Title: Human microRNA targets in HIV genome and a method of identification thereof.

Field of invention: The present invention relates to human microRNA targets in HIV genome and a method of identification thereof. It specifically relates to a novel strategy to target genes of HIV-1 by human microRNAs, or its homologues, to inactivate or block HIV activity.

Background of invention: Human immunodeficiency virus-1 (HIV-1) has been identified as the etiological agent responsible for acquired immune deficiency syndrome (AIDS), a fatal condition that arises by the invasion of the virus on various cells of the human immune system, mainly the T-cells. HIV is a member of the lentivirus, a subfamily of retrovirus, which have a single stranded ribonucleic acid (RNA) as the genetic material. The virus has the ability to integrate its genetic information into the genome of the host cell thereby blocking normal genetic flow of information in the cell. The virus then takes over the cellular machinery and replicates itself by synthesizing its own proteins and packaging the genetic material. Another feature of HIV infection is that the virus does not keep replicating itself all the time. There are "window periods" after infection, during which replication is not observed. This is regarded as a silent phase where the effect of the infection during which immune deficiency is not detected. A critical aspect of HIV infection is that, it infects and invades cells of the immune system, resulting in break-down of the body's immune system and rendering the patient susceptible to opportunistic infections and conditions like neoplasms which arise due to immune system inactivation. HIV-1 is cytopathic for T4 lymphocytes, cells of the immune system that express the cell surface differentiation antigen CD4. In addition to CD4+T cells, the host range of HIV includes cells of the mononuclear phagocytic lineage, including blood monocytes, tissue macrophages, Langerhans cells of the skin, and dendritic reticulum cells within lymph nodes.

Summary of the invention: Accordingly, the present invention relates to the targets for human microRNAs in HIV genome and a method of identification thereof.The invention provides targets of six human microRNAs in HIV-1 reference genome comprising nucleotide stretches of SEQ ID Nos. 1 to 6e invention specifically provides microRNA targets for the HIV genome wherein hsa-miR-29a, hsa-miR-29b and hsa-miR-29c target the nucleotide stretches of SEQ ID NOS 1, 2 and 3 in the nef gene.

Advantages: The main advantage of the invention is to provide a novel strategy to target genes of HIV-1 by human microRNAs, or its homologues, to inactivate or block HIV activity. Another advantage is to use synthetic miRNA, based on modified nucleosides, as therapeutic to prevent or inhibit the progression of disease.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IGIB	IN 3483DEL2005 - 15/12/2006 US 11/645112 - 26/12/2006	Gupta; Kailash Chand; et al.

Title: Novel method for construction of oligonucleotide microarrays.

Field of invention: The present invention relates to a novel method of preparation of oligonucleotide microarrays The invention specifically relates to a novel method of preparation of oligonucleotide microarrays wherein the appropriately modified oligonucleotides are immobilized on the modified polymer surface. The invention also uses easily introducible modification in oligonucleotides for immobilization purpose. The present invention also relates to the fields of molecular biology and nucleic acid analysis. More specifically, the invention relates to a novel method for attaching a desired molecule, preferably a nucleic acid or its conjugate, to a virgin silane or an appropriately modified surface.

Background of invention: One of the most recent applications of synthetic oligonucleotides is their use in microarray technology. DNA microarray is a powerful tool, which allows the simultaneous detection of many different target molecules present in a sample. The technology deals with the covalent fixing of oligonucleotides (small fragments of DNA), cDNA, PCR fragments, etc on the solid or polymer surfaces. These DNA chips or bio-chips can be used for mutation detection, SNP analysis, disease diagnosis, monitoring of gene expression, etc. DNA Microarrays have extended the basic technique by using much smaller amounts of DNA probe, and more importantly by allowing researchers to perform tens of thousands of hybridization experiments in parallel. This allows researchers to view the response of whole genomes to various stimuli.

Summary of the invention: The present invention provides a process for the construction of oligonucleotide microarrays on glass or other polymer surfaces, comprising; (i) reacting 3'- or 5'-phosphorylated oligonucleotides with epoxy functionalized polymer surfaces or glycidyloxyropyltriethoxysilane (GOPTS) via route A and B (Image I and II), respectively, in a buffer containing DMSO (5-20%), at a pH in the range of 5-9, at an elevated temperature ranging between 35 to 65.degree. C., for a period ranging between 1 to 6 h, washing to remove unreacted component to obtain the desired oligonucleotide microarray,(ii) visualizing the said microarray obtained in step (i) by hybridizing it with the labeled complementary oligomer sequence followed by scanning under a laser scanner.

Advantages: The process is simple, rapid and novel. The synthesis of modified oligonucleotides is easy to assemble. Silyl-oligonucleotide conjugate is sufficiently stable for 5-6 months at 4.degree. C. The reactions involving silylation are clean and do not result in any side product formation. The reagent specifically reacts with phosphate monoesters; phosphodiesters do not contribute much (.about.12%).A variety of phosphoryl-, thiophosphoryl-, phosphorothioate-, mercaptoalkylated bioactive ligands can be immobilized without affecting their activity.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IGIB	IN 0925DEL2006 -16/03/2007 US 12/499708 - 29/03/2007	Brahmachari; Samir Kumar; et al.

Title: Targets For Human Micro Rnas In Avian Influenza Virus (H5n1) Genome.

Field of invention: The present invention relates to the targets for human microRNAs in Avian Influenza Virus (H5N1) Genome. The invention particularly provides specific miRNA targets against H5N1 virus.

Background of invention: The 186 cases (as of March 2006, WHO report) of Avian influenza caused by H5N1 virus in humans with increasing reports of cases in poultry and migratory birds, has created great concern and panic globally. Influenza virus has the capability to re-assort its genetic material thereby giving rise to novel antigenic proteins which can defy the immune response mechanism. These influenza viruses occur naturally among birds. Wild birds worldwide carry the viruses in their intestines, but are usually not affected by them. However, avian influenza is very contagious among birds and can make some domesticated birds, including chickens, ducks, and turkeys etc. very sick and kill them.

Infected birds shed influenza virus in their saliva, nasal secretions, and feces. Susceptible birds become infected when they have contact with contaminated secretions or excretions or with surfaces that are contaminated with secretions or excretions from infected birds. Domesticated birds may become infected with avian influenza virus through direct contact with infected waterfowl or other infected poultry, or through contact with surfaces (such as dirt or cages and droppings) or materials (such as water or feed) that have been contaminated with the virus.

Summary of the invention: The invention relates in certain embodiments to targeting of Avian Influenza H5N1 genes with human microRNAs. The invention in certain embodiments provides specific microRNAs targets against Avian Influenza H5N1 strain. MicroRNAs are short RNA molecules which have the ability to repress protein synthesis by binding to messenger RNAs and consequently inhibit the viral activity. In the presently disclosed invention embodiments the applicants have screened the Avian Influenza H5N1 reference genome computationally using human microRNAs for identifying targets for Avian Influenza strain H5N1 activity inhibition.

Advantages: Main advantage of the invention is developed miRNA is non toxic, target specific and effective therapeutics against avian flu. [0090]Still another advantage is development of diagnostics for detection of predisposition to bird flu. Another advantage is its use as synthetic miRNA, based on modified nucleosides, as therapeutic to prevent or inhibit the progression of disease.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IGIB	IN 2159DEL2006 -29/09/2006 US 11/906117 - 16/10/ 2008	Mahajan; lakshna; et al.

Title: Human Lung Surfactant Protein, Sp-D, Modulates Eosinophil Activation And Survival And Enhances Phagocytosis Of Apoptotic Bosinophils.

Field of invention: The present invention generally relates to use of a formulation for induction of and/or increasing apoptosis in activated eosinophils using human lung surfactant protein D in eosinophil mediated diseases and disorders other than airway-hyperresponsiveness, allergy or asthma. Salient eosinophil-mediated disorders are eczema, eosinophilic cardiomyopathy, eosinophilic gastroenteritis, hypereosinophilic syndrome, graft versus host disease, chronic fibrosis, a parasitic inflammatory disorder, drug reaction, eosinophilic pneumonias, episodic angioedema with eosinophilia, inflammatory bowel disease, eosinophilic leukemia and/or food enteropathy and hypereosinophilia associated diseases that include infections, cirrhosis and cancer.

Background of invention: Lung surfactant protein D (SP-D) is involved in pulmonary surfactant homeostasis and is one of the collectins belonging to a family of oligomeric proteins consisting of a collagen region linked to a C-type lectin domain via an .alpha.-helical neck region. The structural subunits of SP-D are homotrimers of these chains, and the subunits are themselves oligomerized into cross-like tetramers and higher oligomers (3). SP-D binds to oligosaccharides on the surface of a variety of pathogenic microorganisms and induces aggregation. It initiates several effector mechanisms including the recruitment of inflammatory cells to destroy the pathogens. SP-D enhances the binding of influenza A virus to neutrophil granulocytes and promotes the neutrophil respiratory burst in response to the virus. It binds directly to alveolar macrophages in the absence of microbial ligands, and generates oxygen radicals (3, 4, 5). In addition to its role in antimicrobial defense, SP-D also seems to have an immunomodulatory function, inhibiting **T** lymphocyte proliferation and IL-2 production as well as inhibiting specific IgE binding to allergens and blocking allergen-induced histamine release from human basophils, incorporating the properties of modulating lung immune response in the lung allergic disease condition (6, 7, 8).

Summary of the invention: The present invention provides the use of a formulation for inducing and/or increasing apoptosis in activated eosinophils comprising of complete or fragment(s) of native or recombinant human lung surfactant protein D. SP-D induces and increases apoptosis specifically in activated eosinophils derived from hypereosinophilic patients for the resolution of eosinophilia and eosinophil mediated pathogenic effects in eosinophil related diseases and disorders other than airway-hyperresponsivenessmale sterility is to be induced with recombinant *Agrobacterium tumefaciens*.

Advantages: The present invention is useful in providing the use of formulation with SP-D in resolution of eosinophilic inflammations by inducing and/or increasing apoptosis towards the beneficial effects in human subjects suffering eosinophil related diseases and disorders. These include neuromuscular and respiratory diseases with eosinophilia, hypereosinophilic leukemias, hypereosinophilc syndromes (rare hematological diseases), skin diseases like eosinophilia-Myalgia syndrome, eosinophilic fascitis, capillary leak syndromes (IL-2), Churg-Strauss syndrome, toxic oil syndrome, parasitosis, etc.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IGIB	IN 0512DEL2007 - 08/03/2007 US 11/935985 - 18/09/ 2008	Das; Hasi Rani; et al.

Title: Compound 3-(1, 1-Dimethyl-Allyl)-6-Hydroxy-Chromen-2-One and its Pharmaceutically Acceptable Salts Thereof.

Field of invention: The present invention relates to compound 3-(1,1-dimethyl-allyl)-6-hydroxy-chromen-2-one of formula I isolated from Ruta graveloens L. The main utility of the invention is to provide lead molecule for development of new drugs for treating several inflammatory diseases in which nitric oxide plays an important role in inflammation.

Background of invention: Inflammation is the body's reaction to invasion by an infectious agent, antigen challenge or even just physical, chemical or traumatic damage. Inflammatory conditions are characterized by generation of pathological concentration of nitric oxide due to increased expression of inos gene. All these conditions are associated with severe pain, discomfort and incapacitation in advanced case. The inducible NOS isoform is not expressed in normal conditions but can be induced in many types of cells such as chondrocytes, macrophages and fibroblast like synovial cells by inflammatory cytokines such as IL-1.beta. and TNF-.alpha. or bacterial lipopolysaccharide (LPS) (Stadler et al., 1991, J Immunol. 147: 3915-20). Macrophages and synovial cells are the most abundant cell types in joints and they are the predominant source of nitric oxide in the inflamed synovium (McInnes I. B. et al., 1996, J. Exp. Med. 184, 1519-1524).

Summary of the invention: The main object of the present invention is to provide novel anti-inflammatory lead compound 3-(1,1-dimethyl-allyl)-6-hydroxy-chromen-2-one for developing new drugs for treating the inflammatory conditions. Another object of the invention is to provide the process for isolation of the novel anti-inflammatory lead molecule 3-(1,1-dimethyl-allyl)-6-hydroxy-chromen-2-one from a plant Ruta graveolens.

Advantages: The present invention relates to novel anti-inflammatory compound 3-(1,1-dimethyl-allyl)-6-hydroxy-chromen-2-one isolated from Ruta graveloens L plant. The isolated novel anti-inflammatory compound 3-(1,1-dimethyl-allyl)-6-hydroxy-chromen-2-one inhibits nitric oxide mediated inflammation both in vitro and in vivo. The main utility of the present invention is to provide lead molecule for development of new drugs for treating inflammatory diseases in which nitric oxide plays an important role in inflammation.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IGIB	IN 2193DEL2006 -04/10/2007 WO PCT/IN07/00452 – 10/04/2008	Abhay Sharma; et. al

Title: A Method For The Identification Of Potential Biomarkers And Drug Targets In Brain Plasticity Related Disorders.

Field of invention: The invention relates to identification of potential biomarkers and durg target candidates using a systems model of Drosophila melanogaster for the brain plasticity related disorders. Invention provides microarray gene expression profiles associated with kindling epileptogensis-like plasticity in fly. The fly genes that are up and down-regulated by convulsant and antiepileptic drugs have been identified. Potential biomarkers of epileptogenesis and related conditions are identified on the basis of expression profiling in the fly model. Potential drug targets for developing therapeutic agents against epilepsy and related disorders have been identified based on transcriptomic analysis.

Background of invention: In general, the antiepileptic drugs (AEDs) being currently used are symptomatic in that they inhibit seizure but do not modify the course of or prevent epileptogenesis (McNamara et al. 2006; Garriga- Canut et al. 2006). A system-level understanding of epileptogenesis is expected to facilitate development of novel antiepileptic, antiepileptogenic, disease-modifying and neuroprotective agents (Gorter et al. 2006). Inherent complexity of mammalian brain however does not allow the available rodent models of epileptogenesis to be subjected to the reiterative methods of systems modeling (Gorter et al. 2006). It is this gap of enabling invention that we used a systems biology approach to identify potential biomarkers and drug targets in neurological and neuropsychiatric diseases. Kindling is an animal model of brain plasticity in which repeated activation of neural pathways through administration of a subconvulsant electrical or chemical stimulus produces a gradually increasing electroencephalographic and behavioral response which, after withdrawal of the stimulus, eventually progresses to spontaneous seizures (Goddard et al. 1969; Pavlova et al 2006). Kindling in rodents is widely used to model epileptogenesis (McNamara et al. 2006; Garriga-Canut et al. 2006).

Summary of the invention: The invention provides a method for identifying potential biomarkers and drug targets in brain plasticity related disorders. The said method is based on systems modeling of kindling epileptogenesis-like plasticity in the fruit fly Drosophila melanogaster. Using the systems model so developed, the invention describes detection of potential biomarkers in epileptogenesis and associated disorders. Further, the invention describes identification of drug targets for developing antiepileptic, antiepileptogenic, disease- modifying, and neuroprotective agents.

Advantages: There is a pressing need to identify new therapeutic targets in epileptogenesis. Potential drug targets identified in the present invention fulfills, this need. Small molecules which are already known to act upon these targets can be readily screened using the behavioral module of the fly systems model described. This will provide a rapid path to drug development.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IGIB	IN 2011DEL2008 - 25/08/2008 US12/181798 – 04/02/2010	Gupta Kailash Chand, et al.

Title: Novel Crosslinked Pei Nanoparticle Based Transfection Agents For Delivery Of Biomolecules.

Field of invention: The invention relates to the development of non-viral cationic vectors for the delivery of genetic material, more accurately for delivery of bioactive molecules such as nucleic acids (DNA, siRNA, miRNA, etc.) to the cells (in vitro and in vivo).

Background of invention: A variety of materials (i.e., cationic lipids, polymers: natural and synthetic and peptides) have been utilized to fabricate non-viral delivery systems (M. J. Tiera et al, Curr. Gene Ther. 6 (2006) 59-71,13) which have several advantages in terms of safety, ease of preparation, reproducibility, ability to carry large nucleic acid constructs and stability (X. Gao et al, AAPS J. 9 (2007) E92-E104). Cationic lipids and cationic polymers for gene delivery may cause toxic effect in vitro and in vivo. For example lipoplexes caused several changes to cells, which included cell shrinking, reduced number of mitoses and vacuolization of the cytoplasm (K. Lappalainen et al, Pharm. Res. 11 (1994) 1127-1131). Cationic polymers, viz., polyethylenimine (PEI), polyamidoamine (PAMAM), polypropylenimine (PPI), poly-L-lysine (PLL), cationic dextran, polyallylamine (PAA), dextran-oligoamine based conjugates and chitosan, (M. D. Brown et al, Int. J. Pharm. 229 (2001) 1-21; H. Hosseinkhani et al, Gene Ther. 11 (2004) 194-203.), are amongst the preferable materials for the preparation of non-viral vectors in terms of their long-term safety and biocompatibility. PLL, PAA and many others were abandoned due to its low transfection efficiency and higher cytotoxicity. Dextran-oligoamine based transfection in a wide range of cell lines is very low in comparison to other cationic vectors based on PEI, dendrimers etc. Of these, PEI is one of the most successful and widely studied gene delivery polymers due to its membrane destabilization potential, high charge density (DNA condensation capability) and ability to protect endocytosed DNA from enzymatic degradation.

Summary of the invention: The primary amino groups present in the PEI system contribute towards cytoxicity whereas secondary and tertiary amino groups help in enhancement of buffering capacity and ultimately improve the transfection efficiency. Therefore, there is a need to design a nanoparticle based transfecting agent based on cationic polymers where, primary amino content could be kept to minimum and secondary, tertiary and quaternary content could be increased and would be useful for efficiently delivering genetic materials with low cytotoxicity and cell damage.

Advantages: The process of synthesizing the polymeric transfection vector is simple and devoid of tedious chemical synthetic routes. The reagents employed in the invention are easily available and need no coupling reagent. The reactions involved in the preparation of nanoparticles are clean and do not result in any harmful side product. The transfection reagent efficiently transfects a variety of cell lines. The transfection efficiency is enhanced manifolds in different cell lines compared to the standards (bPEI 25 kDa, gene porter 2, superfect, Lipofectamine-2000, fugene, etc.). There is no observed cytotoxicity associated with the nanoparticles.

Lab	Patent no./Application No. (Date of filing/Date of grant)	Inventor
IGIB	IN189314 -23/01/2004 US6262231 - 17/07/2001	Puranam U. et al

Title: Polypeptides useful for diagnosis of Aspergillus fumigatus and a process of preparing the same.A

Field of invention: The present invention relates to novel peptides of Aspergillus fumigatus having an amino acid sequence selected from the immunodominant region delimited by aa 6-22 of 18 kD allergen/antigen useful for immunodiagnosis. The invention further relates to a method for using any of the peptide sequences of the present invention for the diagnosis of aspergillosis.

Background of invention: The fungui, Aspergillus fumigatus causes a wide spectrum of human and animal disorders such as allergic bronchopulmonary aspergillosis (ABPA), extrinsic allergic alveolitis, aspergilloma and invasive aspergillosis. Invasive form of aspergillosis is becoming increasingly important in immunosuppressed conditions due to environmental pollution, enhanced use of chemotherapeutic drugs and antibiotics etc. The most susceptible hosts are the immunocompromised patients, such as cases with organ transplant, leukemia or acquired immunodeficiency syndrome (AIDS).

Summary of the invention: The present invention relates to novel peptide sequences from the immunodominant region of an 18 kD major allergen/antigen of Aspergillus fumigatus from aa 6-22, comprising aa 10-20, aa 6-20, aa 14-20, aa 10-22, aa 6-13 and the peptide sequence resulting from the modification by substitution and/or by addition and/or deletion of one or more amino acid altering specified properties. The peptides are useful in enzyme linked immunosorbent assay (ELISA) for the diagnosis of aspergillosis. They have lymphoproliferative as well as immunogenic properties and hence are potentially applicable in immunotherapy and immunoprophylaxis of aspergillosis. They are also able to stimulate the histamine release from sensitised mast cells of patients.

Advantages: Synthetic epitopic peptides with required immunological activity would facilitate use of pure, homogeneous, cost effective, specific diagnostic reagent. Such a reagent is anticipated to find a place in International market of Diagnostics for universal application. Simple and rapid diagnostic technologies can easily be developed with such reagents.Identified antigenic determinants may easily replace crude antigens of current use for intradermal skin testing.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IHBT	IN1914DEL2004-31/12/2004 US 11/022277-23/12/2004	Jonnala Kotesh K et al

Title: Process for production of steviosides from stevia rebaudiana bertoni

Field of Invention: The present invention relates to a process for the production of steviosides from Stevia rebaudiana Bertoni. The present invention relates to a method for recovering steviosides from dried plant material of Stevia rebaudiana using ecofriendly extraction and purification procedures. Water for extraction of the plant material and the ion exchange resins used in the present invention are ecofriendly, non-toxic in nature and are reusable which will ultimately have a tremendous impact on the process economics. The yield of product obtained in the present invention is high and intensity of its sweetness is superior to the plant raw material with milky white in appearance.

Background of invention:. Reference is made to R. H. Giovanetto, Method for the recovery of steviosides from plant raw material; U.S. Pat. No. 4,892,938; Jan. 9, 1990 wherein the method involves recovering steviosides from dried plant material of Stevia rebaudiana Bertoni by extraction and purification. An extract is obtained through treatment in water at a temperature from room temperature to about 65.degree. C. with stirring and subsequent filtration and centrifugation. This extract is treated with calcium hydroxide, whereupon a precipitate is obtained by means of filtration or centrifugation. This precipitate is treated with a strongly acidic ion exchange resin and subsequently with a weakly basic ion exchange resin, for three to five times, filtered and then dried.

Summary of the invention: The present invention provides a process for the production of steviosides from Stevia rebaudiana Bertoni, which comprises drying of plant material at temperature any where from 20 to 50.degree. C., followed by pulverization to 20 to 400 mesh size, extracting the plant material in a solvent consisting of demineralised water and heating the contents by injecting the steam directly or indirectly to a temperature ranging from 50.degree. C. to 120.degree. C. at a steam pressure ranging from 1 to 8 kg/cm.sup.2 for 0.25 to 4.0 hr, filtering the plant material to obtain an aqueous extract, treating the aqueous extract with basic salt to form a precipitate, filtering the treated extract to separate the precipitate, treating the separated clear filtrate with ion exchange resins and thereafter, drying the treated filtrate to obtain a product containing steviosides having stevioside in the range from 40 to 70% by employing water as the only solvent throughout the process.

Advantages: The process is performed with safer and reusable chemicals like water, ion exchange resins in the food grade range and the entire process is carried out in only one solvent phase and that is water. The extraction of the plant material is performed by directly injecting steam where the maximum steviosides are recovered in less time and in little water, which reduces the capital investment on plant machinery. Most of the colouring impurities like chlorophylls, flavonoids and other chelating compounds are precipitated by calcium hydroxide treatment at room temperature by mere stirring.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IHBT	IN 0663DEL2009- 31/03/2010	Arun Kumar Sinha et al.

Title: A process for isolation of vanillin and other phenolic compounds from vanilla beans

Field of invention: The present invention relates to a green process for the isolation of natural vanillin in crystalline form from vanilla pods, preferably from *Vanilla planifolia*. The present invention also relates to a process for isolation of water soluble color fraction and another phenolic rich fraction that may find application as natural flavoring and/or coloring additive in food, beverages, cosmetics and pharmaceutical industry. The present process is free from the use of toxic chemicals, including acid or base, thus enhancing its potential usage as a natural flavoring additive

Background of invention: Production and isolation of vanillin from natural sources present an altogether different scenario. So far, very few attempts have been reported for the isolation of natural vanillin from vanilla pods. In one process, extract containing about 0.1-0.2 g of vanillin was extracted three times with ether. The combined ether layers were concentrated and the residue was taken up in methylene chloride removing any water under dried sodium sulphate (Na_2SO_4). This solution was concentrated to solid, from which approximately a 10% solution in ether was prepared. Pure vanillin was then isolated by preparative gas chromatography of the solution (P. G. Hoffman and M. Salb, *J. Agric. Food. Chem.* **1979**, 27, 352-355).

Summary of the invention : The present invention provides a process for the isolation of vanillin from vanilla pods.

Advantages: Cost effective and industrially feasible process. A process to isolate vanillin in good yield and high purity (99.4%).A process for easy and clean purification of the product by recrystallization. A process for extremely easy column purification employing single eluent in remarkably short period. An eco-friendly and economical industrial process for the separation of phenolic enriched fraction along side vanillin. The obtained phenolic compounds possessing spicy, sour and aromatic flavour may find applications in food and beverage industry.

Lab	Patent No. /Application No. (Date of filing /Date of grant)	Inventor
IICB	US 7045157- 16/05/2006	Santu Bandyopadhyay et al

Title: Use of betel leaf extract to induce IFN-gamma production from human peripheral blood t cells and as a th1 type immunomodulator.

Field of invention: This invention relates to use of betel leaf extract to induce IFN-gamma production from human peripheral blood T cells.

Background of invention: Stinging nettle leaf extracts are registered in Germany for adjuvant therapy of rheumatic diseases. In a whole blood culture system, the nettle extract IDS 23 (Rheuma-Hek) inhibited lipopolysaccharide stimulated monocyte cytokine expression, indicating an immunomodulating effect. (Antirheumatic Effect of IDS 23, a Stinging Nettle Leaf Extract, on in vitro expression of T helper cytokines). The applicants investigated the immunomodulating effects of betel leaf extracts on phytohemagglutinin (PHA) stimulated peripheral blood mononuclear cells (PBMC) in vitro. Betel leaves has a strong pungent aromatic flavor and widely used as a masticatory. Generally, mature or over mature leaves, which has ceased growing but not yet become brittle, are used for chewing.

Summary of the invention: The invention relates to a method for inducing IFN.gamma. from human peripheral blood mononuclear cells wherein the said method comprising preparing water extract of betel leaf; preparation of human peripheral blood mononuclear cells; incubation of hPBMC with betel leaf extract for a period of 18 48 hours; extraction of RNA for cytokine specific RT-PCR or for flow cytometry for the detection of intracellular cytokine protein.; subjecting RNA for RT-PCR to obtain PCR products using IFN.gamma. specific known primers and enhancement of IFN.gamma. as reflected by IFN.gamma. specific band.

Advantages: It provides a method for inducing IFN-.gamma. from human peripheral blood mononuclear cells. Use of betel leaf extract for inducing IFN-.gamma. production from human peripheral blood T cells. It provides a composition comprising betel leaf extract, which is useful as Th.sub.1 type immunomodulator.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IICB	IN 219446 -06/05/2008 US 7087389 -08/08/2006	Tarun K. Dhar et al

Title: Highly cost-effective analytical device for performing immunoassays with ultra high sensitivity.

Field of invention: The present invention relates to analytical device and methods for use in determining analyte in batch of sample suspected of containing such analyte with ultra high sensitivity. More particularly, the invention relates to device and simple methods for application of signal amplification reagents after immunoassay in a laboratory or a field setting for attaining high sensitivity.

Background of invention: The diagnostically important molecules may be small molecules or macromolecules. The small molecules like mycotoxins such as aflatoxin B.sub.1, Ochratoxin A T-2 toxin are present in food and feed such as cereal grains, ground nuts, rice, peanuts, fodder as contaminants due to fungal infection. Human and animals are exposed to mycotoxins through ingestion of toxin-contaminated food and feed, inhalation or skin contact. The determination of mycotoxins in agricultural commodities is important because their consumption by man and animals causes mycotoxicosis. They also produce different biological effects such as acute toxicity, mutagenicity, carcinogenicity, tertogenicity etc (Morgan, M. R. A. Tetrahedron 45, 2237, 1989).

Summary of the invention: The present invention provides a highly cost-effective; easy to manufacture analytical device that can be particularly used for performing immunoassays for detection of analyte within 10 minutes with ultra high sensitivity. The device of the present invention comprises a semi-rigid liquid-impervious support body and a microporous member such as membrane containing multiple immobilized antibody spots attached at the lower surface towards the top breadth side with water-insoluble adhesive over a semi-rigid liquid-impervious body.

Advantages: Analytical device is highly cost-effective and easy to manufacture. The materials used for the construction are cheap and except reaction membrane, all are readily available from stationary store.Absorbent body is not fitted together with reaction membrane using compression or glue during manufacture and are provided separately.

Absorbent body is assembled during the assay and is discarded after use before proceeding for the next step. Additional absorbent body are also provided if required by the assay protocol for addition of elements of signal amplification system. The method developed for performing immunoassay using the device is simple and allows the flow of the sample and costly-labeled reagents always downwards and focussed without application of any force to the absorbent body. The method is useful in assaying wide variety of analytes. Assays are non-instrumental and can be used under field conditions. Visualization of the intensity of the colour spots in comparison with known concentration in reference standard gives an idea about the amount of antigen present

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IICB	US 7638329 - 29/12/2009	Bandyopadhyay et al.

Title: In vitro method to generate dendritic Langerhans type cells.

Field of invention: The present invention relates to a novel in vitro method for the generation of dendritic Langerhans type cells from peripheral blood monocytes especially the platelets.

Background of invention: Dendritic cells (DC), first described by Steinman and Cohn, Z. A. J. Exp. Med. 137: 1142, 1973 are the most potent antigen presenting cells which initiate immune responses such as the sensitization of T cells restricted by major histocompatibility complex molecules, the rejection of organ transplants and the formation of T cell dependent antibodies. They differentiate from their precursors into so-called "immature" DCs which are present in most tissues (Banchereau, J. and Steinman, R. M. Nature 392: 245, 1998). The best characterized immature DCs is the Langerhans cells (LC), located above the basal layer of epithelial cells of the skin. Until recently, it was difficult to isolate dendritic cells or Langerhans cells (Steinman, R. M., Lustig, D. S. and Cohn, Z. A. J. Exp. Med. 139: 1431, 1974). Our knowledge on these important antigen presenting cells has increased dramatically because of success in culturing these cells in vitro.

Summary of the invention : The invention provides an in vitro method for developing dendritic Langerhans type cells, for use in immunotherapy against cancer or infectious diseases and enhancement of graft survival in mammals, said method comprising the steps of: culturing cells selected from peripheral blood monocytes and bone marrow cells in a medium containing platelets obtained from the same species or phylogenetically close species and incubating the culture at 30 to 40.degree. C. for a period sufficient to enable formation of mature dendritic Langerhans type cells. Using this novel strategy dendritic Langerhans type cells are generated from any mammalian species from their peripheral blood monocytes or bone marrow cells using platelets of the same species or phylogenetically close species. These cells are useful for immunotherapy against cancers or infectious diseases and enhancement of graft survival. Particularly, the present invention involves a novel strategy to generate dendritic Langerhans type cells without the addition of (i.e., omits) exogenous cytokines.

Advantages: The conventional method of generating dendritic Langerhans type cells in vitro requires addition of recombinant cytokines like GM-CSF, IL-4 and TGF-.beta.1 to peripheral blood monocyte or bone marrow cultures. These cytokines are expensive. Therefore, generation of dendritic Langerhans cells in vitro using the conventional method is costly. On the other hand, our novel method of generating dendritic Langerhans type cells does not require the addition of any exogenous cytokines to monocyte or bone marrow cultures. Only platelets collected from the same species or from a phylogenetically close species can replace the requirement of exogenous cytokines. Platelets are easy to get and are inexpensive to prepare. Using this novel method large number of dendritic Langerhans type cells are generated in vitro very easily.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IICB	IN 221050 - 13/06/2008 US 7144921- 05/12/2006	A. K. Bhattacharya et al

Title: Novel composition having antibacterial and antifungal properties.

Field of invention: The present invention relates to the use of oil of clove which causes instant immobilization of human spermatozoa both in presence of seminal fluid as well as in presence of female reproductive tract fluids, including uterine components and cervical mucus. The invention may also be useful for treating and/or preventing the common vaginal infections.

Background of invention: Conservatives estimates predict a nearly 50% increase in the current world population of approximately six billion people by the year 2050 (1998 United Nations. 1998 Revision of the official United Nations population estimates and projections. World population nearing 6 billion projected close to 9 billion by 2050, Population Division of the Department of Economics and Social Affairs. United Nations, New York, 998). This potential over-population, particularly in developing countries, is further complicated by the non-availability of proper easy-to-use, simple, cheap, least toxic and non-invasive method of contraception. Several contraceptive devices have been introduced till date and all of them suffer from certain constraints .

Summary of the invention: The present invention relates to the use of oil of clove which causes instant immobilization of human spermatozoa both in presence of seminal fluid as well as in presence of female reproductive tract fluids, including uterine components and cervical mucus. The present invention also relates a contraceptive composition, that can be used vaginally by women to protect themselves from unexpected pregnancies and vaginal infections; a highly specific, safe, stable, and comparatively cheap active ingredient has been discovered. The efficacy has been further proven by hamster and rat spermatozoa, which were immobilized instantaneously with very low concentration of (1:1000) oil. The present invention comprises in vitro as well as in vivo methods for complete prevention of human sperm motility, thereby making sperm entry impossible into upper genital tract (i.e. uterus, Fallopian tube etc.) of women. The invention may also be useful for treating and/or preventing the common vaginal infections.

Advantages: The present invention provides a highly specific, safe and stable contraceptive composition for women to protect themselves from unexpected pregnancies and vaginal infections. It provides an anti-fertility composition comprising clove oil with a dilunet and optionally with one or more pharmaceutically acceptable additives. Provide a composition for spontaneous immobilization of sperms of human, hamster and rats.

Lab	Patent No. /Application No. (Date of filing /Date of grant)	Inventor
IICB	US 7129211 - 31/10/2006	Samir Bhattacharya et al

Title: Adipocyte insulin adpinsl with insulin a and b chains and an effective method of treating type 2 diabetes in a subject using adipocyte insulin.

Field of invention: The present invention relates to an adipocyte Insulin adpInsl with Insulin A and B chains of SEQ ID Nos. 1 and 2, a effective method of treating type 2 diabetes in a subject using adipocyte insulin, said method comprising steps of administering the insulin to a diabetic intraperitoneally, an Insulin gene of SEQ ID No. 3, a process of isolating protein Insulin from the adipocytes of the Carp, said method comprising steps of reverse transcripting RNA of adipocytes to obtain cDNA, using oligonucleotide primers of SEQ ID Nos. 5 and 6 to identify AdpInsl gene from cDNA, and deducing amino acid sequence from cDNA to obtain protein Insulin, and an adipocyte of Catla Catla useful for producing the said Insulin.

Background of invention: Insulin gene expression and secretion of insulin protein in all animals including human being is still known to be pancreatic p-cell specific. Search for an alternative insulin besides pancreatic P-cell has not yet been successful. Insulin like material was detected in bacteria, E. coli (1), immunoreactive and bioactive insulin was found in insects and annelids (2) and extra pancreatic distribution of insulin was reported in rat and human (3 16). But insulin gene expression and protein secretion from these sources is not known.

Summary of the invention: The present invention relates to an adipocyte Insulin adpInsl with Insulin A and B chains of SEQ ID Nos. 1 and 2, a effective method of treating type 2 diabetes in a subject using adipocyte insulin, said method comprising steps of administering the insulin to a diabetic intraperitoneally, an Insulin gene of SEQ ID No. 3, a process of isolating protein Insulin from the adipocytes of the Carp, said method comprising steps of reverse transcripting RNA of adipocytes to obtain cDNA, using oligonucleotide primers of SEQ ID Nos. 5 and 6 to identify AdpInsl gene from cDNA, and deducing amino acid sequence from cDNA to obtain protein Insulin, and an adipocyte of Catla Catla useful for producing the said Insulin.

Advantages: It provides an effective method of treating type 2 diabetes in a subject using adipocyte insulin.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IICB	IN 232610 - 20/03/2009 US 7291353- 06/11/2007	Pratap K. Das et al

Title: Anti-peptic ulcer activity of an extract of a flower of woodfordia fruticosa.

Field of invention: The present invention relates to a pharmaceutical composition comprising an effective amount of an extract or lyophilized extract or at least one bioactive fraction obtained from plant Woodfordia fruticosa along with one or more pharmaceutically acceptable additives/carriers. The present invention particularly provides a composition for treating ulcer caused by the conditions caused by stress induced ulcer, peptic ulcer, cold restraint induced ulcer, drug induced ulcer and acid induced ulcer and also the composition is used as specific inhibitor of gastric H.sup.+, K.sup.+-ATPase.

Background of invention: Traditional herbal preparations are known for centuries to protect against peptic ulcer diseases, the aetiopathological basis of which were not known in those periods. Current day knowledge about the underlying biochemical mechanism for most of the gastric ulcers and majority of the duodenal ulcers deserve appropriate consideration and due weightage while consolidating the claim regarding the efficacy of a plant extract. In a Program on `Discovery, Development & Commercialization of New Bioactive & Traditional Preparations`, coordinated by Council of Scientific Research, the Applicant has been collecting, extracting and screening different potential plants and their parts for their bioefficacy against various diseases. Gastric ulcer is one such disease. Based on screening through appropriate experimental model(s), the applicant has selected a plant flower as our target for the development of an effective anti ulcer medicine. This invention envisages to claim the potential of an extract obtained from the flower of Woodfordia fruticosa to act as an effective therapy against peptic ulcer diseases.

Summary of the invention: The present invention provides a pharmaceutical composition comprising an effective amount of an extract or lyophilized extract or at least one bioactive fraction obtained from plant Woodfordia fruticosa along with one or more pharmaceutically acceptable additives/carriers. The present invention particularly provides a composition for administering to treat ulcer caused by the conditions selected from stress induced ulcer, peptic ulcer, cold restraint induced ulcer, drug induced ulcer and acid induced ulcer and also used as specific inhibitor of gastric H.sup.+, K.sup.+-ATPase.

Advantages: The main advantage of the invention is to provide a pharmaceutical composition for treating peptic ulcer and related ulcerical conditions. Another advantage of the invention is to provide a pharmaceutical composition comprising lyophilized extract or bioactive fractions obtained from plant Woodfordia fruticosa for the treatment of peptic ulcer caused by various conditions.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IICB	IN 02992DELNP2006- 24/05/2006 US 7276258- 02/10/2007	Dey Debleena et al

Title: Herbal extract and compound lupinoside and its analogues as anti-diabetic type II drugs from plant Pueraria tuberose.

Field of invention: The present invention relates to a method of preventing and/or treating diabetes type 2, also, it relates to a method of augmenting Glut4 phosphorylation and Glut4 translocation to a target cell membrane to enhance insulin signal in a signal transduction pathway; further, it relates to a simplified and inexpensive process of obtaining extract and thereafter selectively, its active n-butanol fraction and active molecule Lupinoside PA (LPA.sub.4), useful in preventing and/or treating diabetes type 2; and lastly, a pharmaceutical composition thereof.

Background of invention: Type 2 insulin-resistant diabetes mellitus, an insidious disease, accounts for more than 95% of diabetic cases. This heterogeneous disorder is increasing in epidemic proportions, its world wide frequency is expected to grow more than six percent per anum.sup.1,2. The disease is primarily expressed in the form of hyperglycemia due to defects in glucose disposal into skeletal muscle, fat and liver as they become less responsive or resistant to insulin.sup.3,4. Large number of evidences has been accumulated that hold free fatty acids (FFAs) responsible for insulin inaction.

Summary of the invention: The present invention relates to a method of preventing and/or treating diabetes type 2, also, it relates to a method of augmenting Glut4 phosphorylation and Glut4 translocation to a target cell membrane to enhance insulin signal in a signal transduction pathway; further, it relates to a simplified and inexpensive process of obtaining extract and thereafter selectively, its active n-butanol fraction and active molecule Lupinoside PA (LPA.sub.4), useful in preventing and/or treating diabetes type 2; and lastly, a pharmaceutical composition thereof.

Advantages: To develop a method of preventing and/or treating diabetes type. To develop a method of augmenting Glut4 phosphorylation and Glut4 translocation to a target cell membrane to enhance insulin signal in a signal transduction pathway.To develop a pharmaceutical composition for preventing and/or treating diabetes type 2.

Lab	Patent No. /Application No. (Date of filing /Date of grant)	Inventor
IICB	IN 339DEL2005- 24/05/2006 US 11/439381- 25/05/2006	Ali Nahid et al.

Title: Antileishmanial activity of drug entrapped cationic liposomal formulations.

Field of invention: The present invention relates to a cationic liposomal formulation useful as a leishmanicidal agent. More particularly, it relates to the use of liposomal formulation in the treatment of kala azar. Further, it also relates to a pharmaceutical composition useful for the treatment of Kala azar in a subject. More specifically, it relates to a method of treating the kala azar in a subject. Further, the present invention also relates to a method for the preparation of liposomal formulation.

Background of invention: Protozoan parasites of the genus Leishmania cause a spectrum of diseases ranging from diffused cutaneous lesions (Diffused cutaneous leishmaniasis [DCL]), Local cutaneous leishmaniasis (LCL), mucocutaneous lesions (Espundia), to the more severe form of visceralized disease (Visceral Leishmaniasis [VL] or Kala-azar) in addition to the comparatively rare and illusive post kala-azar dermal leishmaniasis (PKDL). Sandflies of the genera Phlebotomus and Lutzomia act as vectors of all the diseases caused by Leishmania parasites and transmission modes vary from anthroponotic to zoonotic, with a variety of mammalian animals implicated as reservoirs.

Summary of the invention : The present invention deals with the liposomal formulation, method for the preparation and the use thereof which include liposome comprising various cationic lipids associated with neutral lipids and sodium antimony gluconate wherein cationic liposomes themselves have leishmanicidal activity and on encapsulating sodium antimony gluconate into them further improve their therapeutic potentiality. It also relates to a pharmaceutical composition useful for the treatment of Kala azar and a method of treating the kala azar in a subject.

Advantages: The main advantage of the present invention is to provide a liposomal formulations encapsulating sodium antimony gluconate which can target deep hidden parasites and also therapeutically active against drug resistant strain.Another advantage of the present invention is to provide a liposomal formulation wherein cationic liposomes themselves have leishmanicidal activity and on encapsulating sodium antimony gluconate into them further improve their therapeutic potentiality.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IICB	IN 2725DEL2005-29/09/2006	Chattopadhyay Sharmila et al.

Title: Leishmanicidal activity of night jasmine leaf extract containing calceolarioside a against chronic visceral leishmaniasis.

Field of invention: The present invention relates to a bioactive fraction obtained from the leaves of the plant night jasmine. More particularly, it relates to the use of said bioactive fraction in the treatment of visceral leshmaniasis.

Background of invention: Infection with the protozoan parasite Leishmania donovani is a major health problem with significant morbidity and mortality. Leishmaniasis is estimated to afflict 12 million people worldwide, causing disease ranging from skin lesion in cutaneous leishmaniasis to a progressive and fatal hepatosplenomegaly in visceral leishmaniasis (CR Davies, P. Kaye, S.L.Croft and S. Sundar, Leishmaniasis: new approaches to disease control, British Medicinal Journal. (2003) Vol. 15 pp. 377-382). Chemotherapy is still a major challenge to combat leishmaniasis despite the rapid and tremendous development of medicinal and pharmaceutical industry in recent decades. Even today, the pentavalent antimonials sodium antimony gluconate (SAG) has remained the first.

Summary of the invention : The present invention deals with a bioactive fraction obtained from the leaves of the plant night jasmine comprising a) calceolarioside A b) unidentified compounds c) kaempferol glycoside. It also provides the use of the said fraction and the compound calceolarioside A in the treatment of visceral leishmaniasis. Further, it also relates to a pharmaceutical composition and method of treating visceral leishmaniasis using said composition. The invention also relates to a method of isolation of said compound from the bioactive fraction obtained from the leaves of the plant Nyctanthes arbortristis.

Advantages: A potential medicament against kala-azar, visceral leishmaniasis. Herbal antileishmanial chemotherapeutic agent with better activity and less toxicity.. Calceolarioside A, novel strikingly potential antileishmanial drug candidate obtained from natural source.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IICB	IN0369DEL2006- 10/02/2006 US11/705476 - 12/02/2007	Banerjee Sukdeb et al.

Title: Bioactive fraction from plant woodfordia fructicosa.

Field of invention: The present invention relates to a pharmaceutical composition comprising the therapeutically effective amount of the compound oenothein C optionally along with one or more pharmaceutically acceptable carriers, additives, lubricants and diluents. More particularly, it relates to a method of treating peptic ulcer diseases in a subject using the said pharmaceutical composition. Further, the present invention also relates to the use of a compound oenothein C in the treatment of peptic ulcer diseases including gastric ulcer, duodenal ulcer and also gastritis, gastro esophageal reflux disorder (GERD).

Background of invention: Peptic ulcer disease (PUD) is a broad classification encompassing different types of gastric and duodenal ulcers, all of which are clinically characterized as an erosion of the mucosal lining in one or more areas of gastrointestinal tract. PUD does not occur when there is a balance between the aggressive factors and the defensive factors, manifesting only when the former factors become stronger than normal or when the latter factors weaken. However, it is now accepted that Helicobacter pylori is present in more than 90% of duodenal ulcers and 70-80% of gastric ulcers. PUD is therefore currently treated as an infectious disease also, cured with antibiotics.

Summary of the invention : The present invention deals with the pharmaceutical composition comprising the therapeutically effective amount of a compound oenothein C obtained from the bioactive fraction of plant Woodfordia fruticosa optionally along with one or more pharmaceutically acceptable carriers, additives, lubricants and diluents. Further it also provides a method of treating peptic ulcer diseases in a subject using the said pharmaceutical composition. It also relates to the use of the compound oenothein C in the treatment of peptic ulcer related diseases and a process for the isolation of the said compound.

Advantages: The inhibition of gastric proton pump by the compound oenothein C is much stronger than standard medicine omeprazole (about 20 times). Reasonably low MIC values (6.25-25.0 .mu.g/mL) of the same molecule oenothein C against clinical and different standard strains of H. pylori has also been provided in the present invention. The specific anti H. pylori activity of the molecule oenothein C is evident from its high MIC values (>400 .mu.g/mL) against a panel of aerobic bacteria, suggesting its potential as a useful therapeutic agent. Since the acid HCl and the bug H. pylori are the two major reasons for the pathogenesis of gastroduodenal ulcers, position of oenothein C as a single molecule anti gastric and duodenal ulcer medicine is unique.

Lab	Patent No. /Application No. (Date of filing /Date of grant)	Inventor
IICB	US 60/781329- 13/03/2006 USA 11/685413 - 13/03/2007	Basu; Rajatava ; et al.

Title: DNA vaccine as immunoprophylaxis against kala-azar.

Field of invention: This invention relates to a highly conserved membrane protein present in all species of Leishmania can be used as a vaccine antigen for genetic immunization against visceral leishmananiasis.

Background of invention: Leishmaniasis, caused by the most-genetically diverse intracellular protozoan parasite, is exemplified by its diversity and complexity. Visceral leishmaniasis (VL), also known as Kala-azar, is caused by members of L. donovani (LD) complex resulting in clinical symptoms like fever, cachexia, hepatosplenomegaly, and blood cytopenia. Active VL is associated with the absence of parasite specific cell mediated immune response. Carvalho, E. M., et al. Infect. Immun. 33:498. (1981); Carvalho, E. M. et al., A J. Clin. Invest. 76:2066.(1985). VL has also been increasingly recognized as an opportunistic infection in individuals infected with HIV virus. Pintado et al. Visceral leishmaniasis in human immunodeficiency virus (HIV)-infected and non-HIV-infected patients. A comparative study, Medicine (Baltimore); 80:54 (2001). The WHO has identified leishmaniasis as a major and increasing public health problem. United Nations Development Program/World Bank/World Health Organization, The Leishmaniasis. WHO Special Program for Research and Training in Tropical Diseases. Ninth Program Report. Tropical diseases: progress in international research, 1987-1988 (1989). Visceral form of leishmaniasis is fatal if left untreated with recent epidemics in Sudan and India resulting in more than 100000 deaths. Melby, P. C., et al., Infect. Immun. 68: 5595 (2000).

Summary of the invention: In one aspect, the invention provides a method for prophylactic immunizing a mammal infected with virulent form of the parasite Leishmania, comprising administering to the mammal a DNA vaccine comprising of (a) cDNA of the antigen known as Kinetoplastid Membrane Protein-11 (KMP-11), (b) cDNA is a polynucleotide comprising a coding region encoding the antigen, wherein the antigen is a cell surface membrane protein of Leishmania where prophylactic administration of the vaccine is effective to confer protection to the mammal from the parasite.

Advantages: The invention provides a highly conserved membrane protein present in all species of Leishmania which can be used as a vaccine antigen for genetic immunization against visceral leishmananiasis.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IICB	IN 1429DEL2006 - 13/06/2007	Suniti Bhaumik et al.

Title: A hybrid cell vaccine against leishmaniasis [kala-azar].

Field of invention: The present invention relates to a hybrid cell vaccine against Leishmaniasis comprising a syngeneic macrophage with a dominant Leishmania antigen-KMP-11 electrofused with allogenic dendritic cells. The invention in general relates to a hybrid cell therapy approach against visceral leishmaniasis. The vaccine of the present invention was able to achieve complete clearance of splenic and hepatic parasite burden in late stage of L donovani infection in genetically susceptible BALB/c mice..

Background of invention: Visceral leishmaniasis (VL), also known as Kala-azar, is caused by members of L. donovani complex resulting in clinical symptoms" like fever, cachexia, hepatosplenomegaly and blood cytopenia. Active VL is associated with the absence of parasite specific cell mediated immune response (9, 10). VL has also been increasingly recognized as an opportunistic infection in individuals infected with HIV virus (11). WHO has identified leishmaniasis as a major and increasing public health problem (12). Visceral form of leishmaniasis is fatal if left untreated with recent epidemics in Sudan and India resulting in more than 100,000 deaths (13).

Summary of the invention : Hybrid cell vaccination approach with dendritic cells has been widely used successfully in tumor models only. By devising a novel strategy of transfecting syngeneic macrophage cell line from BALB/c mice with a dominant Leishmania antigen-KMP-11 and electrofusing with allogenic DC from C57BL/6, the inventors obtained a complete clearance of splenic and hepatic parasite burden in late stage L donovani infection in genetically susceptible BALB/c mice. Curative response resulted from a high KMP-11 specific MHC class I restricted $CD8^{+}$CTL response. This is the first study that realized the potential of hybrid cell vaccine in the field of infectious disease and clearly shows the contribution of Th2 cytokine response in conferring protection to Leishmania donovani infection in experimental VL model

Advantages: The present invention for the first time substantiated that DC-based hybrid cell therapy can be implemented in future vaccine designs against advanced state of Visceral Leishmaniasis [VL] and has the potential to be used in intracellular parasitic disease in general.

Lab	Patent No. /Application No. (Date of filing/Date of grant)	Inventor
IICB	IN 1039DEL2008 - 23/04/2008 PCT/IN09/0238- 17/04/2009	Nahad ALi et al.

Title: A non-recombinant membrane antigen, a diagnostic kit thereof and process for detection of visceral leishmaniasis and pkdl.

Field of invention: The present invention relates to a non-recombinant membrane antigen (LAg) obtained directly from promastigotes of Leishmania donovani strain AG83, useful for diagnosing visceral Leishmaniasis (VL) and PKDL (Post Kala azar Dermal Leishmaniasis) in a subject suspected of being infected with the parasitic protozoa Leishmania donovani.

Background of invention Reactive oxygen species (ROS) are natural byproducts of aerobic metabolism. ROS are produced in cells by a variety of enzymes and are detoxified by a series of proteins and small molecules. The various ROS can exert different effects according to their nature and to their intracellular level that are determined by both their production rate and the activity of antioxidant enzymes. Low level of ROS usually promotes cell proliferation while high concentration induces programmed cell death or apoptosis (Laurent A, Nicco C. et al. Cancer Res. 65: 948, 2005). Most cancerous cells exhibit elevated ROS generation compared to their normal counterparts (Burdon R.H. Free Radic Biol Med. 18: 775, 1995 ; Szatrowski T.P. and Nathan CF. Cancer Res. 51: 794, 1991). High level of endogenous ROS in most cancerous cells provides an opportunity to exploit the potential of ROS to preferentially kill cancer cells over the normal ones by using ROS inducing agents

Summary of the invention : The present invention provides a non-recombinant membrane antigen (LAg) obtained directly from promastigotes of Leishmania donovani strain AG83, wherein said membrane antigen (LAg) being characterized by a complex of 25 -35 polypeptides having molecular mass in the range of 18- 155kD and having sensitivity and specificity in the range of 95% - 100% to anti-leishmanial IgG antibodies present in the serum of patient suffering from Visceral Leishmaniasis (VL) or Post Kala-azar Dermal Leishmaniasis (PKDL).

Advantages: The two assays based on ELISA and Dipstick are simple, sensitive and specific assay for diagnosis of visceral Leishmaniasis, which can detect the LAg-specific IgG antibodies in the serum of the active VL and PKDL patients. Dipstick assay is a simple, and rapid method, easy to perform; A small amount of blood is adequate and requires minimal processing. No special equipment is required for the storage of the dipstick or buffers. Multiple samples can be assessed simultaneously and no sophisticated equipment is required. Results can visually analyzed and interpretation is simple. Results can be obtained within 2 hr and it is therefore applicable at field level. The method is equally effective as rK39 strips on Indian patients. Due to its much low cost of the LAg-Dipsticks (Rs. 1.00 per test) in comparison to rK39 strips (Rs. 70.00 approx), it can be widely applied in the Indian subcontinent.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IICB	US 12/154847 - 27/05/2008 PCT/IN08/00332 - 27/05/2008	Kabir Syed Nazrul et al.

Title: Pharmaceutical composition having virucidal and spermicidal activity.

Field of invention: The present invention relates to a pharmaceutical composition having virucidal and spermicidal activity. More particularly, the present invention relates to Acaciaside-B [Ac-B] and one of its co-isolate which is enriched with Acaciaside-B (Ac-B-en-frn), to be used as a prophylactic contraceptive for HIV infection/AIDS. The present invention further relates to the use of Ac-B and/or Ac-B-en-frn in mixture with other natural or synthetic substances in the field of drugs and pharmaceuticals, for preparing formulations/methodology/devices for protection against human immunodeficiency virus (HIV-1) infection through invasive sexual contacts and/or control of unwanted pregnancy. The present invention also relates to the use of the seeds of Acacia auriculiformis as raw materials for isolation of Ac-B to provide an active principle for preparation of over the counter (OTC) available self-administrable, prophylactic, vaginal formulation/contraceptive with anti-HIV hallmark.

Background of invention: Nonoxynol-9 (N-9), the effective spermicidal molecule used widely in vaginal contraceptive formulations has been shown to render the user susceptible to STDs, including AIDS. The WHO has cautioned that N-9 containing formulations should not be used by those at risk of acquiring HIV infection. The most intriguing aspect of Ac-B, however, is that its spermicidal effects involve damage of lipid molecules of the cell membrane [H Ray, et al., Unpublished Observation]. HIV requires intact lipid rafts, highly specialized sub-regions in cell membranes, for entry into cells and budding of fully infectious particles. By virtue of its lipid dispersing effects, Ac-B is likely to disrupt the lipid rafts as well as the lipid molecules of viral envelop and therefore, theoretically appears to be a likely prophylactic candidate for HIV infection.

Summary of the invention : The present invention provides a novel active principle of plant origin i.e. Acaciaside-B, which is non-mutagenic and/or Ac-B-en-frn, whose mutagenic potential is yet to be explored, that possess virucidal and spermicidal properties, and may be useful as an active principle for the preparation of OTC formulations, available as emergency protection against HIV-1 infection during heterosexual invasive contact and/or vaginal contraceptive, wherein the said composition comprising the therapeutically effective amount of Ac-B, or its derivatives, or analogues, or pharmaceutically acceptable enriched mixture with other inert and/or safe materials, thereof obtained from the extract of the seeds of Acacia auriculiformis for preparation of chemical barrier against HIV infection during heterosexual interaction or as OTC available vaginal formulation/contraceptive with prophylactic action.

Advantages: Acaciaside-B has an anti-HIV property and capable to prevent HIV infection at a dose level of greater than or equal to 1.0 microgram per ml in vitro, which is perhaps well within tolerable limits. MEC of Ac-B is 125 micro g/ml for spermicidal activity on human sperm which is significantly lower than that of closest prior arts.Ac-B is non-mutagenic as tested in Ames Test. Ac-B does not interfere with the growth of Lactobacillus acidophilus in laboratory culture.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IICB	IN2640DEL2007- 06/11/2008 PCT/IN08/00798 - 02/12/2008	Bandhopadhyay et al.

Title: Extract of piper betel leaves for the treatment of human malignancies by inducing oxidative stress.

Field of invention: This invention relates to the treatment of malignancies of different origin that are sensitive to oxidative stress in animals including human beings by using extract of Piper betel leaves along with a pharmaceutically acceptable additives.

Background of invention: Reactive oxygen species (ROS) are natural byproducts of aerobic metabolism. ROS are produced in cells by a variety of enzymes and are detoxified by a series of proteins and small molecules. The various ROS can exert different effects according to their nature and to their intracellular level that are determined by both their production rate and the activity of antioxidant enzymes. Low level of ROS usually promotes cell proliferation while high concentration induces programmed cell death or apoptosis.

Summary of the invention The present invention provides composition comprising extract of Piper betel leaves along with pharmaceutically acceptable additives useful for treating human malignancies of different origin by inducing oxidative stress. The malignancies include but not limited to B-cell leukemia, hepatocellular carcinoma, salivary gland carcinoma, pancreatic carcinoma, prostrate carcinoma, breast adenocarcinoma, cervix carcinoma, skin melanoma, human burkitt lymphoma, ehrlich ascites carcinoma.

Advantages: To provide a method of treating human beings for treating malignancies of different origin which are sensitive to oxidative stress by the way of administering extract of Piper betel leaves along with a pharmaceutically acceptable additives.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IICB	IN 2034DEL2008 - 28/08/2008 US 12/584059 - 28/08/2009 PCT/IB2009/006665 - 28/08/2009	Adhya Samit

Title: Protein – coding RNA to correct mitochondrial dysfunction.

Field of invention: The invention consists of compositions and methods for delivery of protein-coding RNAs to correct mitochondrial dysfunction.

Background of invention: The underlying defects in many human diseases [TABLE 1] [Taylor, R.W., & Turnbull, D.M. (2005) Mitochondrial DNA mutations in human disease. *Nature Rev Genet* **6:** 389-402] are in the functioning of the cellular energy-generating system of mitochondria. These defects are caused by mutations in mitochondrial genes, deletions and/or rearrangements of parts of the mitochondrial genome, or by mutations in nucleus-encoded genes specifying protein components of the oxidative phosphorylation (OX PHOS) pathway. Such mutations may be transmitted through the germ line or be somatic, and the disease is usually complex, with multi-tissue involvement.

Summary of the invention : The present invention provides Pc RNA useful for the treatment of mitochondrial dysfunction, composition and method for preparing and using correctional RNA, with a carrier, administered to stimulate respiration of the cells, tissues, organs or the whole organism of normal or diseased subjects.

Advantages: The advantage of the present method is that the carrier complex is simple to prepare, with biochemically defined components, is suitable for upscaling and automation, yields complexes of greater purity, and avoids the expenses and hazards associated with handling large amounts of protozoa with infective potential.

Lab	Patent No. /Application No. (Date of filing /Date of grant)	Inventor
IICB	IN 0044DEL2009- 12/01/2010 PCT/IB2010/000040 - 12/01/2010	Santu Bandyopadhyay et al
Title: Inhibitors of nuclear factor - kappa b (NF- b) and inflammatory cytokines.		
Field of invention: The present invention relates to compounds of general formula 1 for the treatment of malignancies(cancers). Malignancies may be treated by the inhibition of phosphatidylinositol-3-kinase (PI3) pathway or by inducing nitric oxide (NO).		
Background of invention: Cancer or malignancy is the result of uncontrolled growth of a given cell type that occurs together with invasion of the surrounding tissue and the spread of malignant cells. Molecular evidence suggests the important roles for PI3 signaling pathway in tumor promotion and progression (Nature Rev. Drug Discovery 2005, 4, 988-1003).References may be made to Journal "Nature Rev. Drug Discovery 2005, 4, 988-1003PI3" wherein signaling pathway abnormalities are common in many cancers regardless of their origin.		
Summary of the invention : The present invention provides a pharmaceutical composition for the treatment of malignancies.		
Advantages: It provide compounds for the treatment of malignancies (cancer).Another advantage is it provide compounds for the treatment of malignancies (cancer) of breast, prostate, pancreas, acute lymphoblastic leukemia, and acute/chronic myelogenous leukemia. Malignancies may be treated by PI3 (phosphatidylinositol-3-kinase) pathway inhibition or by nitric oxide production.		

Lab	Patent No. /Application No. (Date of filing /Date of grant)	Inventor
IICB	IN 0381DEL2009- 19/02/2010 PCT/IN2010/000117 - 26/02/2010	Pratap kumar Das et al

Title: Development of a bifunctional molecule 5-hydroxy-2-phenyl-7-(6-piperidin-1-yl-hexyloxy)-4h-benzpyran-4-one as anti helicobacter pylori and gastric antisecretory agent.

Field of invention: The present invention relates to flavanoid compounds and process for preparation thereof. The present invention relates to the demonstration of anti *Helicobacter pylori* activity and gastric antisecretory activity of a semisynthetically designed flavonoid compounds, to be used for the prevention and treatment of gastroduodenal disorders in general and peptic ulcer diseases in particular.

Background of invention: *Helicobacter pylori* (*H. pylori*) is a ubiquitous, gram negative, highly motile, S-shaped, microaerophilic bacterium which colonizes the human gastric mucosa for extended time period. *H. pylori* infection is widespread with seroprevalence in the developed world between 30-60% (Everhart, 2000). Infection with the bacterium is usually contracted during childhood and patients remain infected for life unless treated. *H. pylori* infection has been shown to result in the development of chronic gastritis, gastro esophageal reflux disorder (GERD), and peptic ulcer diseases including gastric and duodenal ulcers. It is also linked to mucosa-associated lymphoid tissue (MALT) lymphoma, and gastric adenocarcinoma (Go, 2000).

Summary of the invention : The present invention provides a flavanoid compound of general formula X_1.

Advantages: The semisynthetic molecule can be prepared commercially starting from chrysin and piperidine, abundantly present in various plants (already published). The compound is not toxic. Peptic ulcer disease is a multietiologic disease. This designed molecule is capable of acting simultaneously against the bug *H. pylori* and the hypersecretion of gastric HCl, the two major etiologies of peptic ulcer diseases.

Lab	Patent No. /Application No. (Date of filing /Date of grant)	Inventor
IICB	US 6946277 - 20/09/2005	Khowala , et al.

Title: Method for enhancing cellobiase activity of termitomyces clypeatus using a glycosylation inhibitor.

Field of invention: This present invention relates to a novel edible mushroom strain Termitomyces clypeatus and a method for enhancing cellobiase activity of the novel strain Termitomyces clypeatus using 2-deoxy-D-glucose as glycosylation inhibitor.

Background of invention: An enzyme preparation containing high cellobiase activity is useful for enzymatic hydrolysis of cellulose, leading to production of glucose, which in turn may be converted to ethanol to be used as an alternative and renewable energy source. Cellulose comprises the most abundant source of fermentable carbohydrates in the world as plant biomass. When biologically converted to fuels, such as ethanol and various other low-value high volumes commodity products, this vast resource can provide environmental, economic and strategic benefits on a large scale unparalleled by any other sustainable resource as referred by--Handbook on Bioethanol Production and utilization.

Summary of the invention : This invention provides a method for enhancing the cellobiase activity of the strain Termitomyces clypeatus using 2-deoxy-D-glucose as glycosylation inhibitor, said process comprises inoculating and growing mycelial culture of (the edible mushroom) Termitomyces clypeatus, (Ghosh A. K. and Sengupta S., Journal of Food Sciences And Technology; vol 15. No.6, pp 237-242, 1978; and ibid Vol 19, pp 57-60, 1982) in sterilized medium containing 0.05 to 5.0% of 2-deoxy-D-glucose in addition to 0.5 to 2.0% of cellobiose, succinate--0.5%, 2 to 3% of ammonium di hydrogen phosphate and conventional micro-nutrients at pH between 3 to 8 and incubating at temperatures between 20-35.degree. C. under shaking in aerobic conditions, and separating the culture medium by known methods, and using the culture filtrate directly as the source of the enzyme cellobiase and also for endo-glucanase and cellobiohydrolase for use in cellulose hydrolysis.

Advantages: The enzyme preparation contains highest cellobiase activity in units per ml produced, so far reported from any other known organisms. Simply modulating media composition and fermentative conditions, without any genetic manipulation of the organism produces the activity. The enzyme preparation contains other cellulolytic activities, like endo-glucanase and cellobiohydrolase activities useful for better hydrolysis of cellulose, which are obtained in a single fermentation. The enzyme preparation is obtained from an edible mushroom, which is being consumed by people for a long time beyond record and the species is recorded as edible mushroom in literature. So, the enzyme preparation can be used directly for human consumption purposes, such as in processing of food products and medical aids etc. without any risk. The potency of the enzyme preparation can be easily determined by the assay of enzyme activities according to the methods that can be performed easily.

Lab	Patent No. /Application No. (Date of filing /Date of grant)	Inventor
IICB	IN 01691DELNP2005- 26/04/2005 US 6977242- 20/12/2005	Chatterjee , et al.

Title: Two gonadotropin releasing hormones and a method to isolate the same.

Field of invention: The present invention relates to two novel Gonadotropin releasing hormones muGnRH I and muGnRH II of amino acid SEQ ID 1 as QHWSAWRLPG, and SEQ ID 2 QHWSWGILPG respectively, useful for induced breeding in fish both in combination and alone, by activating production of Gonadotropin, and a method of isolating the same from Indian Murrel brain, and further, a method of inducing breeding in fishes using the said novel gonadotropin releasing hormones.

Background of invention: Gonadotropin Releasing Hormone (GnRH) is now the best available biotechnological tool for the induced breeding of fish. GnRH is the key regulator and central initiator of reproductive cascade in all vertebrates. It's a decapeptide and first isolated from pig and sheep hypothalami with the ability to induce pituitary release of luteinising hormone (LH) and follicle stimulating hormone (FSH). Since then only one form of GnRH has been identified in most placenta! mammals including human beings as the sole neuropeptide causing the release of LH and FSH.

Summary of the invention : The present invention relates to two novel Gonadotropin releasing hormones muGnRH I and muGnRH II of amino acid SEQ ID 1 as QHWSAWRLPG, and SEQ ID 2 QHWSWGILPG respectively, useful for induced breeding in fish both in combination and alone, by activating production of Gonadotropin, and a method of isolating the same from Indian Murrel brain, and further, a method of inducing breeding in fishes using the said novel gonadotropin releasing hormones.

Advantages: Use of novel gonadotropin releasing hormones for induced breeding in fishes. It provides a method of isolating and sequencing novel gonadotropin releasing hormones from Indian Murrel brain. To develop gonadotropin-releasing hormones for enhanced release of gonadotropin in fishes.

Lab	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
IICT	IN 185750 - 09/11/2001 USA 6617141 - 09/09/2003	Kaimal , et al.

Title: Reduced-calorie fats containing behenic acid and process of making thereof.

Field of invention:. This invention relates to a process for the preparation of reduced calorie fats. This invention particularly relates to the preparation of reduced calorie fats by incorporating behenic acid into edible oils such as sunflower, groundnut, safflower, rapeseed, soybean and fish oils. More particularly, it provides a reduced calorie plastic for containing essential fatty acids and natural antioxidants using different processes involving chemical interesterification of 1,3-dibehenin and edible oils or chemical interesterification of 1,3-dibehenin based structured fat and edible oils or enzymic transesterification of edible oils with alkyl behenates.

Background of invention: Typical fats and oils provide approximately 6 kcal/g of metabolizable energy compared to 4 kcal/g for protein or carbohydrate [Atwater, W. O. et al., Annu. Rep. Storrs Agric. Exp. Stn. (1903) No.15, 123-146 & Maynard, L. A., J. Nutr. 28 (1944) 443-453]. In addition to the caloric and nutritional value, fats have many functions in the diet.

Summary of the invention: The present invention provides a process for the preparation of reduced-calorie fat which comprises esterification of edible oils with a source of behenic acid such as herein described, in presence of a catalyst at a temperature in the range 25.degree. C. to 150.degree. C. at least for 0.5 hr. and then recovering and purifying the reduced-calorie fats using conventional methods such as herein described. Edible oils which may be used are such as sunflower, groundnut, safflower, soybean, rapeseed, fish oil etc. The sources of behenic acid which may be used are 1,3-dibehenin, alkyl behenate and a structured fat containing behenic acid described herein. The esterification temperature may be in the range of 25.degree. C. to 150.degree. C. depending on the type of catalyst used which may be an alkali metal alkoxide or a thernostable lipase enzyme such as Lipozyme. The esterification reaction may be effected in the time range of 0.5 hr to 6 hr. Recovery of the reduced-calorie fat may be effected by filtration followed by column chromatographic purification in case of enzymatic transesterification or by washing-off the catalyst alkali metal alkoxide in case of chemical transesterification.

Advantages: The starting materials for the preparation of low calorie structured fat are the natural edible oils preferably vegetable oil sources like mustard, sunflower, safflower and groundnut (peanut) oils. The process does not involve any costly chemicals. The reduced-calorie plastic fat prepared in the present invention has all the physical, chemical and biological attributes of a fat, consists only of triacylglycerols but deliver less calories and does not contain unnatural components such as very low molecular weight fatty acids. 4. The reduced-calorie fat contains essential fatty acids and natural antioxidants which are not present in the similar products reported earlier. 5. The reduced-calorie plastic fat does not contain any trans fatty acids which are usually present in the similar type of plastic fats prepared by partial hydrogenation.

Lab	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
IICT	IN 235262 - 29/06/2009 USA 7144740 - 05/12/2006	Dadala , et al.

Title: Method for chromatographic finger printing and standardization of single medicines and formulations.

Field of invention:. The present invention relates to a novel method of chromatographic finger printing useful for chemical and therapeutic standardization. More particularly, the present invention relates to chromatographic fingerprinting of organic and organo-metallic molecules which have UV-Visible radiation absorptive property present in a plant, animal or any other source capable of being used as a single or formulated medicine.

Background of Invention: The ancient man after many years of evolution started thinking about him and tried to understand the nature. He started living under a cover, the caves and in-groups. The process of thought has encouraged him to understand the nature and its inter action with the living beings.

Summary of the invention:. This invention relates to a method for detection and identification of principles from extracts of plants or animal, natural or synthetic sources, using chromatographic finger printing techniques.

Advantages: The contour chromatogram of the medicine becomes a Fingerprint of it. The fingerprints developed for a same medicine extracted under different pH value helps to understand the drug release in the intestine system at different pH values thus facilitating the pharmacodynamics of the medicines under study. The spectral bands of all the constituents are given in a single picture assessing the medicine about its therapeutic properties and nature, very easy.The 3-D Chromatogram becomes a photo of all the UV-spectra of all wavelengths of each constituent in a single picture indicating the chemical (conjugative and polarity) property of the molecule eluted. A database of the fingerprints of various herbal medicines available in the country useful for Quality control, Forensic and customs departments to control the use and misuse of the herbal medicines at the public interest. The database also facilitates to select a plant for collection of the herbal medicines suitable to be used for the therapeutic usage for a medicinal professional or an herbal trader. Analysis of the fingerprints using this software gives role of ecological factors on various herbal medicines available in the country and it is useful for Quality Control, Forensic and Customs Departments to control use and misuse of the herbal medicines at the national interest The analysis of the fingerprints is useful to understand the therapeutic efficacy of the medicines using the physico-chemical properties of the medicines as reported in the ancient literature. The analysis also gives information about the medicinal value of the various medicinal plants in the country and the role of the ecological factors on the chemical ingredients of the same medicine available in various parts of the country. The therapeutic and ethano-botanical classification of the fingerprints helps to bring some generalizations useful for the doctors and researchers for a complete understanding of the traditional medicines by analyzing the fingerprints.

Lab	Patent no./Application No. (Date of filing/Date of grant)	Inventor
IICT	IN 230857 - 28/02/2009 US 6342626 - 29/01/2002	Kaimal , et al.

Title: Process for the preparation of alkyl esters from commercial lactic acid.

Field of invention:. The present invention relates to a process for the preparation of alkyl ester from commercial lactic acid. The present invention particularly relates to a catalyst-free improved process for the conversion of aqueous commercial lactic acid containing free acid, dimer or highpolymers of lactic acids to alkyl ester by reaction with alcohol.

Background of invention: Esters of lactic acid are high boiling liquids with properties of interest as solvents and as plasticizers for cellulose plastics and vinyl resins. Butyl lactate is used as a high boiling solvent in lacquer formulations. The advantages of lactic acid and its esters in cosmetics and toiletries formulations have been reported (Manufac. Chem., 1999, May, 18-19). Lactate esters can be regarded as a new generation of skin whitening agents that have been shown to produce a synergistic effect when combined with other skin whitening agents (Purac Products--Brochures, www.purac.com.). Lactate esters are used to meet the high quality demands of semiconductor industry as a safe solvent in photoresist and in edgebead removal formulations (Purac Products--Brochures, www.purac.com.). A valuable way of producing butyl acrylate is by dehydration of butyl lactate (Manufacturing Chemist, 1999, May, 18-19; J. Chem. Tech. Biotech., 1994, 59, 149-156). Butyl lactate is used as a co-surfactant in preparation of microemulsions with anionic surfactants (J. Disp. Sci. Tech., 1997, 18, 161-175).

Summary of the invention:. The present invention provides a process for the conversion of commercial lactic acid to alkyl ester which comprises simultaneous hydrolysis of dimer and highpolymers of lactic acid to free lactic acid and esterification of free lactic acid, by reaction with alcohol at a temperature in the range of 130-250.degree. C. for 2 to 8 hrs at a pressure of 20-25 kg/cm.sup.2.

Advantages: The present invention is a catalyst free one step process for the simultaneous conversion of dimer and highpolymers of lactic acid to free lactic acid by hydrolysis and esterification of free lactic acid to alkyl lactate by reaction with alcohols. The reaction is carried out with commercial lactic acid having a total acidity of 88% (free acid, 73%). As no catalyst is used, there is no generation of aqueous effluents as in the case of homogeneous catalysts. Hence the process is more environmentally friendly.

Lab	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
IICT	IN 227530 - 13/01/2009 US 6403344 - 11/06/2002	Marellapudi ,et al.

Title: Enzymatic process for the preparation of an acetylated phospholipid.

Field of invention:. The present invention relates to an enzymatic process for the preparation of an acetylated phospholipid. The invention particularly relates to an enzymatic process for the preparation of an acetylated phospholipid from vegetable lecithins such as soybean lecithin, rapeseed lecithin etc., and animal lecithins like egg yolk lecithin or pure phosphatidylethanolamine isolated from the above lecithins. The commercial lecithins or phosphatidylethanolamine are acetylated by using vinyl acetate as acylating agent in presence of lipase from Mucor miehei having 1,3-position specificity as catalyst.

Background of invention: Commercial lecithin is an important co-product of oil processing obtained during degumming step. For example, soybean lecithin is a complex mixture and comprises of phospholipids and triglycerides, with minor amounts of other constituents like phytoglycolipids, phytosterols, tocopherols and fatty acids. The major phospholipids present in vegetable lecithins are phosphatidylcholine, phosphatidylethanolamine and phosphatidylinositol. The egg yolk lecithin contains phosphatidylcholine and phosphatidylethanolamine as major phospholipids. Lecithin has potential as a multifunctional additive for food, pharmaceutical and industrial applications.

Summary of the invention:. The present invention provides an enzymatic process for the preparation of an acetylated phospholipid from a lecithin, said process comprising acetylating the said lecithin in the presence of vinyl acetate and a catalyst comprising lipase from Mucor miehei having 1,3-position specificity, separating the desired acetylated phospholipid.

Advantages: The present invention is an enzymatic process for the preparation of acetylated phospholipids from vegetable lecithins such as soybean lecithin, rapeseed lecithin etc., animal lecithins like egg yolk lecithin, and pure phosphatidylethanolamine isolated from the above lecithins .The present invention uses vinyl acetate as acylating agent and also as a solvent. The final product acetylated phospholipids can be. easily obtained by filtering off the lipase followed by removal of vinyl acetate by distillation. The present invention selectively acetylates amino group of phosphatidylethanolamine without acetylation of hydroxyl group of phosphatidylinositol present in lecithin. This is possible only in the enzymatic acetylation using 1,3-specific lipase as described in the present invention. 1,3-Specific lipase does not allow the secondary hydroxyl group of phosphatidylinositol to participate in the reaction. In the present invention the excess acylating reagent and the enzyme can be reused in the next batch of the reaction The present invention provides an enzymatic method using lipase from Mucor miehei having 1,3-position specificity, which can be carried out under mild conditions compared to existing chemical methodologies and which is also an eco-friendly process.

Lab	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
IICT	IN 228674 - 06/02/2009	Prasad rbn, et al.

Title: A process for the up gradation and bleaching of crude rice bran wax.

Field of invention: The present invention relates to a process for the up-gradation and bleaching of crude rice bran wax, obtained during refining of crude rice bran oil. More particularly, the present invention relates to a process for refining and purification of crude rice bran wax obtained during de-waxing stage of refining process of rice bran oil to an essentially wax ester product which involves, a) removal of the triglycerides oil, b) removal of polymeric resinous material, c) bleaching of upgraded wax to obtain a pale yellow colored product that has potential in food, cosmetic and pharmaceutical applications. Depending on the intended application, some of these process steps may be omitted; for example, If the intended application is for industrial uses such as polishes, carbon paper, etc, the color may not be a great hindrance.

Background of invention: About 3.8 lakh tons of crude rice bran oil is processed in India every year (India is the world's largest producer of rice bran oil) and an important step in the processing of the oil is the removal of waxes present in the oil (de-waxing). Rice bran oil has the highest wax content among vegetable oils and can reach up to 5% [F.T. Orthoefer, in Bailey's Industrial Oil and Fat Products edited by Y.H. Hui, John Wiley & ONS, Inc., New York p.393 (1996)]. Thus, there is a potential of about 28,000 tons of wax with a multitude of potential applications including paper coating, candles, waterproofing polish (floor, furniture and shoe), carbon paper, printing inks, adhesives, fruit and vegetable coatings, cosmetics, pharmaceutical preparations, etc. Purified rice bran also can at least partially substitute camauba wax, which is totally imported.

Summary of the invention: The present invention provides a process for upgrading crude rice bran wax, said process comprising: a) treating crude rice bran wax with isopropyl alcohol (IPA) containing 1 to 15% by volume water to form an IPA-wax suspension; b) allowing the IPA wax suspension to stand to allow precipitation of resinousmatter; c) separating the resinous matter thus formed from the IPA-wax suspension toobtain clear IPA-wax solution containing upgraded wax, oil and soft wax;d) separating the upgraded wax from clear solution of step (c), ande) optionally bleaching the upgraded wax before or after its is removed from the clear solution.

Advantages: The present invention is a simple process for the upgradation and bleaching of crude rice bran wax obtained during dewaxing stage of refining process of rice bran oil. In the present invention the resinous matter present in the crude rice bran wax is separated easily by incorporating water into IPA. The present invention describes an easy process for the separation of resinous matter and oil in a single step. The removal of resinous matter and oil, and also bleaching is carried out continuously in the same vessel if the oil content in the crude wax is upto 40%.

LAB	Patent No./Application No (Date of filling/ Date of grant)	Inventor
IICT	IN 202379 -24/11/2006 US 17494676 -24/02/2009	Chakrabarti Prasad, et al.

Title: Process for the pre-treatment of vegetable oils for physical refining.

Field of invention: The present invention relates to a process for the pretreatment of vegetable oils such as rice bran oil, soybean oil, sunflower oil and palm oil for physical refining. More particularly, the present invention relates to a simple and economically attractive process for the pretreatment of vegetable oils which involves (a) enzymatic degumming with commercially available phospholipase A.sub.1 from the sources like Aspergillus oryzae microorganism, (b) bleaching of the enzymatically degummed oil using bleaching earth and activated carbon, and (c) dewaxing (in case of rice bran oil) of degummed and bleached oil at lower temperature to obtain oil with less than 5 ppm of residual phosphorus which is amenable for physical refining.

Background of invention: Vegetable oils contain a number of impurities such as phospholipids, fatty acids, pigments, odoriferous compounds that must be removed from the oils to make them suitable for direct human consumption. The refining of edible oils and fats can be carried out using two routes, namely chemical and physical refining. In chemical refining, the oil is treated with water followed by alkali to make it free of gums and free fatty acids. Alkali reacts with free fatty acids and produces soap which in presence of oil and water, forms considerable amount of emulsion wherein neutral oil gets occluded resulting in high oil loss. Particularly, for oils containing high free fatty acids like rice bran oil, emulsification causes higher refining losses. The soapstock produced in this process poses serious disposal problems. The physical refining method, the most viable alternative, involves processing of degummed oils where free fatty acids are removed by steam stripping along with deodorization. Consequently, oil losses are reduced, free fatty acid is distilled out with improved quality.

Summary of the invention: The present invention provides a process for the pretreatment of a vegetable oil selected from the group consisting of rice bran oil, soybean oil, sunflower oil and palm oil prior to physical refining of said vegetable oil, said process comprising subjecting the vegetable oil to enzymatic degumming using a phospholipase A.sub.1 enzyme, separating the gums, and bleaching the degummed product so obtained In another embodiment of the invention, the vegetable oil is subjected to degumming without the addition of citric acid and sodium hydroxide. In yet another embodiment of the present invention citric acid and sodium hydroxide are

Advantages: The present invention is an improved process for the pretreatment of vegetable oils like rice bran oil, soybean oil etc. suitable for the physical refining route. The present invention uses the improved enzymatic degumming method wherein the enzyme (phospholipase A.sub.1) used is isolated from microbial sources like Aspergillus oryzae. The present invention considerably reduces the degumming time compared to the existing prior art of enzymatic degumming.

Lab	Patent no./Application No. (Date of filling/Date of grant)	Inventor
IICT	IN 03611DELNP2006 -22/06/2006 US 10/587904 -28/07/2006 PCT/IN2005/00034 - 28/01/2005	Dadala vijayakumar, et al

Title: Method for Standardization of Chemical and Therapeutic Values of Foods and Medicines Using Animated Chromatographic Fingerprinting.

Field of invention: The present invention relates to a novel method of assessment of chemical and therapeutic properties of foods and traditional medicines using chromatographic finger printing useful for Chemical and therapeutic standardization. More particularly the present invention relates to organic, organo-metallic, metallic and metallo complex molecules which have absorptive or emission property of electromagnetic radiation presented in the form of Contour and 3-D stable and motion graphics present in natural or man made foods or medicines used as a single or formulated materials, for chemical and therapeutic standardization.

Background of invention: In the world many foods and drugs are used as a part of life for dietary, nutritional and therapeutic purposes. In India the traditional customs and social activities include, use of Ayurveda, Siddha and other Traditional Indian system of medicines to maintain the general health of people. In countries where, traditional philosophies were practiced most of the day-to-day activities will be included with some kind of traditional customs. Being the most intelligent animal, man might not have made any thing mandatory for the next generations with out any purpose. Being responsible and affectionate to the next generations to keep them healthy and happy he might have proposed some discipline in the life style. But this will be understood only by the generations who created it. Due to his personality man had also mis-used, mis-interpreted and misguided the next generations for his own benefits regarding some of these traditions in due course of time.

Summary of the invention: The present invention relates to a method for detection and identification of constituents of extracts of plants or animal, natural or synthetic sources possessing chemical and medicinal values and capable of responding to Electro Magnetic of radiation using a 2-D and a 3-D animated chromatographic finger printing and the generated movie movable on all axis between 0-360 degrees, chromatogram is divided in to 27 zones or further partitions there of, for chemical and therapeutic standardization where in said method comprising the steps of: i. Extracting Organic, Organo-metallic and metallic atoms or molecules using suitable solvent. ii. Subjecting the extract obtained in step (i) to the separation analysis based on pH, polarity under the influence of physical properties like temperature, viscosity and ionic media using a Chromatography technique under experimental conditions. iii. Generating static and animated Contour and 3-D data graphs of the ingredients eluted based on conjugative and polarity properties along with varying energies.

Advantages: The main advantage of the present invention is to propose a novel method for chemical and therapeutic standardization by detection and identification and animated 2-D and 3-D chromatographic finger printing of organic, organo metallic and metallic constituents of extracts of plants, animal or geological origin, natural or synthetic sources capable of responding to different wavelengths of electromagnetic radiations.

LAB	Patent No./Application No. (Date of filing/ Date of grant)	Inventor
IICT	IN 1624DEL2007 - 01/08/2007 PCT/IN07/00509 - 26/10/2007	Prabhavathi devi et al.

Title: Novel glycerol based heterogeneous solid acid catalyst useful for the esterification of fatty acids,a process and use thereof.

Field of invention: The present invention relates to a novel glycerol-based solid heterogeneous acid catalyst useful for the esterification of fatty acids. The present invention also relates to a process for the preparation of glycerol-based solid heterogeneous acid catalyst.

Background of invention: Biodiesel is generally prepared by the transesterification of natural oil or fat of vegetable or animal origin. The transesterification is carried out by acid or base catalysis. As the rate of reaction of the base catalyst is much faster than the acid catalyst, base catalysts are used, most often, commercially. For an alkali catalyzed transesterification, the glycerides and alcohol must be free from water and free fatty acids. Some of the natural oils or fats contain considerable amounts of free fatty acids, which interfere during the transesterification process. These free fatty acids are to be converted into their corresponding esters before transesterification.

Summary of the invention : The present invention provides a novel glycerol based heterogeneous solid acid catalyst useful for esterification of fatty acids or fatty acids present in vegetable oils and animal fats and having the following characteristics: i. molecular formula CH0.53-0.87S0.015-0.03O0.35-0.51 i ii. acid density in the range of 1.6-4.6 mMol/g; iii. surface are of 2-12.6 m^2/g; iv. insoluble in water and organic solvent like chloroform, hexane, pyridine and N,N-dimethylformamide and v. reusable. and a process for the preparation of said catalyst, said process comprises simultaneous partial carbonization and sulfonation of glycerol by reacting it with concentrated or fuming sulphuric acid, at a temperature in the range of 200-300 ^0C.

Advantages: The glycerol-based heterogeneous solid acid catalyst is prepared from crude glycerol, a by-product of biodiesel without any pre-treatment. This application enhances the value of glycerol, which indirectly enhances the economics of biodiesel industry.. Another feedstock for the preparation of solid acid catalyst is glycerol pitch, which is a low value by-product of fat splitting process. As fat splitting industry is facing several problems to dispose the glycerol pitch, this application may enhance the value to glycerol pitch..Technical grade glycerol is also used for the value addition through the preparation of glycerol-based solid acid catalyst.. The preparation of glycerol-based heterogeneous solid acid catalyst is carried out simultaneously by partial carbonization and sulfonation in a single pot reaction and the resultant solid acids contain more acid density and hydrogen moieties.

LAB	Patent No./Application No (Date of filling/ Date of grant)	Inventor
IICT	IN 1201DEL2008 - 12/05/2009 PCT/IN2009/000286 - 14/05/2009	Venkata,K.et.al.

Title: Polyol esters of medium chain fatty acids and process for preparation thereof.

Field of invention: The present invention relates to the preparation of different polyol esters based on 10- undecenoic acid and undecanoic acid and their evaluation for their properties as potential lubricant base stocks.

Background of invention: In recent years the awareness and concern over the use of petroleum based fuels and lubricants and their impact on the environment has opened the quest for environment friendly lubricants from renewable resources like vegetable oils.Mineral oil based lubricants, generally suffer from many disadvantages such as high toxicity to the environment and poor biodegradability. There is a need for the environment to be protected from the pollution from lubricants which are not environmentally friendly. Also the dependency on the dwindling supply of petroleum feed stock for the production of mineral oil base stocks is also a cause of worry. For these reasons a new class of environmentally acceptable lubricants is available and vegetable oils find a major place among them along with synthetic esters (polyol esters with short chain fatty acids and diesters) which are considerably expensive and can not be used always. The use of vegetable oils as lubricants is known for a long time. In recent years, increasing attention has been paid to natural triglycerides, fatty acids derived from them, and their potential applications. This raw material is cheap and renewable. Moreover, natural fats and products derived from them are generally environmentally friendly. Their lubricity (antiwear, antifriction and load carrying capacity) characteristics are vastly superior to that of mineral oils and these oils can work at much lower viscosities and remove heat faster than hydrocarbon based lubricants.

Summary of the invention: In the present invention novel polyolesters were prepared with pure unsaturated fatty acids undecenoic acid or with its hydrogenated derivative undecanoic acid. Undecenoic acid is generally prepared from castor oil (non edible vegetable oil) using pyrolysis reaction. Different types of lubricant base stocks were prepared with 10-undecenoic acid and undecanoic acid or their mixtures with different polyols have 5-6 carbon atoms and a total of 2-4 hydroxyl groups. The products were characterized for their physico-chemical properties and evaluated for their use as potential lubricant base stocks.

Advantages: Polyol esters of 10-Undecenoic acid have superior lubricant properties like low pour points, high viscosity index and high flash points. Vegetable oils with high oleic content are considered to be potential candidates to prepare bio-lubricant base stocks because of their good low temperature properties and oxidation stability. This high oleic content is generally achieved by genetic modification of vegetable oils like soybean, rape seed or sun flower or by chemical modifications like selective hydrogenation of polyunsaturated oils like soybean oil. 10-undecenoic acid is a monounsaturated fatty acid like oleic acid and polyol esters of 10-Undecenoic acid also have low temperature properties and they also may exhibit good thermal and oxidative properties like polyol esters of high oleic vegetable oils.

LAB	Patent No./Application No (Date of filling/ Date of grant)	Inventor
IICT	IN 1202DEL2008 - 12/05/2009 PCT/IN2009/000283 -14/05/2009	Bhaskar P.S.et al.

Title: Castor oil fatty acid based estolide esters and their derivatives as potential lubricants base stocks.

Field of invention: This invention relates to preparation of straight chain and isoalkyl esters of castor oil fatty acid-based estolides and their derivatives as potential lubricant base stocks.

Background of invention: Conventional mineral oil-based lubricating oils and synthetic esters. Vegetable oil based lubricants are attractive alternatives to mineral oil-based lubricants due to their enhanced biodegradability, lower toxicity and several other properties.Estolides are a class of esters, based on vegetable oils that form when the carboxylic acid functionality of one fatty acid reacts at the site of unsaturation or double bond, of another fatty acid to form an ester linkage, and the product is popularly known as estolides. The secondary linkages of the estolides are more resistant to hydrolysis than triglycerides, and the unique structure of the estolide results in materials that have physical properties far superior to those of vegetable and mineral oils for certain applications [Inform, 15, p. 515 (2004)].Esters of estolides derived from oleic acids and C_6 to C_{14} saturated fatty acids, characterized by superior properties for use as lubricant base stocks have been described in Industrial Crops and Products (2001), 13(1), 11-20. In another study saturate-capped, oleic estolides were esterified with 2-ethylhexanol to obtain the corresponding ester [Industrial Crops and Products, 18, p. 183 (2003); US patents,US 6,018,063(2002) & US 6,316,649 (2001)]. These coco-oleic estolide esters displayed superior low temperature properties (-36^{0}C) and more suitable as a base stock for biodegradable lubricants and functional fluids than current vegetable oil-based commercial materials.

Summary of the invention :. In the present invention a family of a novel estolide compounds derived from castor oil fatty acids estolides with about an acid value of 95 is reported. The castor oil fatty acids used in this invention contains not less than 84% of ricinoleic acid.

Advantages: Advantages of the estolide derivatives of invention are their high viscosity index (VI) and viscosity grade of ISO VG 32 and above which are more desirable. These estolide derivatives may not need thickeners which are necessary for improving the viscosity, VI and presence of polymer based thickeners or modifiers can cause shear stability problems in formulated lubricants. Low temperature properties are important for lubricant pumpability, filterability, fluidity, as well as cold cranking and startups. Pour point is the most common indicator of the low temperature behavior. Base stocks derived from vegetable oils usually have high pour points without the addition of pour point depressants. The estolide derivatives of the invention have superior low temperature properties than trioleate, vegetable oils .

LAB	Patent No./Application No (Date of filling/ Date of grant)	Inventor
IICT	IN- 1200DEL2008 -12/05/2009 PCT/IN2009/000287-14.05.2009	Rao,B.V.S.K. et al.

Title: A novel chemically modified castor oil fatty acid derivatives having superior lubricants performance properties and to method for its preparation.

Field of invention: This invention, relates to a novel chemically modified castor oil fatty acid compounds namely 9.10,12-tri hydroxy octadecanoic acid alkyl ester rich fatty acid alkyl esters and 9,10,12-tri acyloxy octadecanoic acid alkyl ester rich fatty acid alkyl esters mixture having superior lubricant performance properties and the methods for their preparation.

Background of invention: Vegetable oils such as rapeseed oil and high oleic varieties of oils are considered to be potential candidates to prepare bio-lubricant feed stocks which replace conventional mineral oil based lubricating oils and synthetic esters [Randies, SJ. et al.; J. Synthetic Lubrication., 9:145 (1992); Asadauskas, S. et al; Lub. Eng., 52:877 (1996)]. Vegetable oil-based derivatives are attractive alternatives to petroleum derived products because they have enhanced biodegradability, lower toxicity and they originate from renewable oilseed sources. The ester linkages deliver inherent lubricity and enable the oils to adhere to metal surfaces. In addition, vegetable oils have higher solubilising capacity for contaminants and additives than mineral oil base fluids. Most of the work reported on lubricant base stocks in the literature is based on edible oils. A major non-edible oil namely castor oil serves as an industrial raw material for the manufacture of a number of functional derivatives [J. Am. Oil Chem. Soc. 51, 65 (1974), J. Am. Oil Chem. Soc. 48, 759 (1971)]. Castor oil is a well known lubricant due to the presence of hydroxyl fatty acid (12-Hydroxy 9 cis - octadecenoic acid or ricinoleic acid) to an extent of 85-90% (Chemical Business, 1991, 55-60). J. Synthetic Lubrication 24,181(2007) reported the physico-chemical characteristics of castor oil.

Summary of the invention : The present invention relates to a novel class of chemically modified castor oil based lubricant base stocks as well as methods for producing them. In accordance with the invention, 12-hydroxy 9-cw-octadecenoic acid based lubricant base stocks are prepared starting from castor oil. Accordingly castor oil is dihdroxylated using hydrogen peroxide in the presence of acid catalyst followed by saponification to get a mixture of hydroxy fatty acids and non-hydroxy fatty acids. 9,10,12-Trihydroxy octadecanoic acid is the major fatty acid present in the product.

Advantages: In the present patent novel chemically modified castor oil fatty acid derivatives were prepared having superior lubricant performance characteristics. These products exhibited good viscosity index high flash point and very low pour points. They will have superior thermal and oxidative stabilities due to lack of unsaturation. They are potential base stocks for metal working, hydraulic and other industrial fluids.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IICT	IN 0045DEL2009 - 12/01/2010 PCT/IN2010/000021 - 12/01/2010	Bethala Lakshmi Anu Prabhavathi Devi, et al.

Title: A Process For Preparation Of Hexadecyl *Cis*-9-Tetradecenoate And Hexadecyl *Cis*-10-Tetradecenoate.

Field of invention: The present invention relates to a process for the preparation of two isomers of cetyl myristoleate namely hexadecyl *cis*-9-tetradecenoate and hexadecyl *cis*-10-tetradecenoate. More particularly, the present invention also relates to evaluation of both the isomers hexadecyl *cis*-9-tetradecenoate and hexadecyl *cis*-10-tetradecenoate for blocking inflammation and reduction of adjuvant-induced arthritis in rats.

Background of invention: Cetyl myristoleate (CMO) is the common name for hexadecyl *cis*-9-myristoleate. CMO is the ester of *cis*-9-tetradecenoic acid (myristoleic acid) and 1-hexadecanol (cetyl alcohol). Cetyl myristoleate is well known for its anti arthritis properties. Hexadecyl *cis*-9-tetradecenoate was found only in very selective number of species of animals including cows, whales, beavers and mice. Cetyl myristoleate was isolated from mice in 1972 by Harry W. Diehl, a researcher at the National Institutes of Health (Diehl HW, May EL. J Pharm Sci 1994; 83:296-9). Cetyl myristoleate has been used for immunizing against inflammatory rheumatoid arthritis in mammals (Diehl, US 4,049,824, Levin, WO 01/41783), treatment of rheumatoid arthritis (Diehl, US 4,113,881) and osteoarthritis (Diehl, US 5,569,676).

Summary of the invention: The present invention provides a process for the preparation of two isomers of cetyl myristoleate namely hexadecyl *cis*-9-tetradecenoate and hexadecyl *cis*-10-tetradecenoate and evaluation of both the isomers hexadecyl *cis*-9-tetradecenoate and hexadecyl *cis*-10-tetradecenoate for blocking inflammation and reduction of adjuvant-induced arthritis in rats.

Advantages: The advantages of the invention are the said isomers hexadecyl *cis*-9-tetradecenoate and hexadecyl *cis*-10-tetradecenoate as prepared are evaluated for blocking inflammation and reduction of adjuvant-induced arthritis in rats. Use of isomers hexadecyl *cis*-9-tetradecenoate and hexadecyl *cis*-10-tetradecenoate are effective to reduce the inflammation and edema of the animals equally up to 36 % compared to control group at a dose 400 mg/kg body wt.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IICT	IN 0350DEL2009 - 04/12/2009 PCT/IN2010/000109 - 25/02/2010	Bethala Lakshmi Anu Prabhavathi Devi; et al.

Title: A Process For Preparation Of Phytosteryl Ferulate.

Field of invention: The present invention relates to a process for the preparation of phytosteryl ferulate as nutraceutical/food supplement, an equivalent to some of the molecules present in oryzanol isolated from rice bran oil soap-stock using ferulic acid and phytosterols isolated from soybean oil deodorizer distillate.

Background of invention: Over the decades, the methods of oryzanol isolation from plant oils have been improved. Such method include isolation of cycloartenyl ferulate from plant oil using selective organic solvent for oryzanol extraction followed by chromatographic purification [Kimura, Goro Jap Pat 6314796 (1988) and Jap Pat 6314797 (1988)], isolation of oryzanols from rice bran dark oil by precipitating the sterins with aluminium sulfate followed by crystallization of oryzanols from the supernatant [Beso oils & fats Co. Ltd., Jap Pat 8295942 (1982)], highly concentrated seperation of oryzanols from rice bran and rice germ oils by two-step alkali treatment [Shimuzu, Hisashi; Jap Pat 76123811 (1976). Extraction of oryzanols from rice bran soap stack with diethyl ether at pH 9.5 followed by its chromatographic purification on a neutral alumina column [G.S. Seetharamaiah, and J. V. Prabhakar; J. Food Science Technology, 23,270 (1986)]. Extraction of oryzanols from rice bran soap stack with ether after acidification of soap stock with HCl [Tomotaro, tsuchiya et al; Jap Pat 4895 (1957)].

Summary of the invention: The present invention provides a process for the preparation of phytosteryl ferulate. The present invention provide a new synthetic process for the preparation of phytosteryl ferulate as nutraceutical/food supplement, an equivalent to some of the molecules present in oryzanol isolated from rice bran oil soap-stock using ferulic acid and phytosterols isolated from soybean oil deodorizer distillate

Advantages:. Phytosteryl ferulate as prepared in present invention shows hypocholesteremic activity in hamsters in comparison with that of natural oryzanol isolated from rice bran oil soap stock at par.

Lab	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
IICT	IN 1840DEL2009 - 07/09/2009	Saravanan Krishnasamy; et. al
Title: A Rapid and Continuous Transesterification Process for Biodiesel from Crude Jatropha oil.		
Field of invention: The present invention relates to an effective and rapid process for continuous preparation of biodiesel from crude non-edible oil like Jatropha containing varying amounts of free fatty acids (FFA) 2-10%, gums (0.3 to 0.6 %) unsaponifiable matter(0.4 -1.1%).		
Background of invention: In India use of non edible oils such as Jatropha and Karanja for biodiesel preparation has advantage as they do not get entangled in food v/s energy debate as they may be grown on marginal and waste lands, hence do not require the irrigated land. The crude non-edible oils invariably have high FFA (2-10 %) along with unsaponifiable matter and gums. The free fatty acids need to be esterified and then oil can further be transesterified using lower alcohols to get biodiesel. A number of patents and publications on esterification and transesterification reaction processes for the preparation of biodiesel with and without catalysts are available in the literature. Attempts were made by researchers to reduce the heterogeneity of the reaction mixture and the reaction time.		
Summary of the invention: The present invention provides an efficient and rapid process for preparing biodiesel directly from Crude Jatropha oil containing Free fatty acid (FFA) 2-10 %.		
Advantages: Crude Jatropa oil with high FFA, without any pretreatment such as degumminig, chemical or physical refining is used. The transesterification reaction is carried out in two stages in which the reaction time is 5-10 minutes in each stage and the separation of the layers also takes place rapidly within 5-10 minutes.		

Lab	Patent no. /Application No. (Date of filing/Date of grant)	Inventor
IIP	IN 239072 - 04/03/2010 US 10/585041 - 29/06/2006	Gupta;Ashok Kumar et al.

Title: Process For Preparing Fatty Acid Alkylesters Using As Biodiesel.

Field of invention: The present invention relates to a process for the preparation of fatty acid alkyl esters suitable for use as biodiesel. More particularly this invention relates to a process for the preparation of fatty acid alkyl esters suitable for use as biodiesel, by a single step catalytic esterification of free fatty acids and transesterification of triglycerides from vegetable oil or animal fats with a lower alcohol. Biodiesel, generally defined as methyl esters of vegetable oils, animal fats and even waste frying oils. Biodiesel is renewable and know to emit less smoke and carbon monoxide than petro-diesel and produce no sulfur dioxide. Many studies have been reported to demonstrate the use of biodiesel to run diesel engine, either pure or blended with petro-diesel.

Background of invention: Biodiesel can be produced by transesterification of vegetable oil or fat with a monohydric alcohol in presence of a catalyst usually a base such as hydroxides or methanolate of sodium or potassium. Among the alcohols that can be used in the tranesterification are methanol, ethanol, propanol, butanol and aryl alcohol. Due to low cost, polarity and short chain methanol is used as alcohol in biodiesel production. Excess alcohol is generally used to shift the equilibrium to the product side. Glycerol is obtained as byproduct in the production of biodiesel by transestrification. Vegetable oil or fat is generally obtained by extraction or pressing natural vegetable seeds and animal fats. It usually contains free fatty acids, phospholipids, sterols, water, odorants and other impurities. The refined oils also contain small amounts of free fatty acids and water.

Summary of the invention : The present invention provides a process for the preparation of lower alkyl esters of fatty acids by reacting triglycerides such as a vegetable oil or animal fat or free fatty acids or combinations thereof. With lower alcohols such as methanol, ethanol, propanol or butanol in presence of a catalyst and purifying the esters thus produced. The esters produced are suitable for use as fuel in diesel engines either as such or blended with petro-diesel.

Advantages: Present process of preparation is a single step esterification as well as transesterification .Separation of fatty acid esters and glycerol is easy and does not require the neutralization step.

Lab	Patent no. /Application No. (Date of filing/Date of grant)	Inventor
IIP	IN 1891DEL2005 - 06/07/2006 US 11/490514- 20/07/2006	Sain; Bir; et al.

Title: Process for desulphurisation of liquid hydrocarbon fuels.

Field of invention: The present invention relates to a process for the desulphurization of liquid hydrocarbon fuels. Particularly the invention relates to a process for oxidative desulphurization of liquid hydrocarbon fuels such as diesel fuel, gasoline, jet fuel, fuel oils, coal liquids and similar petroleum products to ultra low sulphur hydrocarbon fuels with sulfur content less than 10 ppm. More particularly, the present invention relates to oxidative desulphurization of liquid hydrocarbon fuels using carboxylic acid urea-H.sub.2O.sub.2 adduct, organosulphonic acid-H.sub.2O.sub.2 as oxidation system.

Background of invention: Hydrocarbon fuels such as diesel fuel, gasoline, jet fuel, fuel oils and coal liquids are presently being consumed in vast quantities and their consumption continues to grow at alarming rates, due to their high energy densities and convenient physical form. This high consumption inevitably has a major impact on global environment. Most notably transport hydrocarbon fuels like diesel fuel, gasoline, jet fuels are receiving intense scrutiny due to increased environmental concerns. There is an increasing demand to reduce sulphur content in the hydrocarbon fuels to produce products, which have very low sulphur contents and are thereby marketable in the even more demanding market place.

Summary of the invention : Hydrocarbon fuels such as diesel fuel, gasoline, jet fuel, fuel oils and coal liquids are presently being consumed in vast quantities and their consumption continues to grow at alarming rates, due to their high energy densities and convenient physical form. This high consumption inevitably has a major impact on global environment. Most notably transport hydrocarbon fuels like diesel fuel, gasoline, jet fuels are receiving intense scrutiny due to increased environmental concerns. There is an increasing demand to reduce sulphur content in the hydrocarbon fuels to produce products, which have very low sulphur contents and are thereby marketable in the even more demanding market place.

Advantages: Use of continuous counter current oxidation reactor eliminates need of settler, as settling zones are provided in the reactor itself. This increases efficiency of oxidation process by providing highest concentration of oxidant to tail feed and optimum utilization of oxidant. Oxidation step increases polarity of sulfur compounds present in the hydrocarbon fuel leading to their selective extraction by N-methyl pyrrolidinone antisolvent mixture.The process describes for the first time, use of N-methylpyrrolidinone antisolvent mixture as solvent for extraction of sulphones/sulphoxides from oxidised hydrocarbon fuels with minimum extraction of aromatics.Extraction of sulphones/sulphoxides from oxidised hydrocarbon fuels reduces handling and regeneration of large amounts of adsorbent making the process convenient and more feasible.

Lab	Patent no. /Application No. (Date of filing/Date of grant)	Inventor
IIP	IN3335DEL2005 - 09/12/2005 US11/374249 - 13/03/2006	Singh Arun Kumar et al.

Title: Composition of lubricating oil for two stroke gasoline engines and process for the preparation thereof.

Field of invention: The present invention relates to a composition of lubricating oil for two stroke gasoline engine and process for the preparation thereof. This invention particularly relates to composition of lubricating oil for two stroke gasoline engine that mainly contains alkyl benzenes. In addition to alkyl benzenes, the composition also contains an antioxidant, an extreme pressure additive, an antifoaming agent, a pour point depressant, a corrosion inhibitor and a detergent-dispersant additive, lubricity additives, smoke reducers, according to which it produce lower amounts of observable smoke in the exhaust-emission as a result of combustion in a two-stroke gasoline engine.

Background of invention: The two-stroke gasoline engine is a well known power source for outboard motors, snow mobiles, motor boats, motorcycles, scooters, mopeds, gensets and a variety of landscaping equipment, e.g., lawn mowers, chain saws, string trimmers and blowers. The widespread use of two stroke gasoline engines is primarily due to their simple design and lightweight construction, their ability to provide high power output with quick starts at low temperature and their relatively low cost. Two-stroke gasoline engines are operated using a mixture of gasoline and a lubricant in prescribed proportions. Because the fuel contains a gasoline lubricant mixture, large amounts of smoke are generated and emitted in the exhaust.

Summary of the invention : The present invention provides a composition of lubricating oil for two stroke gasoline engine comprising (i) base stoke of tailored heavy alkyl benzene having carbon atom mainly C21 to C25 in the range of 80-90 wt %, (ii) anti-oxidant in the range of 0.006-0.05% by weight (iii) extreme pressure additive in the range of 0.01-0.05% by weight, (iv) detergent-dispersant in the range of 0.05-0.15% by weight, (v) anti-foaming agent in the range of 0.01 to 1.0% by weight, (vi) pour point dispersant in the range of 0.01 to 1.0% by weight, (vii) corrosion inhibitor in the range of 0.10-0.03% by weight (viii) smoke reducing agent in the range 9.0-19.0% by weight and (ix) optionally with lubricity additive in the range of 0.01-0.05% by weight.

Advantages: The lubricant would be particularly suited for operating outboard motors, snow mobiles, motor boats, motorcycles, scooters, mopeds, gensets and a variety of landscaping equipment, e.g., lawn mowers, chain saws, string trimmers and blowers, etc.It reduces use of petroleum, offer better use of petrochemical waste product.Reduce green house gases & emissions, having higher smoke index 150 to 250.Product is more biodegradable around 40 to 60% and ecofriendly than petroleum lubes.

Lab	Patent no. /Application No. (Date of filing/Date of grant)	Inventor
IIP	IN 3332DEL2005 - 09/12/2005 US 11/392994 - 29/03/2006	Singh; Arun Kumar et al.

Title: Composition of hydraulic fluid and process for the preparation thereof.

Field of invention: The present invention relates to a composition of hydraulic fluid and process for the preparation thereof. This invention particularly relates to composition of hydraulic fluid that mainly contains alkyl benzenes. In addition to alkyl benzenes, the composition also contains an antioxidant, an extreme pressure additive, an antifoaming agent, a pour point depressant, a corrosion inhibitor, a detergent-dispersant additive and a lubricity additive, according to which it produce lower amount of pollution. The product of this invention has utility as a general purpose hydraulic fluid in vacuum pumps and stationary equipment.

Background of invention: Hydraulic oil is an industrial lubricant used in many applications, from gear pumps to axial piston pumps to heavy-duty farm and industrial equipment. All hydraulic oils should prevent components from excessive wear and maintenance costs even under extreme temperatures. The deterioration can result from a variety of factors. Rust is one common problem that plagues small parts in engines, transmissions, and hydraulics systems. This problem often arises from the presence of excess water vapor in the system. Oxidation and foam build up is other problems that build up over time and affect the performance of hydraulics systems. For optimal functioning, a hydraulic fluid must be relatively incompressible and must flow readily. In addition, it should provided adequate lubricity for moving parts, stability under anticipated conditions of use, compatibility with materials used to construct the hydraulic system, and the fluids should have the ability to protect system components against chemical reaction with materials which may enter the system. Finally, they should have a minimal impact on the environment.

Summary of the invention : The present invention provides a composition of hydraulic fluid comprising TABLE-US-00001 (i) base stoke of tailored heavy alkyl 98.0-99.8 wt %, benzene having carbon atom mainly C18 to C22 in the range of (ii) anti-oxidant in the range of 0.006-0.05% by weight (iii) extreme pressure additive 0.005-0.05% by weight, in the range of (iv) detergent-dispersant in the range of 0.05-0.15% by weight, (v) anti-foaming agent in the range of 0.01 to 1.0% by weight, (vi) pour point dispersant in the range of 0.01 to 1.0% by weight, (vii) corrosion inhibitor in the range of 0.10-0.03% by weight (viii) lubricity additive in the range of 0.005-0.05% by weight.

Advantages: The present invention provides the composition of the hydraulic fluid is fairly biodegradable and eco-friendly and provides better or equivalent performance as mineral oil based hydraulic fluids.

Lab	Patent no. /Application No. (Date of filing/Date of grant)	Inventor
IIP	IN 3336DEL2005 - 09/12/2005 US 11/386576 - 21/03/2006	Singh Arun Kumar et al.

Title: Composition of insulating fluid and process for the preparation thereof.

Field of invention: The present invention relates to a composition insulating fluid and process for preparation thereof. This invention particularly relates to composition of insulating fluid that mainly contains alkyl benzenes. In addition to alkyl benzenes, the composition also contains an antioxidant, an antifoaming agent, a pour point dispersant, a corrosion inhibitor and a detergent--dispersant additive. The product of this invention has utility as an insulating fluid in electrical installations such as transformer.

Background of invention: Enhancing the life of an electrical transformer is an essential part of a modern power operation technology. The aging or deterioration of insulating oil is normally associated with oxidation. Due to the presence of oxygen and water, insulating oil oxidizes even under ideal conditions. The insulating properties of the oil are also affected by contaminants from the solid materials in the transformer dissolving in the oil. The reaction between unstable hydrocarbons in the oil and oxygen, moisture or other chemicals in the atmosphere, with the assistance of accelerators such as heat, results in decay products in the oil. Mineral oil insulating fluids undergo oxidative degradation in the presence of oxygen to give a number of oxidation products. The final products of oxidation are acidic materials that can affect the characteristics of the insulating fluid as well as damage the components of the electrical unit. The high temperatures in due course cause the fluid to oxidize and ultimately produce sludge and soluble acid in sufficient quantity to impair its heat transfer and dielectric efficiency. Sludge formation is the terminal stage of the deterioration process. The acids formed in the process of oxidation attack on the cellulose fibers and metals forming metallic soaps, lacquers, aldehydes, alcohols and ketones which precipitate as heavy tarry acidic sludge on the insulation. Sludge appears faster in heavily loaded, hot running and abused transformers causing shrinkage of the insulation through leaching out varnishes and cellulose materials.

Summary of the invention : Accordingly the present invention provides a composition of insulating fluid comprising (i) base stoke of tailored heavy alkyl benzene having carbon atom mainly C14 to C18 in the range of 98.0-99.8 wt %, (ii) anti-oxidant in the range of 0.006-0.05% by weight (iii) detergent--dispersant in the range of 0.05-0.15% by weight, [0018] (iv) anti-foaming agent in the range of 0.01 to 1.0% by weight, (v) pour point dispersant in the range of 0.01 to 1.0% by weight, vi) corrosion inhibitor in the range of 0.10-0.03% by weight.

Advantages: The advantage of this invention that the composition of the insulating fluid based on alkyl benzene obtained from an alternate source of the present invention is free from condensed aromatic, eco-friendly and provides better or equivalent performance as mineral oil based insulating fluids.

Lab	Patent no. /Application No. (Date of filing/Date of grant)	Inventor
IIP	IN 0702DEL2007 - 05/03/2008 US 12/593920 - 30/09/2009 PCT/IN2008/000189 - 26/03/2008	Adhikari; Dilip; et al.

Title: Process For The Preparation Of Ethanol From Starch.

Field of invention: The present invention relates to a process for the preparation of ethanol from starch. More particularly, the present invention relates to a process for the preparation of ethanol from starch such as tapioca, potato, sweet sorghum, rice by liquification and saccharification of starch and subsequent fermentation of mono saccherides to ethanol in presence of thermophilic micro-organisms.

Background of invention: Plant products such as tapioca, corn, rice, potato, sweet sorghum contain starch that used as feedstock for the production of ethanol. According to conventional process, starch containing agricultural products are grinded and made starch slurry or gelatinized with water for enzymatic hydrolysis. The total time required for conversion of starch to ethanol in the fermentation broth in the conventional process is around 65 to 75 hrs. Improvement in the efficiency of conventional process has been made by developing simultaneous saccharification and fermentation (SSF) process in which saccharifying enzyme can function under the same conditions of fermentation at 30.degree. C. and pH 4.0 to -4.5. The process significantly saves time and energy during saccharification and fermentation process.

Summary of the invention : The present invention provides a process for the preparation of ethanol from starch using thermophilic microorganisms and the said process comprising the steps of: [0014](a) cultivating, harvesting and preserving the thermophilic microorganism selected from Geobacillus sp. IIPTN (MTCC 5319) and ethanologen Kluyoveromyces sp. IIP E453 (MTCC 5314), [0015](b) subjecting the starch to simultaneous liquification and saccharification by extra cellular enzymes of the bacteria Geobacillus sp. IIPTN (MTCC 5319), at temperature of 40-80.degree. C., at pH in the range of 5-7.0, to obtain the starch hydrolysate, [0016](c) subjecting the above said starch hydrolysate obtained in step (b) to fermentation to ethanol by thermophilic ethanologen Kluyoveromyces sp. IIP E453 (MTCC 5314), at a temperature in the range of 40-100.degree. C., at a pH in the range of 4.5-5.5, followed by the recovery of ethanol by conventional distillation, OR [0017](d) subjecting the starch to simultaneous liquification, saccharification and fermentation by co-culturing thermophilies, Geobacillus sp. IIPTN (MTCC 5319) and Kluyoveromyces sp. IIP E453 (MTCC 5314), at a temperature of 40-60.degree. C. and at a pH of 4.5-5.5, followed by the recovery of ethanol by known method.

Advantages: The process has the advantage of operating at a temperature which accomplishes liquification, saccharification and fermentation to convert starch biomass to ethanol by using the thermophilic microorganisms.The process would save significant amount of energy input for bioethanol production as compared to hitherto known process.

Lab	Patent no. /Application No. (Date of filing/ Date of grant)	Inventor
IIP	IN 2825DEL2008 -15/12/2008 US 12/634312 - 09/12/2009	Rengaswamy, Nerur Sankaranayan ; et al.

Title: A process for the removal of sulfones from oxidized hydrocarbon fuels.

Field of invention: The present invention relates to a process for the removal of sulfones from oxidised hydrocarbon fuels.

Background of invention: Increased industrial activities and a rapidly escalating increase in demand of fossil fuel for power generation and transportation , has led to increased emission levels which has demanded highest scrutiny with respect to the health hazard and environmental pollution. A key pollutant in hydrocarbon transportation fuels is sulphur which apart from being responsible for formation of harmful sulphur di-oxide emissions during fuel combustion, also causes poisoning of the catalytic converters in automobiles in turn leading to increase in NOx emissions .New fuel quality standards are being imposed for the control of such emissions through reduction in sulfur content in the hydrocarbon fuels. There are several approaches for such desulfurisation of hydrocarbon fuels. Some of these approaches were particularly examined to achieve ultra deep desulfurisation. The conventional hydro-desulfurisation of hydrocarbon fuels being currently practiced in the petroleum refining industry involves contacting of hydrogen with the hydrocarbon stream in presence of catalyst at elevated temperatures and pressures to convert sulfur compounds present therein to hydrogen sulfide in.

Summary of the invention: The present invention provides a process for the derusting/removal of corrosion products from a ferrous material substrate, said process comprising electrochemical treatment of the substrate in natural seawater as electrolyte under an optimum current density in the range of 6 to 8 A/sq. dm using an inert anode of stainless steel material.

Advantages: The process as a whole is environmentally friendly, as no major pollutant is involved during operation and even most of the goacous products liberated during the process are utilised in the cleaning process, unlike conventional methods, both chemical and electrolytic cleaning. The process as a whole is material friendly as the base metal loss due to this process is found to be negligible compared to conventional methods of chemical and electrolytic cleaning. The process of the present invention is user friendly as no hazardous gaseous product or any other by-product is produced during the cleaning operation, unlike conventional methods of chemical or electrolytic cleaning. The process is also cost effective as the energy consumption is low and the total operational cost is at least 75-90 times less than conventional methods.

Lab	Patent no. /Application No. (Date of filing/Date of grant)	Inventor
IIP	IN 0204DEL2008-25/01/2008 US 12/261351-30/10/2008	Jain;Suman Lata ; et al.

Title: Process For Direct Hydroxylation Of Aromatic Hydrocarbons.

Field of invention: The present invention relates to a process for direct hydroxylation of aromatic hydrocarbons. Particularly the present invention relates to a process for direct liquid phase hydroxylation of aromatic hydrocarbons with hydrogen peroxide catalyzed by vanadium based catalysts. More particularly the present invention relates to a process for direct liquid phase hydroxylation of aromatics like benzene to phenol, toluene to cresols and anisole to methoxyphenols by using hydrogen peroxide as environmentally benign oxidant in polar solvent like acetonitrile using vanadyl phthalocyanine as catalyst in the temperature range ambient to 100.degree. C.

Background of invention: Hydroxy aromatics are valuable organic intermediates in chemical industries related to resin, plastics, pharmaceuticals and agrochemicals. Phenol for example is further processed to form phenol resins, caprolactam, bisphenol A, adipic acid. Similarly cresols are used for preparing antioxidants, herbicides, insecticides, dyes, flavoring agents, plastics and lubricating oils. p-Cresols is also used for producing BHT (2,6-di-tert-butyl-4-hydroxy toluene) an important antioxidant. Guaiacol (o-methoxyphenol) and p-methoxyphenol also find wide applications in the field of pharmaceuticals, synthetic perfumes, antioxidants and polymerization inhibitors. There are mainly two industrial processes for the production of guaiacol involving methylation of catechol with dimethyl sulphate or carbonate in presence of alkali. p-Methoxyphenol is industrially produced by selective methylation of hydroquinone with dimethyl sulphate or carbonate. These processes are highly environmentally unacceptable.

Summary of the invention : The present invention provides a process for direct hydroxylation of aromatic hydrocarbons which comprises reacting aromatic hydrocarbon with hydrogen peroxide with a molar ratio of hydrocarbon to hydrogen peroxide in the range 1:0.05 to 1:10 in a polar solvent with a weight ratio of hydrocarbon to solvent in the range 1:3 to 1:20, in the presence of heterogeneous catalyst selected from vanadium phthalocyanine or its derivative, at a temperature in the range of 25-100.degree. C., for a period 1-10 hrs in a batch or continuous manner, removing the catalyst from the above said reaction mixture, followed by fractional distillation of the resultant filtrate to recover the unreacted aromatics and obtaining the desired hydroxyl aromatics.

Advantages: The present process is uniformly applicable for a wide variety of aromatic hydrocarbons like benzene, toluene and anisole.The present invention describes for first time use of vanadyl phthalocyanine as highly active catalyst for hydroxylation of aromatic hydrocarbons like benzene, toluene, anisole which could be recycled without any metal leaching problem. In the present invention hydroxylation of aromatic hydrocarbons is carried out under very mild reaction conditions by using environmentally benign aqueous hydrogen peroxide as oxidant.

Lab	Patent no. /Application No. (Date of filing/Date of grant)	Inventor
IIP	IN 0776DEL2008-08/09/2008 US 12/399717 -06/03/2009	Nagabhatla; swanadham et al.

Title: .Modified Zeolite Catalyst Useful for the Conversion of Paraffins, Olefins and Aromatics in a Mixed Feedstock into Isoparaffins and a Process Thereof

Field of invention: The present invention relates to a modified zeolite catalyst useful for the conversion of paraffins, olefins and aromatics in a mixed feedstock into isoparaffins. More particularly, the present invention relates to a porosity and acidity modified zeolite comprising one or two noble metals. The present invention also relates to a process for the conversion of paraffins, olefins and aromatics in a mixed feedstock into isoparaffins.

Background of invention: Environmental concern and restriction on fuel quality especially on the restriction on the amount of sulfur, aromatic and olefins in FCC gasoline demands novel catalyst and process for hydrocarbon conversion. The octane loss occurred during traditional sulfur removal process also demands hydrocarbon conversion process for octane boosting in an eco-friendly way. The present invention relates to a process for hydroconversion of feedstocks, especially FCC gasoline, to a catalyst for use in hydro conversion process with a feedstock having high amount of paraffins, olefins and aromatics to produce branched paraffin and to a process provides such catalyst. Whereas, the present invention deals with the conversion of aromatics, olefins and naphthenes present in the feed into iso-paraffins. Based on the prior art details and drawbacks thereof, the present work is intend to provide a process for the reformulation of the FCC gasoline, where, most of the olefins and aromatics present in the feed have been converted into branched paraffins using a porosity modified, acidity modified zeolite supported noble metal based catalyst.

Summary of the invention:The invention provides a modified zeolite catalyst, useful for the conversion of paraffins, olefins and aromatics in a mixed feedstock such as FCC gasoline that contain high content of olefin, aromatic and n-paraffin into isoparaffins. The utility of the process is for upgrading the octane number of a industrial feedstock such as desulfurized FCC gasoline through conversion of most of the olefins and aromatics present in it into environment friendly branched paraffins, using porosity improved, noble metal containing zeolite based catalyst, so as to meet the quality requirement of fuel to use as gasoline blending stock.

Advantages: The present invention are: [0019]A porosity and acidity improved catalyst that can enhance the formation of bulky iso-paraffins having high octane number [0020]The catalytic process can convert undesired aromatics and olefins present in the feedstock into environment friendly isoparaffins. [0021]The catalytic process reduces aromatics and olefins in the feedstock without any octane loss. [0022]The process can be used for the improvement of research octane number (RON) of the feedstocks, at least by 8 units.

Lab	Patent no. /Application No. (Date of filing/Date of grant)	Inventor
IIP	IN 0538DEL2008 -18/02/2009 US 12/390851-23/02/2009	Kumar; Adhikari Dilip ; et al.

Title: Novel Strain And A Novel Process For Ethanol Production From Lignocellulosic Biomass At High Temperature

Field of invention: The present invention relates to a novel strain and a novel process for ethanol production from lignocellulosic biomass at high temperature, wherein the process comprises the hydrolysis of lignocellulosic biomass to produce fermentable sugars, recovery of fermentable sugars from hydrolysate, fermentation of sugars to ethanol by thermophilic yeast, Kluyveromyces sp. IIPE453, MTCC 5314, which exhibits growth and sugar fermentation at high temperature range between 37-65.degree. C. and in situ recovery of ethanol by air/gas stripping.

Background of invention: Bioethanol is being blended with gasoline 5-80% as transportation fuel in different countries to substantiate the rising price of crude oil and such high-octane blended fuel that reduces CO.sub.2 and NO.sub.x emission from the automobiles. Lignocellulosic biomass based ethanol production has many advantages. The large scale availability of biomass at a cheaper cost, environmentally benign bioprocessing to produce ethanol, national energy security, competitive alcohol based downstream chemicals, macroeconomic benefits for rural communities and the society at a large, has accelerated the biomass based bioethanol production worldwide. The lignocellulosic feed stock does not compete for food and land available for food production. Bioethanol as fuel is carbon neutral when produced from lignocellulosic biomass.

Summary of the invention : The present invention relates to thermophilic yeast, Kluyveromyces IIPE453, MTCC 5314, an ascomycetous yeast of the fungal family saccharomycetaceae, order endomycetales, isolated by the inventors from soils of Dehradun, India and applied by the inventors in production of ethanol using hexose and pentose individually or in mixture; wherein the novel strain grows on sucrose, glucose, xylose, maltose, galactose, cellobiose in the temperature range of 37-55.degree. C. and ferment glucose, xylose, sucrose and starch to ethanol in the temperature range of 40-55.degree. C. and at pH range of 3.5 to 5.5 showing maximum rate of ethanol production i.e; 13.8 g.l.sup.-1h.sup.-1 on glucose in continuous fermentation process in comparison to other yeast strains including thermo tolerant yeast Kluyveromyces marxianus IMB-3 reported elsewhere as prior art.

Advantages: The yeast strain Kluyveromyces sp. IIPE453, MTCC 5314, capable of utilizing hexose and pentose sugars in sugar cane bagasse as carbon substrate simultaneously for growth at higher temperature range of 37 to 55.degree. C. with a shorter lag phase of 4 hrs and high specific growth rate of 0.18 h.sup.-1. The yeast strain Kluyveromyces sp. IIPE453, MTCC 5314, can be used for the production of ethanol from low cost renewable biomass such as sugarcane bagasse or cassava starch as alternate feedstock to molasses. The yeast strain Kluyveromyces sp. IIPE453, MTCC 5314, has the high stability in the continuous fermentation at high temperature. High growth rate and ethanol production rate of the strain at higher temperature would be advantageous at lower process cost.

Lab	Patent no. /Application No. (Date of filing/ Date of grant)	Inventor
IIP	IN 0670DEL2008- 08/09/2008 PCT/IN2009/000150 - 05/03/2009	Arun kumarsingh et.al

Title: A composition of biodegradable gear oil.

Field of invention: The present invention relates to a composition of biodegradable gear oil. : This invention particularly relates to composition of biodegradable gear oil that mainly contains chemically-modified non-edible vegetable oils.

Background of invention: It is not possible to prevent lubricant losses to the environment. Ecological balance is of great concern or survival of living beings. Industrial experts estimate that 70% to 80% of lube oil leaves the system through leaks, spills, line breakage and fitting failure. No doubt, petroleum based lubricants increase the capacity and speed of industry and other machines. It however, leads to increase the toxicity of the environment. It is affecting living organisms including plants, animals and marine life for many years. The other types of lubricants known as synthetic lubricants are designed for use in extreme conditions of temperature, pressure, radiation or chemical and have excellent lubricity and thermal stability.

Summary of the invention: The present invention provides a composition of biodegradable gear oil comprising i. base oil stock containing mono-ester of non-edible vegetable oil or mixture thereof, in the range of 95.5 - 99.5 % by weight, ii. additive pack in the range of 0.5 - 4.5 % by weight, and the. said additive is comprising of: a. at least one anti-oxidant from phenol, amines, gallate, tetrazole,;anisole type of . compound, in the range of 6.5 - 12.0 % by weight, b. at least one extreme pressure additive selected from the group consisting of sulfide, selenide, phosphosulfide, phosphoselenide in the range jof 68.0 — 23.5 % by weight, c. at least one pour point dispersant cum anti-foaming agent selected from the group consisting of polymeric long chain acrylate, alcohol, ester, ether, adipate type compounds in the range of 2.0 - 46.5 % by weight, ; d. at least one corrosion inhibitor selected from the group consisting of triazole, gallate, polyols, amines, phenols and sulfonates in the range of il.O - 7.0 % by weight and e. at least one detergent -dispersant selected from the group! consisting of sulfonate, succinimides, phosphonates in the range of 11.0 - 12.0: % by weight.

Advantages: The base oils of the compositions are completely biodegradable and totally from renewable source i.e. non-edible vegetable oil. (This is innovative and non-obvious development).The present lubricant would be particularly suited for GL 4 grade, general purpose automotive and industrial gear oil. Ecofriendly from a renewable source4. Exhibit excellent miscibility with mineral and synthetic oil in aill proportions. Economical than synthetic oil based gear-oil.Reduces use of petroleum,Beneficial to farmers, Safer to handle due to higher flash point of 200-240^{0}C.

Lab	Patent no. /Application No. (Date of filing/ Date of grant)	Inventor
IIP	IN 1900DEL2009 -15/09/2009 PCT/IB2010/000592 -19/03/2010	Savita kaul et.al

Title: A process for conversion of low cost and high FFA oils to biodiesel

Field of invention: The present invention relates to a process for conversion of low cost and high free fatty acid (FFA) oils to biodiesel. The present invention particularly relates to a process of converting high FFA containing feed stocks (FFA 20-85 %) to biodiesel in the presence of macro reticular and gel type acidic heterogeneous resin followed by transesterification in presence of homogeneous basic catalyst and separation of biodiesel and glycerine.

Background of invention: Vegetable oil or fat is generally obtained by extraction or pressing natural seeds. Vegetable oil usually contains free fatty acids, phospholipids, sterols, water, tocopherols and other impurities. While as Palm fatty acid distillate (PFAD), Soya deodistillate, acid oil, are obtained as byproducts during refining of Palm oil or soya oil. These oils are mainly low cost material containing FFA in the range of 20-85%, while as restaurant grease is the waste oil collecting in grease traps from Kitchens of hotels and restaurants.Vegetable seed oils have about 90% of the heat content of petroleum based diesel fuel and a favorable energy output/input ratio and, therefore, have the potential to replace congenital diesel fuel for compression ignition engines.

Summary of the invention: The present invention provides a process for converting high free fatty acid containing feedstocks (FFA 20-85 %) into biodiesel.

Advantages: Low cost and high FFA feed stock, restaurant grease, waste cooking oil, PFAD, Soya distillate, acid oil, Jatropha curcas oil and Mohua oil can be used for biodiesel production.Another advantage of the process is using heterogeneous resins in SS basket where no filteration of converted feed stock is required after 1st stage.Another important advantage is the repeated use (4-5 cycles) of heterogeneous resin.Another advantage is that flexible feedstocks can be used without pretreatment or neutralization.The another important advantages is by using such low cost feed stock and repeated use of heterogeneous resin under mild conditions. The process is economically viable. Yet another important advantage is the least disposal problems as no washing is required after 1st stage/esterification.

LAB	Patent No. / Application No. (Date of filing/ Date of grant)	Inventor
NBRI	IN 192829 -14/11/2005 US 7459545 -02/12/2008	Tuli et al

Title: Chemically synthesized artificial promoter for high level expression of transgenes and a method for its synthesis.

Field of Invention: The present invention relates to a chemically synthesised and theoretically designed promoter for high level expression of transgenes in different organisms and a method for designing of the said promoter. The invention further relates to testing of the said promoter to demonstrate high level activity as compared to the natural Cauliflower Mosaic Virus (CaMV) 35S promoter.

Background of invention:.. One of the main objectives of plant genetic engineering is to develop transgenic plants with new characteristics and traits, which may include insect resistance, virus resistance, herbicide resistance, yield enhancement, stress tolerance, nutritional improvement, expression of industrially valuable proteins in economically profitable expression systems, like plants, etc. Many factors contribute to high level expression of genes which code for such desired characteristics, where `expression` includes transcription, translation and post translational events. The abundance of any one transcript in a cell directly relates to transcriptional events, which in turn depends upon the strength of the promoter from which it is expressed. Thus, for the development of transgenic plants where high level of transgene expression is to be obtained, it becomes absolutely indispensable that the transgene be expressed from a strong promoter, the transcript is stable, it is translated efficiently and that the resultant protein is also stable in plant cell. Each of these steps synergistically contributes to enhancing the level of expression of the product of the transgene.

Summary of the invention: Some of the objectives of this invention are to design a synthetic promoter aimed at achieving the desired level of expression of the target genes in plant cells, but also in bacteria, yeast, lower euckaryotic cells and animal cells, to use such a promoter in combination with specific regulatory elements, to modify it appropriately so as to make it tissue specific, development stage specific, organ specific and or inducible by specific external environmental/applied factors, as well as, providing, a new approach for studying the complexity of the interaction between cis-acting elements and trans-acting factors.

Advantages: The invention emphasises the development of an artificial DNA sequence on the basis of computational analysis of various genes which express at high level in plants. The invention provides a new outlook in the field of developing artificial transcriptional regulatory elements that act in cis on genes.

LAB	Patent No./ Application No. (Date of filing/ Date of grant)	Inventor
NBRI	IN 230948 -28/02/2009 US 7128924 -31/10/2006	Palpu Pushpangadan et al

Title: Safe, Eco-Friendly, Health Protective Herbal Colours And Aroma Useful For Cosmaceutical Applications

Field of invention: The present invention relates to a safe, eco-friendly, health protective and cosmetic composition useful as lipstick and for other cosmaceutical applications like eye-shadows, skin creams, glow-glitters and rouges.

Background of invention: There is worldwide revival of interest in the use of natural colours especially in cosmetics and pharmaceuticals as the synthetic colours are likely to cause many side effects. Keeping this in view the present invention is undertaken to develop purely natural herbal colorants for cosmetic compositions. One aspect of the invention pertains to the development of a herbal composition useful as Lipstick with mood altering functional attributes including stimulation of creative thoughts on persons who apply the same on lips. Such features of the composition are attributed to the selected blended formulations of Natural colours and essential oils/aroma isolates incorporated.

Summary of the invention: The invention provides a safe, eco-friendly, health protective and beautifying herbal composition containing colourants and aroma, and useful for various cosmaceutical applications. The invention also provides a process for the preparation of the herbal cosmetic composition comprising extraction of colourants from natural sources such as plants, and mixing the colourants with aroma and other base material for cosmaceutical applications.

Advantages: Herbal colourants offer an advantage in that they can be added or used without taking into consideration certification by different agencies like FAO, WHO and Cosmetic authorities etc. The herbal colourants are safe, eco-friendly and health protective. These herbal colourants may be used in more sensitive and delicate parts of the body like lips, cheeks and eyelids. These herbal colourants can be used in leucoderma particularly of lips region. The herbal colours are antimicrobial and anti-inflammatory.The herbal colours are free from any strong side effects like carcinogenic effects to the users.

LAB	Patent No. / Application No. (Date of filing/ Date of grant)	Inventor
NBRI	IN 227723-19/01/2009 US 7083779 -01/08/2006	Behl , et al.

Title: Nontoxic dental care herbal formulation for preventing dental plaque and gingivitis.

Field of invention: The present invention relates to a dental care herbal formulation, its preparation, and its application for control of dental plaque and gingivitis, comprises a combination of active fractions from Citrullus colocynthis and neem.

Background of invention: Herbal medicines or herbal drugs are of ancient origin and their use is known in cultures throughout the world. In India science of herbal medicine known as "ayurveda" medicine, which gives us the modern term "ayurvedic," derived from "ayur," meaning life and "veda" meaning knowledge. A movement to identify individual active ingredients in beneficial herbs developed in the 18th century, leading into a transitional period from the use of natural herbs to the use of pharmaceutical drugs such as extracts and purified chemicals, sometimes referred to as allopathic drugs. With advances in chemistry, some of the active ingredients were chemically synthesized and given to patients in the form of pills. However, during this time of transition, the synthesized, purified or extracted active ingredients of pharmaceutical drugs were observed to exhibit significant adverse side effects.

Summary of the invention: The invention relates to a synergistic dental care herbal formulation comprising of fractions containing active constituents from neem (Azadirachta indica), Citrullus colocynthis and a fraction with antioxidants from Cucumis sativus. The invention includes a process to combine component A from neem bark and leaf fraction rich in nimbolides; component B from underground part preferably root of Citrullus colocynthis comprising primarily glycosides; addition of 0.1 to 0.4% of fraction rich in antioxidants from Cucumis sativus as component C and a carrier 5 18% edible grade ethanol. The herbal formulation is useful for preventing and control of dental plaque and gingivitis applying on teeth and gums over a period of two weeks or more. The invention providing herbal formulation is non-toxic and biodegradable, suppressing growth of wide spectrum of micro organisms causing periodontal diseases; and useful in the form of lotion, cream, mouthwash, mouth rinse, toothpaste or similar forms of application in daily life or therapeutical application etc.

Advantages: The present invention provides several advantages over methods known in the prior art, in that: The present invention discloses a synergistic herbal formulation comprising an antioxidant from plant source preventing >61% dental plaque and >25% gingivitis applying on teeth and gums over a period of two weeks. The formulation is safe, non-toxic, biodegradable and without any side effect.

LAB	Patent No./ Application No. (Date of filing/Date of grant)	Inventor
NBRI	IN 233430 -30/03/2009 US 7438932 -21/10/2008	Palpu , et al.

Title: Method for treating stomach ulcers with herbal extract composition

Field of invention: The present invention relates to development of an antiulcer herbal composition(s), process of preparing the extracts useful for preparing herbal formulation to treat ulcers.

Background of invention: Peptic ulcer represents a major health problem, both in terms of morbidity and mortality. Research advances during the last decade have offered new insights in the therapy and prevention of gastroduodenal ulceration by measures directed at strengthening the mucosal defense system rather than by attenuating the aggressive acid-pepsin factors held responsible for the induction of ulcers. The rise in gastric acidity and peptic activity are usually a manifestation of a physiological disturbance affecting one or more mechanisms which normally regulate gastric secretion. Neurotransmitters or hormones that directly stimulate secretion of hydrochloric acid and pepsin by the gastric glands are acetylcholine, gastrin and histamine. In addition there are other factors which play an important role in the manifestation of peptic ulcers. Activity of the gastric secretary cells has been found to be stimulated by caffeine, alcohol, hydrochloric acid, sodium chloride, non steroidal anti-inflammatory drugs (NSAIDS) and stress.

Summary of the invention: The present invention provides a herbal formulation useful in the treatment of acute and chronic ulcers in stomach. The herbal formulation comprising of Utleria solifolia that has been used by Malasar and Kadar tribes, Kerala as mentioned in prior art for the above mentioned purpose as the active ingredient. Along with this plants used traditionally like Asparagus racemosus, Foeniculum vulgare, and Ficus glomerata are added which are used in intestinal discomforts and as an galactogogue together with conventional additives.

Advantages: Neutralizes the excess acid in the stomach. 2. Used in acute and chronic gastric/duodenal ulcers. Used in healing and curing of ulcers. 4. Useful in curing internal bleeding.

LAB	Patent No./Application No (Date of filling/Date of grant)	Inventor
NBRI	IN 02185DELNP2004-27/07/2004 US 7344737 -18/03/2008	Pushpangadan, Palpu et al.

Title: Primary Health Care Products-Herbal Ointment For Cuts, Burns And Wounds.

Field of invention: The present invention relates to the development of primary health care products. Particularly, the invention provides a novel herbal composition and ointment useful for the treatment of cuts, burns and wounds.

Background of invention.:Wound is disruption of cellular and anatomical continuity of an organism or its parts (Boyd, 1970). The process of cutaneous wound repair is characterized by three overlapping phases involving inflammation, proliferation and the remodeling. After injury, new tissue formation stats with reepethialisation and is followed by granulation tissue formation. The latter process encompasses macrophage accumulation, fibroblast ingrowth, matrix decomposition and angiogenesis (Clark 1996). Inflammation, reepithelization and granulation tissue formation are driven in part by a complex cocktail of growth factors and cytokines, which are released at the site of injury. Although wound healing is essentially a physiologic process, but some chronic wounds exhibit considerable delay in healing. The delayed wound healing may be a consequence of pathologic states associated with immune disorders, diabetes, ischemia, venous stasis, malnutrition, metabolic derangements, burn or gunshot wounds and even ageing. These chronic wounds last much longer, and prolong the care and hospitalsiation time of patients. Trabucchi et al (1988) suggested that oxygen free radicals generated by xenobiotic administration, ischemic-reperfusion or sepsis inhibited the healing of skin or intestinal wounds in rats.

Summary of the invention : The present invention provides a herbal composition to heal burns, cuts and wounds. The ingredients of the composition is are obtained from plant materials including Utleria solicifolia, which is considered to be a divine plant by tribal people of Kerala and has been used to cure internal wounds and prevent bleeding due to ulcers. Along with this, other plants traditionally used for the treatment of cuts and wounds in the composition are Jatropha curcas, Clerodendrum infortunatum, and Centella asiatica.

Advantages: The designed herbal ointment is highly effective in the treatment of cuts, burns and wounds. The scar formation during the healing of the wound is minimized. The cell growth is uniform and leaves behind no scar or protrusion.

LAB	Patent No. /Application No. (Date of filing /Date of grant)	Inventor
NBRI	IN 01286DELNP2005 -31/03/2005 US 10/984947 -09/11/2004	Pushpangadan; et. al

Title: Anti-diabetic Herbal formulation comprising Glycine max.

Field of invention: The present invention relates to a novel herbal formulation useful in the treatment of piles. The invention provides a novel herbal preparation comprises of Glycine max active fraction containing 7S globulin protein extract, Curcuma longa and Zingiber officinale Linn. Rhizome extract used in treatment of diabetes.

Background of invention: Diabetic mellitus is a chronic condition that is diagnosed by a blood test and requires life long management (American Diabetic association, 2002). The more patients understand about the disease the better they are enabled to make good decisions on its management. Dietary therapy and exercise are critical both in preventing and managing diabetic mellitus and the results of the diabetic prevention program research group indicate that changes in life style reduced the incidence of diabetic by 58% (Knowler et al., 2002).

Summary of the invention : The present invention provides an herbal formulation useful in the treatment of herbal dosage form from the soya bean milk used as a anti-diabetic. The herbal formulation comprising of Glycine max active fraction containing 7 S globulin fraction extract, Zingiber officinalis (rhizome) and curcumin (a phenolic antioxidant). Glycine max (Soya bean) protein varies from light cream to white in colour. It is used as nourishing food. It was shown that it produce a significant improvement in general ability and behavioural pattern.

Advantages: The essential oil forms the basic raw materials for perfume and flavour making industries. They are also used in the cosmetics and pharmaceutical industries. which can influence human thoughts and emotions. Many of the essential oils are reported to have antimicrobial, insect repellent and insecticidal properties.

LAB	Patent No. /Application No. (Date of filing/ Date of grant)	Inventor
NBRI	IN 03501DELNP2004-09/11/2004 US 7172772 -06/02/2007	Palpu Pushpangadan et al.

Title: Herbal Composition For Gastrointestinal Disorders

Field of invention: The present invention relates to the development of health protective herbal antidiarroeal composition.

Background of invention: Diarrhoea is a condition, which results from the failure of one or more functions of alimentary canal. The alimentary canal receives mixes, digests and absorbs a wide variety and unpredictable amount of food with remarkable efficiency. What is left of the mixture of the food at the end of the alimentary canal is finally excreted as a small and convenient volume of the solid waste. Failure of the one or more of the aforementioned processes results in the passage of inconveniently bulky and liquid stools at increased frequency and is termed "Diarrhoea". Diarrhoea is also defined as the passage of loose, liquids or watery stools. Diarrhoea is caused due to any of the following causes: abnormal motility, disturbances in intestinal permeability, or the presence of osmotically active, nonabsorbable substances in the human gut. Broadly classified as acute and chronic diarrhoea. The acute diarrhoea (gastroenteritis) is mainly infectious; the pathological mechanism may be toxin production (preformed toxin, enterotoxin and cytotoxin), enteroadherence, mucosal-invasion (minimal, variable and severe) and systemic infection (viral hepatitis). The various other infectious agents may be classified as nonopportunistic pathogens (Shigella, Salmonella, E. histolytica, Giardia lamblia etc.), opportunistic infections (protozoa and viruses), human immunodeficiency virus (bacteria). Chronic diarrhoea may again be classified as inflammatory, osmotic, secretary, altered intestinal motility and factitious.

Summary of the invention: Accordingly the present invention, a herbal formulation is useful in the treatment of diarrhea. The herbal formulation comprising Cissampelos paereia, Mangifera indica, Cinnamomum sps. and Buchanania lanzan which are used for high antioxidant, hepatoprotective, digestive, choleretic, nervine relaxant and good immuno-enhancing properties.

Advantages: The present invention to provide a novel antidiarhoeal herbal formulation. Another advantage of the present invention is to that the plants used in the invention possess high antioxidant, hepatoprotective, digestive, choleretic, nervine relaxant and good immuno-enhancing properties.Another advantage of the present invention is to prepare herbal formulation(s) with a combination of the plants which are used in diarrhea, intestinal discomforts.

LAB	Patent No. /Application No. (Date of filing/Date of grant)	Inventor
NBRI	IN 239427 -19/03/2010 US 6989165 - 24/01/ 2006	Pushpangadan , et al.

Title: Synergistic composition for treating hyperilipdemia.

Field of invention: The present invention relates to a synergistic pharmaceutical composition useful for the treatment of hyperlipidemia.

Background of invention: Coronary heart disease continues to be a leading cause of morbidity and mortality in developed countries. It is rapidly assuming similar trends in developing countries also.sup.1. It has been predicted that cardiovascular diseases will be the most important cause of mortality in India in year 2015.sup.2. Hyperlipidemia defined as elevation in serum levels of cholesterol and triglycerides and decrease in HDL cholesterol levels is acknowledged as a major risk factor for coronary heart disease.sup.3. Secondary and possible reversible forms of hyperlipidemias include diabetes mellitus, hypertension, hypothyroidism, nephritic syndrome and obstructive liver disease. Obesity is a complex multifactorial disease that develops from the interaction between genotype and the environment. The understanding of how and why obesity occurs is incomplete, however it involves the integration of social, behavioral, cultural, physiological, metabolic and genetic factors. The presence of overweight, obesity in a patient is of medical concern for several reasons. It increases the risk for several diseases, particularly cardiovascular diseases and diabetes mellitus.

Summary of the invention : The present invention relates to a synergistic pharmaceutical composition useful for the treatment of hyperlipidemia, said composition comprising extracts of plant Gentiana kurroo of concentration ranging between 2 5 wt. %, Murraya koenigii of concentration ranging between 8 15 wt %, Allium sativum of concentration ranging between 2 4 wt %, Zingiber officinalis of concentration ranging between 2 5 wt %, Amorphophallus campanulatus of concentration ranging between 1 10%, and pharmaceutically acceptable additive(s); a process for the preparation of the said synergistic pharmaceutical composition; and also, a use of the said composition for treating hyperlipidemia, atherosclerosis, and obesity.

Advantages: Reduces body weight. Useful in the treatment of hyperlipidemia. Used to lower serum cholesterol, phospholipids and triglycerides. Useful in curing atherosclerosis.

LAB	Patent No./Application No (Date of filling/Date of grant)	Inventor
NBRI	IN 05374DELNP2005 -23/11/2005 US 7338674 -04/03/2008	Palpu Puchpangadan et al.

Title: Anti-arthritic herbal composition and method thereof.

Field of invention: The present invention relates to development of an anti-arthritic herbal composition.

Background of invention. Osteoarthritis (OA) is the breakdown of the joint articular cartilage. This results in the release of matrix components and their degradation products into the synovial fluid where they may become exposed to the immune system and lead in some instances to an autoimmune response by the patient (Bannerji et al, Journal of Rhuematology 33: 36.39, (1992); Poole, Osteoarthritis, W. B., Saunders, pp 155-189 (1992)). Disease activity in OA patient and their response to drug treatments have been monitored using clinical and radiologic methods of assessment (Theiler et al, Osteoarthritis cartilage, 3: 1757-1774 (1994)). More recently however biochemical assays, which quantified PG epitopes ad matrix proteins in joint synovial fluid has been employed to follow disease progression (Setnikar, International Journal of Tissue Reaction, 14:253-261 (1992)). Although these biochemical markers have afforded important data on the turnover of cartilage and bone in OA joints, they cannot provide information on the cellular events that may be responsible for the abnormal metabolism of these tissues. Further more therapeutic agents whose mechanism of action may include effects on leukocyte populations are not readily amenable to study using these biochemical markers.

Summary of the invention : The present invention provides an herbal composition useful in the treatment of arthritis and inflammation. The herbal composition comprises a therapeutically effective combination of extracts obtained from the plants Terminalia chebula, Pluchea lanceolata, Desmodium gangeticum, Vitex negunto and Zingiber officinale, optionally along with pharmaceutically acceptable additives. The invention further comprises methods of making the herbal composition and methods of use for the treatment of arthritis and inflammation.

Advantages: Invention provides a novel anti-arthritic herbal composition useful as an anti-inflammatory agent and provides relief in pain. The present invention is to provide a method of preparing an herbal composition useful as an anti-inflammatory agent and provide relief in pain.

LAB	Patent No. / Application No. (Date of filing/ Date of grant)	Inventor
NBRI	IN 232959 -24/03/2009 US 7279151 -09/10/2007	Palpu Pushpangadan et al.

Title: Herbal Oro-Dental Care Composition And Process For Preparing The Same

Field of invention: The present invention relates to synergistic herbal oro-dental care composition used for preventing dental problems and a process for preparing the same. More particularly, the composition comprises herbs such as Citrus karna, Zanthoxylum armatum, Azadirachta indica and Oriza sativa.

Background of invention: Bacterial aggregation on the teeth is known as plaque and causes dental caries, gingivitis, periodontitis and other gum diseases. A variety of microorganisms are present in the oral cavity. These range from the natural flora of the host to pathogenic species. Among these microorganisms are the gram-positive rods associated with the formation of plaque (a dense, enamel-adherent, microorganism-containing polysaccharide matrix). Specific areas, including periodontal and sub gingival spaces and interpapillary spaces of the tongue present environments that harbor bacteria. These spaces are difficult to reach by tooth brushing, and are only moderately affected by standard mouthwashes. Mechanical methods have been used for some time for the prevention of dental plaque but have not generally achieved sufficient results. Studies have shown that mechanical methods, such as the use of dental floss and inter-space brushes do not efficiently eliminate plaque. The persistence of these microorganisms in such environments greatly increases the risk of calculus and plaque build-up and carrier formation, which in turn presents the danger of gingival inflammation and periodontal disease. Thus, chemical plaque control as a substitute or supplement to mechanical methods is sought. Azadiracta indica is useful for anti bacterial/antiprotozoal activity and eliminating plaque from the tooth.

Summary of the invention: The present invention provides a synergistic herbal oro-dental care composition comprising Citrus karna, Zanthoxylum armatum, Azadirachta indica and Oriza sativa and optionally one or more additives which not only provides beneficiary effects of the individual ingredients, but is also highly effective in various dental problems. The present synergistic herbal oro-dental care composition comprising 20-30% by weight of powdered parts or extract of Citrus karna, 20-30% by weight of powdered parts or extract of Zanthoxylum armatum, 20-30% by weight of powdered parts or extract of Azadirachta indica, 20-30% by weight of powdered parts or extract of Oriza sativa and optionally one or more additives.

Advantages: Since the components used in the formulation is of herbal origin the product is safe to be used orally, as they have no or nil adverse or side effects on the gum sand teeth.The product is economically viable and eco-friendly. It doesn't contain tobacco or any other carcinogenic habit forming substance as ingredients to spoil the teeth and gums.

LAB	Patent No./Application No (Date of filing/Date of grant)	Inventor
NBRI	IN 239346 -16/03/2010 US 7658954 -09/02/2010	Pushpangadan;Palpu et al.

Title: Synergistic antipyretic formulation.

Field of invention: The present invention relates to a synergistic antipyretic formulation comprising extracts of plants Berberis aristata, Tinospora cordifolia, Alstonia scholaris, Andrographis paniculata and Hedychium spicatum, optionally along with pharmaceutically acceptable additives.

Background of invention. Pyrexia during infection produced through the generation of pyrogen (a protein), which increases prostaglandin synthesis in hypothalamus--raising its temperature. Body temperature is normally regulated between 35.8 and 37.2.degree. C. (96.5 and 99.degree. F.) in healthy persons. Omitting disorders that may involve cerebral thermoregulatory centres directly, such as brain tumors, intra cranial hemorrhage or thrombosis, or heat stroke, the disease states may be accompanied by fever. One of the major causes of fever is Malaria. It is a protozoan disease transmitted by the bite of anopheles mosquitoes. It is the most important of the parasitic diseases of human being, affecting approximately 200 million people and causing over one million death each year. Dengue fever is an infectious disease carried by mosquitoes and caused by viruses. ophthalmia and antipyretic.

Summary of the invention : The present invention relates to a synergistic antipyretic formulation comprising extracts of plants Berberis aristata, Tinospora cordifolia, Alstonia scholaris, Andrographis paniculata and Hedychium spicatum, optionally along with pharmaceutically acceptable additives; its use in treating fever, and lastly, a process for the preparation said synergistic antipyretic formulation. Considered useful in respiratory diseases, chronic diarrhea and advance stages of dysentery. The bark is regarded as a bitter tonic and mild febrifuge and possesses astringent, anthelminitic and galactogogue properties. It is reported to be employed in heart diseases , asthma, chronic diarrhea and to stop bleeding of wounds.

Advantages: Present invention develops a synergistic antipyretic formulation comprising extracts of plants Berberis aristata, Tinospora cordifolia, Alstonia scholaris, Andrographis paniculata and Hedychium spicatum, optionally along with pharmaceutically acceptable additives.

LAB	Patent No. / Application No. (Date of filing/ Date of grant)	Inventor
NBRI	IN 1502DEL2004-13/08/2004 US 11/202864-12/08/2005	Tuli; Rakesh ; et al.

Title: Chimeric G protein based rabies vaccine.

Field of invention: The present invention relates to a recombinant chimeric G-protein based rabies vaccine having SEQ ID No. 1 and its parts or variants thereof expressed in plant tissue. The invention also relates to a chimeric gene of SEQ ID No. 2 that encodes a chimeric G-protein based rabies vaccine having SEQ ID No 1. The invention also provides a method for large scale production of the chimeric G protein based rabies vaccine and a method of vaccinating a subject for rabies.

Background of invention: Reference may be made to Hohnes et al., 2002; "Genetic Constraints and the Adaptive Evolution of Rabies Virus in Nature" Virology 292, 247-257 who used a molecular evolutionary approach to investigate the adaptation of rabies virus in nature. Their analysis revealed that the DNA sequence of the nucleoprotein (N) and glycoprotein (G) genes of natural viral isolates were highly constrained, especially at nonsynonymous sites, in contrast to the higher rates of nonsynonymous evolution observed in viruses subject to laboratory passage. In evidence to this statement Charlton et al., 1997. "The long incubation period in rabies: Delayed progression of infection in muscle at the site of exposure", Acta Neuropathologica. 94, 73-77 reported that although rabies virus has a strong neurotropism, replication in vivo does not take place only in neuronal cells. In particular, the virus replicates in muscle tissue also at the site of inoculation before entering the peripheral and central nervous system as well as the salivary gland and other non nervous tissues. Such a process has been documented by Morimoto et al., 1996. "Characterization of a unique variant of bat rabies virus responsible for newly emerging human cases in North America" Proc. Natl. Acad. Sci. USA 93, 5653-5658 who state that in vitro substitutions in the viral glycoprotein (G) sequence accumulate in cell culture of rabies virus and change the tropism for nervous tissues, thereby changing virulence. This shows an adaptive process of virus which was also highlighted in study of Kissi et al., 1999 "Dynamics of rabies virus quasispecies during serial passages in heterologous hosts", J. Gen. Virol. 80, 2041-2050 who observed substantial genetic variation in the G protein coding gene from viruses passaged through different host species.

Summary of the invention : The present invention provide a recombinant chimeric G-protein based rabies vaccine having SEQ ID No 1 and its parts or variants there of. The present invention is to provide a chimeric gene of SEQ ID No. 2, encoding chimeric G-protein based rabies vaccine having SEQ ID No 1. The present invention is to provide a method for generating large scale chimeric G-protein based rabies vaccine. The present invention is to provide a method of vaccinating a subject for rabies.

Advantages: Present invention provides a recombinant chimeric G-protein based rabies vaccine having SEQ ID No 1 and its parts or variants thereof. It also provides a chimeric gene of SEQ ID No. 2, encoding chimeric G-protein based rabies vaccine having SEQ ID No 1.

LAB	Patent No./Application No (Date of filing/Date of grant)	Inventor
NBRI	IN 01263DELNP2005-31/03/2005 US 7687081- 30/03/2010	Palpu Pushpangadan et al.

Title: Herbal formulation useful as local anesthetic.

Field of invention: The present invention relates to a novel herbal formulation useful as local anaesthetic.

Background of invention. Local anaesthesia may be employed in hernia operations, either on its own or combined with general anaesthesia. The choice of technique will be influenced not only by local resources and skills, but also by patient preference. With a careful technique, local anaesthesia causes minimal physiological disturbance. This may be particularly useful for patients with cardiovascular or respiratory disease for whom there may be advantages in avoiding a general aesthetic. The absence of postoperative sedation or drowsiness allows early ambulation and diminishes the requirement for recovery facilities. Local anaesthesia provides postoperative analgesia for up to four hours and may be administered by the surgeon. When adrenaline is mixed with the local anaesthetic (normally in a dilution of 1:200,000) useful vasoconstriction is produced resulting in a relatively bloodless field.

Summary of the invention : The invention provides a novel herbal formulation useful as local anaesthetic. The herbal formulation is also useful for membrane stabilizing properties and in topical anaesthesia, nerve block conduction, extradural and infiltration anaesthesia. Herbal local anesthetic synergistic formulation (s) containing extracts of plants in pharmacologically effective form. Herbal formulation(s) as claimed in claim 1 wherein the extracts/juice of the plants are mixed in the ratio viz. Spilanthus calva (1-3% wt), Spilanthus oleraceae (1-3% wt), Urtica dioica (2-3% wt), Piper longum (1-2% wt), Gymnema sylvestre (2-3% wt) and the balance being the conventional additives

Adantages: The present invention provides a novel herbal formulation useful as a local anaesthetic, for spinal anaesthesia and for membrane stabilizing properties. Another advantage of the present invention is to prepare herbal ointment/cream/gel form that improves and acts as local anaesthetic.

LAB	Patent No./Application No (Date of filing/Date of grant)	Inventor
NBRI	IN 2507DEL2004 - 16/12/2004 US 7247322 - 24/07/2007	Palpu Pushpangadan et al.

Title: Herbal nutritious chocolate formulation and process for preparation thereof

Field of invention: The present invention relates to development of chocolate with novel herbal composition(s) with proven pharmacological activities such as anti-oxidant, anti stress, adaptogenic and immune enhancing property.

Background of invention: The origins of chocolate can be traced back to ancient Maya and Aztec civilizations in Central America, who first enjoyed `chocolate; a much-prized spicy drink made from roasted cocoa beans. Chocolate was exclusively for drinking until the early Victorian era, when a technique for making solid `eating` chocolate was devised. Throughout its history, whether as a cocoa, a drinking chocolate beverage or confectionery treat, chocolate has been a much sought after food. Conventional chocolate is assumed to be a causative factor of to migraines, acne and pimples, diabetes and obesity and also considered a luxury food. On the other hand Cocoa beans contain a type of antioxidant that may have a role in the prevention of certain diseases. The catechins found in cocoa beans aid resistance against degenerative diseases such as cancer and heart disease. It is therefore desirable to provide a chocolate type of edible substance, which can provide positive effects with lesser or no side effect. One of the methods by which this can be achieved is by blending of modern knowledge with traditional Indian systems of medicine and preparing medicine in the form of food, which is therapeutically effective. Another factor, which was considered in the present investigation, was to ensure that the costs of the process were not prohibitive.

Summary of the invention : The present invention provides chocolate based herbal nutritious formulation, comprising extracts obtained from Tinospora cordifolia, Glycyrrhyza glabra, Adhatoda vasica, Madhuca indica and Cassia occidentalis and mixed with acceptable additives. In one embodiment of the invention the extracts are in the form of juices. The invention provides the extracts/juice of the plants are mixed in the ratio consisting of Tinospora cordifolia 4-7%, Glycyrrhyza glabra 4-7%, Adhatoda vasica 4-7%, Madhuca indica 8-15%, and Cassia occidentalis 2-4%. The invention provides the formulation is in the form of a semisolid, solid or granules.

Advantages: The present invention to provide a novel herbal nutritious chocolate .The herbal nutritious composition helpful in defending the body against the effects of stressful environment and provide vitality and energy.

LAB	Patent No./Application No (Date of filing/Date of grant)	Inventor
NBRI	IN 01259DELNP2005 -31/03/2005 US 7344739 -18/03/2008	Palpu; Pushpangadan et al.

Title: A Novel Immunomodulatory And Anti-Allergic Herbal Formulation.

Field of invention: The present invention relates to novel herbal formulation(s) useful as anti-allergens.

Background of invention. Stress is known to alter the physiological homeostasis of the organism and results in the break down of the integrated adaptational processes. In response to extreme environmental demands various endocrinal and visceral responses occur naturally in a variety of experimental situations. For example, changes in plasma corticosterone and gastric mucosal integrity are widely reported during stress and both peripheral and central mechanisms seemingly regulate these changes. Much interest has recently been generated on the immunological changes during stress with reports indicating that the immune status of the organism is actually modified by experimental stressors. The central nervous system, besides being crucial for stress, also regulates immune function and studies show that common neural substrates like the hypothalamus are clearly involved in such central nervous system-immune system interactions. Neuro-pharmacological data have shown that complex neurochemical mechanisms regulates stress responses and transmitters like gamma-aminobutyric acid (GABA) and endogenous opiates are crucially involved. For example, benzodiazepenes (BZD), which modulate GABA, and opioid antagonists, modify several stress responses like gastric ulcer formation and plasma corticosterone. Evidence indicates that central nervous system innervation of lymphoid tissue is possible.

Summary of the invention : The present invention provides a novel of the invention of an herbal formulation(s) obtained from plants having the property of stimulant and resistant to various pathogens and acts as an immunomodulation as a tablet, injection and as a liquid formulation(s). The herbal synergistic formulation has anti-allergy properties and comprises extracts of Tinospora cardifolia, Piper longum, Albizia lebbeck and Curcunia amada.

Advantages: The invention provides a novel Anti-allergic herbal formulation(s) in various dosage forms viz; tablet, capsule and ointment form for easy consumption. The present invention is to prepare herbal dosage form that improves in the treatment of allergy.

LAB	Patent No. / Application No. (Date of filing/ Date of grant)	Inventor
NBRI	IN 2506DEL2004 -16/12/2004 US 7399491 -15/07/2008	Palpu , et al.

Title: Health promoting functional foods fortified with herbs

Field of invention: The present invention relates to health promoting functional foods fortified with herbs. The present invention also relates to a jam with a novel herbal composition. The present invention particularly relates to a novel herbal composition, which promotes proven pharmacological activities such as anti-oxidant, anti-stress and adaptogenic activities and comprises of plant juices or extracts together with the conventional recipients to form a paste/jelly/jam/cake/cream puff/chocolate forms fortified with these plants are added which are used as functional foods.

Background of invention: Human health depends to a large extent on three elements: spiritual harmony, physical activity and adequate nutrition. It has been observed over the last few decades that the stress of modern life, reduced physical activity and consumption of processed foods and chemicals preservatives, including over & unwanted use of modern drugs, are responsible for the decrease in the resistance to disease. Currently A "big-bang" is impacting the health food and pharmaceutical industries among others. This nutraceutical (nutrition plus pharmaceutical) explosion is derives from research publications providing scientific evidence to support hypothesis that phytochemicals in food and in isolated from provide health benefits to the consumer.

Summary of the invention: The present invention provides a herbal composition useful as a nutrient, anti-stress and adaptogenic agent, the composition comprising plant juice or extracts of plants selected from the group consisting of Mangifera indica, Evolvulus alsinoides, Withania somnifera, Asparagus racemosus and Amaranthus hypochondriacus, together with excipients/additives. In one embodiment of the invention, the extracts are obtained from powdered plant parts or lyophilized juice/extracts of plants.

Advantages: The present invention provides a synergistic novel health promoting functional food fortified with herbs having anti-stress and adaptogenic activity. Another important advantage is to provide a cost-effective health promoting functional food fortified with herbs.

LAB	Patent No. /Application No. (Date of filing/Date of grant)	Inventor
NBRI	IN 01277DELNP2005 - 31/03/2005 US 11/024019 - 28/12/2004	Pushpangadan, Palpu et al

Title: Herbal Formulation For The Treatment Of Piles.

Field of invention: The present invention relates to a novel herbal formulation useful in the treatment of piles.

Background of invention: A major discovery of the past two decades in the field of gastrointestinal disorder has been the elucidation of understanding the mechanism of anorectal problem. This is commonly known as piles or haemorrhoids. The word haemorrhoids is derived from Greek- haima meaning blood and rhoos meaning flowing. Piles is derived from Latm-pila meaning a ball. Haemorrhoids are veins occurring in relation to the anus. Such haemorrhoids may be external or internal-external or internal to the anal orifice. The external variety is covered by the skin, while the internal variety lie beneath the anal mucous membrane. When the two varieties are associated, they are known as intero-external haemorrhoids. Varicosities in veins are regions that are enlarged and inflamed. In the rectal veins, varicosities are known as haemorrhoids (piles). Haemorrhoids develop when the veins are put under pressure and become engorged with blood. If the pressure continues, the wall of veins stretches. Such a distended vessel oozes blood, and bleeding or itching are usually the first signs that a haemorrhoids has developed. Stretching of a vein also favours clot formation, further aggravating swelling and pain. Haemorrhoids may be caused by constipation, which may be brought on by low-fiber diets .

Summary of the invention : The present invention provides a novel herbal formulation(s) obtained from decoction of four potent plants and possessing the property of improving general health and used in treatment of diseases of blood, stomach problem and piles. The novelty in the invention resides in a herbal formulation having the property of nerve relaxation and antinociceptive properties and its use as intoxicant, stomachic, antibacterial, expectorant, tonic, rheumatism, boil and swelling.In one embodiment of the invention the herbal anti-hemorrhoids synergistic formulation (s) contains extracts of plants in pharmacologically effective form.

Advantages: The antitoxicant, antibacterial, and antifungal property is used in treatment of diseases of blood, stomach problem and piles.It is used to treat ulcer and sores and helps in relieving rectal inflammation. The formulation has an anti –inflammation property and reduces constipation, which is one of the important criteria for being an effective measure against haemorrhoids.

LAB	Patent no. / Application No. (Date of filing/ Date of grant)	Inventor
NBRI	IN 2505DEL2004 -16/12/2004 US 7186279 -06/03/2007	Pushpangadan Palpu et al.

Title: Herbal dye and process of preparation thereof

Field of invention: The present invention relates to herbal dye. More particularly, the present invention relates to a herbal black hair dye and to a process of preparation thereof from natural materials. The mixture of dye derived from the method of present invention can be used in coloring human hair.

Background of invention: Synthetic dyes used for coloring of hair have been known for many years. Colorants are classified as being temporary or permanent. In temporary coloring the color can be washed from hair relatively easily. So called permanent coloring of hair typically involves the formulation of aromatic diamine or hydric phenols polycompounds such as para phenylene diamine on the hair fibre. But they are raising so many side effects such as skin cancer, loss or damage of hair, etc. So these synthetic dyes, which are used for coloring hair, are very toxic and thus hazards to human health as well as to the environment. Over the years significant efforts have been directed towards elimination of many problems associated with the dyeing of human hair. Various approaches to hair dyeing have been developed these includes direct action dyes, natural dyes and oxidative dyes. Thus, it is desirable to develop a hair coloring composition which exhibits reduced fading, provides improved resistance to wash out during a daily devising regimen, car deliver substantially consistent hair color result throughout the hair, which has reduced irritant effect on skin which has reduced staining on skin and which has reduced adverse effects on the hair of the user. It is also desirable to develop a convenient, eco-friendly and easy to use method for the delivery of such a hair coloring formulation to the hair. There is also a need for natural hair coloring composition which effectively dye the hair but avoid or reduce damage to the hair which can color the hair effectively and avoid reduce irritation and or staining to the skin of the user.

Summary of the invention: The present invention provides a herbal dye composition comprising a mixture of: (a) dyes extracted from plants Juglans regia, Indigofera tinctoria, Terminalia chebula, Acacia sinuata, Lawsonia inermis, Trigonella foenum-graecum, Sapindus mukorossi Eclipta alba, Embelica officinalis, Acacia catechu and Piper betle, (b) and a hair coloring mordant,

Advantages: Composition of herbal dyes and hair coloring mordants can be used to deliver a variety of hair colors to the hair.

LAB	Patent No. /Application No. (Date of filing/Date of grant)	Inventor
NBRI	IN 0920DEL2006 -31/03/2006	Palpu Pushpagadan ,et al.

Title: Mosquito Repellent Herbal Formulation.

Field of invention: The present invention relates to a mosquito repellent herbal formulation.More particularly, the present invention relates to a mosquito repellent herbal formulation comprising synergistic combination of extracts/essential oil constituting from *Plectranthus mollis* (Ait) Spreng and one or more plants selected from the group of, *Piper betel* L., *Lantana camara* L., and *Hyptis suaveolens* Poit along with a pharmaceutically acceptable carriers or additives.

Background of invention: A large number of human diseases like malaria, filariasis, Japanese encephalitis, dengue, hemorrhagic fever, yellow fever etc are transmitted by the mosquito. Generally, form of mosquito repellents used includes mats, coil, lotions and vaporizers prepared from allethrine group of compounds, herbs, oil or diethyl toluimide (DEET). The harmful effects of synthetic mosquito repellent on human health have been investigated and found toxic by the several research workers (Sharma, V.P., *Current Science*, 2001, 80 (3): 341-343). The disease like hyper -excitation of the nervous system, histopathological lesions, including the loss of cilia and an increase in vascularity of the alveolar wall. The heating and burning of synthetic pyrethroids repellents have ill effects. The diseases like breathing problems, eye irritation, cough, cold and sneezing, headache, asthma, bronchial irritation, itching, ear, nose and throat pain, giddiness, vomiting, nausea, allergy etc. have been reported.

Summary of the invention : The present invention provides a mosquito repellent herbal formulation comprising synergistic combination of extracts/essential oil obtained from *Plectranthus molis* (5-20%) and from one or more plants selected from the group of *Piper betel L.*(5-20%)., *Lantana camara L.* (5-10%), and *Hyptis suaveolens* Poit (5-10%) and balance being selected from the group of pharmaceutically acceptable additives, diluents, binders, vehicles solvents.

Advantages: This mosquito repellent herbal formulation is non-irritants and having no toxic- effects, no itching, no breathing problems, no bronchial irritation, and no pain in nose, ear and throat.There is no skin blackness or any harmful symptom appears or causes health hazards after the long use of this mosquito repellent herbal formulation.

LAB	Patent No. /Application No. (Date of filing/Date of grant)	Inventor
NBRI	IN 2697DEL2008 -28/11/2008 PCT/IB2009/007561-26/11/2009	Samir v Sawant et al.

Title: . A gene for inducing male sterility in plants

Field of invention: The present invention relates to a method for producing male sterile plants. In particular this invention relates to transformation of a plant with said genetic construct comprising plant *BECLIN 1* gene and expression of this gene in anther tapetum yields a male sterile transgenic plant. Male sterile plants are useful for the production of hybrid plants by sexual hybridization. The development of hybrid cultivars is highly desired because of their generally increased productivity due to increased hybrid vigor or heterosis.

Background of invention: Hybrid plants have become increasingly important in various commercial food crops around the world. Hybrid plants have the advantages of higher yield, better quality and stress resistance than their parents, because of heterosis or hybrid vigor. Crop uniformity is another advantage of hybrid plants when the parents are homozygous; this leads to improved crop management. Hybrid seed is therefore commercially important and sells at a premium price. In crops such as maize, sunflower, sorghum, sugar beet, cotton, and many vegetables, hybrids account for a large share of the seed market. Not only the U5A and Europe, but also many developing countries rely on their food production to a large extent on hybrids. Sale of hybrids in various crops account for nearly 40 per cent of the global commercial seed business of about US$ 15 billion. This share is likely to increase as the importance of hybrid vigor is yet to be realized fully, especially in developing countries.

Summary of the invention : The present invention provides a method for producing male sterile plants by expressing plant *BECLIN 1* gene in the tapetum layer of anthers during early stages of pollen development.

Advantages: .The expression vector claimed in this invention is a good tool for generating male sterile lines of various crop plants. It is advantageous to use plant *BECLIN1/ATG6* as male sterility gene because it has no product which is cytotoxic outside the target cell. The plant *BECLIN1/ATG6*, as a male sterility DNA mimics natural systems and is inherently less destructive than for example ribonuclease, diphtheria toxin and so does not present such a problem if `leakage` occurs into other cells.

LAB	Patent No./Application No (Date of filing/Date of grant)	Inventor
NBRI	IN 233541 -30/03/2009 US 7550163 23/06/2009	Palpu; Pushpangadan et al.

Title: The present invention relates to the development of health protective herbal soft drink.

Field of invention: The present invention relates to the development of health protective herbal soft drinkThe soft drink comprising two or more plants decoction selected from Sida sps., Vitis vinifera, Withania somnifera, Boerhaavia diffusa and Tinospora cordifolia..

Background of invention. Diet or food therapy is emerging as the latest trend in health care programme. It is now said that there will be more dieticians than physician in the present century as many diseases can be prevented if the right kind of diet is prescribed. Herbs into our lives in an ongoing way, it is easier to modify an existing habit than to create a new one. Consumption of the right kind of food articles and drinks suited to the climate, age and constitutional, natures of the individuals are getting greater scientific security and attention. The rich and diverse traditional diet practices prevalent among various communities with the regional variations are now found to health protective/promoting. Over 1000 different kinds of alcoholic drinks, soft drinks, beverages and medicinal drinks are traditionally consumed in India. But unfortunately with the introduction of various exotic drinks many of the local drinks, which are mostly plant based, are fast disappearing and some of them almost forgotten.

Summary of the invention : The invention provides a novel herbal soft drink comprising decoction of plants selected from Sida sps., Vitis vinifera, Withania somnifera, Boerhaavia diffusa and Tinospora cordifolia for the protection and prevention of health and in particular, but not exclusively with antioxidant, immunoenhancing, hepatoprotective, cardiotonic, diuretic, digestive, choleretic, nervine relaxant properties.

Advantages: Soft drink is purely herbal. Soft drink is meant for the protection and prevention of health and in particular, with antioxidant, immunoenhancing, hepatoprotective, cardiotonic, diuretic, digestive, choleretic, nervine relaxant properties. Soft drink gives instant energy and combat fatigue. The soft drink comprising two or more plants decoction selected from Sida sps., Vitis vinifera, Withania somnifera, Boerhaavia diffusa and Tinospora cordifolia.. Soft drink developed is non-toxic. No chemical preservative or colourants are used in this soft drink. Soft drink is a good source of iron.

Lab	Patent No./Application No (Date of filing/ Date of grant)	Inventor
NEERI	IN 01533DELNP2003 -24/09/2003 USA 6929810 - 16/08/2005 USB 7074439 -11/07/2006	Hemant, J. et.al.

Title: Essential oil composition for potable water disinfection

Field of invention: This invention relates to a simple and natural method for disinfection of potable liquids, such as drinking water, by using a formulation of an essential oil derived from an herbal material. More particularly, this invention relates to a clove oil emulsion preparation, which finds application in disinfection of drinking water contaminated with harmful pathogens to make it potable.

Background of invention. Water is life-the concept coined in ancient Indian civilization. The need for pure and safe water is universal. The quest for pure water began in prehistoric times. Criteria of purity have become more complex, more quantitative, perhaps even more rigid, but principles, methods and materials for water purification remained remarkably similar from the earliest recorded data of 2000 BC down to the present time. The ancient Indian knowledge base on antimicrobial properties of herbs available in nature was the first documented evidence on disinfection. It is true that there were no elaborate tools to establish the validity of these claims. The quest for pure water prompted Rishis to search for suitable herbs in nature and inspired us to check the validity of the concept in modern context. This is the best time to search for such fomulation as the whole world is back to nature for simple remedies with no side effects.

Summary of the invention : It has now been found that essential oils may be used as disinfectants for potable liquids, such as water. In one aspect, the invention provides a composition for the disinfection of a potable liquid, comprising an essential oil; one or more emulsifiers ; optionally an electrolyte; and optionally a carrier oil. In one embodiment of the invention, use of carrier oil is preferred, as it substantially favors a stable emulsion preparation. An unsaturated carrier oil, such as Saffola oil (unsaturated corn oil) is preferred.

Advantages: Essential oils are extensively used medicinally in Ayurveda and Aromatherapy for their great variety of bio-dynamic actions. Besides antimicrobial and antiseptic properties, they are reported to be antiviral and antitoxic. Essential oils are used as vital constituents of many cosmetic preparations, as spices, and in medicines. In cosmetics essential oils are mainly responsible for fragrance; in spices, essential oils are the principle ingredients which contribute to the flavor, easy digestibility and (sometimes) to the durability of food.

Lab	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
NEERI	IN2623DEL2006- 07/12/2006 US 7637379-29/12/2009 PCT/IN07/00567-05/12/2007	Pophali et al.

Title: Circular secondary clarifier for wastewater treatment and an improved solids-liquid separation process thereof

Field of invention The present invention relates to "An Improved Circular Secondary Clarifier for Wastewater Treatment and an Improved Solids-liquid Separation Process Thereof". The improved circular secondary clarifier of the present invention enables treatment of wastewaters having suspended solids (SS) concentration in the range 500-5000 mg/l and above, and provides improved solids-liquid separation and enhanced biochemical oxygen demand (BOD) reduction with reduced surface area and low hydraulic retention time (HRT).

Background of invention: A conventional circular secondary clarifier for treatment of wastewaters comprises an inlet (1) for conveying wastewater, a centre feed column (2) having openings (3) through which, wastewater is radially distributed in to the clarifier, an inlet well also referred to as baffle wall (4) is provided to prevent escape of solids along with the treated effluents, the clarifier bottom (5), having a slope preferably in the range 1 in 12 to 1 in 10, towards the center of clarifier, is provided to collect the settled solids referred to as sludge (9) to the center and the treated effluent (6) is collected into the peripheral channel called launder (7), the settled sludge (9) is collected at the center by a rotating scraper (8) and the sludge (9) is withdrawn under hydrostatic pressure from the bottom outlet (10) and collected in sump cum pump house (not shown) for either recycling to aeration tank or for sludge dewatering and thickening, before ultimate disposal.

Summary of the invention The improved circular secondary clarifier of the present invention requires less surface area and low HRT, and provides efficient solids-liquid separation. Following points bring out the novelty and non-obvious inventive steps of the present invention: Provision of a low level inlet, being enlarged to dissipate the hydraulic energy of incoming wastewater. Formation of plume, just above the inlet and extending vertically upwards to some distance. Plume formation is indication of natural flocculation and dissipation of hydraulic energy, which in turn indicates that quiescent condition is prevailing in the clarifier. The plume, comprising of dense flocs, being heavier than wastewater, settle as one unit or zone at the bottom of clarifier.

Advantages: An improved solids-liquid separation is obtained, thereby ensuring minimum SS concentration in the treated effluent. High underflow solids concentration is obtained that minimizes pumping rate, and maintains desired active biomass concentration in aeration tank. It requires less surface area and depth and operates at low HRT, thereby facilitates savings in capital cost.

Lab	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
NEERI	0651DEL2006 - 10/03/2006 US 12/282376 - 10/09/2008 PCT/IB07/00136 - 22/01/2007	Hemant purohit et al.

Title: A method for the screening of bacterial isolates.

Field of invention: The present invention relates to a composition of primers useful for the screening of bacterial, isolates.The present invention also relates to a method for the screening of bacterial isolates. Further, it also relates to a kit for the screening of bacterial isolates.

Background of invention: One of the most important tasks in microbial ecology and its application in bioremediation technology is the precise determination of microorganisms in the environmental samples (Chhatre et al 1996, Fritsche and Ofrichter, 1999; Dubey et al. 2003). Using some commonly known and simple techniques, the microbiologist can quickly deduce the species of the unknown microorganism. However, subspecies or actual strain determination of the microorganism present in the sample frequently requires sophisticated methods of genetic or biochemical analysis (Amman et al., 1995; Gich et al. 2000). This becomes particularly more relevant, if few selected genera are over-represented and are contributing for most of the available physiological diversity (Benes et al. 2002; du Plessis, 2001; Kapley et al. 2001; Mahendraker, and Viraraghavan, 2001; Orupold 2001; Rittman, 2002; Saadoun, 1999).

Summary of the invention: The present invention deals with a composition, which comprises of six primers useful for the screening of bacterial isolates. Further, the invention also relates to a method useful for screening of bacterial isolates based on nucleic acid sub-sequence, which are flanked by inverted repeats. It is particularly focus on sets of primers that are specifically evaluated for discriminating bacteria based on genotypic characteristics. The detection method employs a polymerase chain reaction (PCR) technique, using specific oligonucleotide primers for amplification. Further, it also provides a kit useful for the screening of bacterial isolates.

Advantages: The present invention provides a rapid method to distinguish bacterial genotypes and identify perturbations related to stress in any defined environmental niche unlike the methods described above in prior art.

Lab	Patent No./Application No (Date of filing/ Date of grant)	Inventor
NEERI	IN 0731DEL2006 -20/03/2006 US11/509299 -04/03/2008	Palasram; Patil Mahendra et al.

Title: Method for direct solidification and stabilization of liquid hazardous wastes containing up to 100,000 mg/L of arsenic.

Field of invention: The present invention relates to a method for direct solidification and stabilization of liquid hazardous wastes containing up to 100,000 mg/L of arsenic.
More particularly, it relates to a method for direct solidification and stabilization of liquid hazardous wastes containing arsenic up to 100,000 mg/L in liquid wastes into a non-leachable solid material conforming to the USEPA TCLP criteria and ready for final disposal to landfills or containment facilities.

Background of invention. Arsenic is one of the most toxic elements and is a known human carcinogen. Because of high toxicity associated with arsenic, the industrial uses of arsenic have been drastically curtailed in recent times thereby reducing the quantum of arsenic waste generation. However, the historic operations have lead to generation of significant quantities of arsenic wastes, which are still stored at many production facilities, where arsenic was used as one of the raw materials. The most significant among such production facilities are nitrogenous fertilizer-manufacturing complexes, wherein the well-known Giammarco-Vetrocoke process was predominantly employed during the manufacture of ammonia from feedstock.

Summary of the invention : The present invention deals with a method for direct treatment of liquid wastes containing up to 10% or 100,000 mg/L of arsenic by solidification/stabilization in a relatively cost effective and environmentally safe manner as compared to conventional processes. The method also permits the simultaneous utilization other heavy metal bearing wastes (such as spent catalysts), in the solidification/stabilization of liquid wastes containing very high concentration of arsenic.

Advantages: Application of solidification and stabilization technology for direct treatment of liquid wastes containing very high concentration of arsenic (up to 100,000 mg/L).The solidification/stabilization of wastes with higher concentrations arsenic (more than 100,000 mg/L) is also possible with suitable changes in quantities of ingredients mentioned in the present invention. Significant cost reduction in the treatment of liquid arsenic wastes can be achieved due to elimination of intermediate treatment stage of transforming arsenic from liquid phase to solid/semi-solid phase prior to solidification and stabilization as practiced conventionally.

Lab	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
NEERI	IN0646DEL2006 - 10/03/2006 US7510659 - 31/03/2009	Rayalu , et al.

Title: Surface-modified zeolite and process for synthesis thereof for sequestration of anions.

Field of invention: The present invention relates to a surface-modified zeolite. Further, it relates to a process for synthesis of surface-modified zeolites for sequestration of anions. More particularly, it relates to a process for removal of toxic elements from water using surface-modified zeolite and recovering of the said surface-modified zeolite.

Background of invention: In the backdrop of the widespread public concern about vast sections of Population, e.g., in West-Bengal (India) and Bangladesh, being potentially exposed to consumption of ground water containing high concentrations of arsenic, the urgency for delineating an appropriate treatment strategy for arsenic removal is realized to overcome the grave threat of chronic arsenic poisoning. Recent epidemiogical evidence of the toxicity of inorganic arsenic suggests that the current maximum contaminant level (MCL) may not be sufficiently protective for human health; the probable WHO guideline value of 10 .mu.g/L is based on both estimated health risks and the practical quantitation level. The estimated cost of compliance with more stringent levels (in the range 2-20 .mu.g/L) is quite high. The existing treatment technologies, such as coagulation, softening, and adsorption on alumina or activated carbon and reverse osmosis accomplish arsenic removal to meet the current standard of 50 .mu.g/L.

Summary of the invention: The present invention deals with cost-effective surface-modified zeolite materials developed from commercial zeolites and flyash-based zeolites by treating with surface modifiers like hexadecyltrimethyl ammonium bromide (HDTMA-Br). The formation of zeolitic materials with anionic characteristics requires treatment with a surfactant with initial concentrations greater than its critical micelle concentration (CMC). The sorption of oxyanions on the surfactant-modified zeolite (SMZ) is attributed to surface complexation and surface precipitation. Incorporation of metal ions on SMZ showed improved anion uptake for dearsenification of water due to synergistic effects and is able to meet the stringent target of 10 ppb of As on potable water being adopted by most countries.

Advantages: The main advantages of the present invention are: Offers selectivity over conventional adsorbents for arsenic at low concentrations Offers versatility over conventional adsorbents for sorption of wide range of pollutants ranging from cationic to anionic High adsorption capacity over conventional adsorbents Possible frequent regeneration and disposal by virtue of its conversion to value added ceramic precursors by heat treatment Stabilization/immobilisation of arsenic in SMZ at higher temperature. Offers cost-effectiveness over other adsorbents by offering single unit for wide array of pollutants/chemical species vis-a-vis multiple units required for targeting wide array of pollutants/chemical species.

Lab	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
NEERI	0293DEL2007-14/02/2007 11/959035- 22/01/2009	Uddhaorao; Muley ; et al.

Title: A Device for the Storage and Treatment of Biodegradable Wet Solid Waste

Field of invention The present invention relates to a device for the storage and treatment of biodegradable wet solid waste. In particular, the invention relates to the device for storage and treatment of biodegradable wet solid waste, thus for improving integrated solid waste management system for the biodegradation and recycling of household waste.

Background of invention: The solid waste management system involves collection, transportation, processing, treatment and disposal of waste generated day to day in the city. The most important part of solid waste management system is the collection of waste. Based on the collection system only other systems viz., transportation, processing, treatment and disposal of waste are decided. Presently, house-to-house collection system or community bin system is adopted in most of the cities in India for collection of waste. The wastes collected by these systems are heterogeneous in nature. They consist of paper, plastic, metals, glass, coconut husk, rags, clothing, vegetable, fruits, leaves and cooked food waste, crockery, wooden matter stones, bricks and so on. This creates problems and difficulties in treatment and processing of wastes. It is very difficult to segregate individual components of commingled solid waste for effective treatment and processing.

Summary of the invention The present invention provides a device for the storage and treatment of biodegradable wet solid waste, the said device comprising of a basket (6) with holes (7) on the lateral surface and closed at the bottom, the said basket supporting a bucket (3) with handle (4) and removable cover (2) having a hole (1) at the centre and completely open at the bottom with a circular removable mesh (5) which fits into the bucket at the bottom and the entire assembly supported on a stand (8) of circular cross section bar.

Advantages: The wet waste can be stored for a longer period (from 1 week to 6 weeks).The wet waste stored does not pose the problems of foul odour, insects and flies. The leach ate generated if any is absorbed in absorbing media. It reduces the cost incurred on solid waste management system. It provides very good raw material for treatment process like compost. It helps in providing less area for treatment processes

Lab	Patent no./Application No. (Date of filing/Date of grant)	Inventor
NEIST	IN183826 -03/11/2000 US5808117 - 15/09/1998	Chowdhary , et al.

Title: Process for the production of 16-Dehydropregenolone acetate form diosgenin.

Field of invention: This invention relates to an improved process for the production of 16-Dehydropregnenolone acetate from diosgenin.

Background of invention:. The hitherto known processes for the preparation of pseudodiosgenin suffer from following disadvantages(i) poor yield (50%) of pseudodiosgenin diacetate (ii) the catalyst could not be recovered for reuse, thereby making the process non-economical (iii) use of a very high boiling solvent like n-octanoic acid and the corrosive nature of the solvent which is not suitable for a commercial application. Further, the recovery of such high boiling solvent would be more energy intensive thereby making the process uneconomical (iv) use of catalysts like Pyridinium hydrochloride and titanium tetrachloride both of which are highly toxic. To overcome the above difficulties and to provide an environmentally friendly process, the inventors have now evolved a process for producing 16-Dehydropregnenolone acetate (16DPA).

Summary of the invention: The process of the present invention comprises a) acetolysis of diosgenin of formula 1 of the drawing by heating in a pressure reactor in the presence of an acetylating agent and a non-polar solvent, maintaining the pressure in the reactor in the range of 4-6 kg/cm.sup.2 and at a temperature in the range of 200.degree.-250.degree. C. to produce pseudodiosgenine acetate of formula 2 of the drawing; b) Oxidizing the so obtained pseudodiosgenin acetate of formula 2 to obtain diosone of formula 3; and c) Hydrolysis and degradation of the diosone of formula 3 so obtained to produce 16-Dehydropregnenolone acetate of formula 4 of the drawings accompanying the specification. We have also now observed that when the diosone is hydrolyzed and degraded in the presence of a mild organic acid, the yield of 16-Dehydropregnenolone acetate is found to be higher (about 5%). Further, in this instance, it is also possible to recover the unused mild organic acids and re-use it thereby making the process economical.

Advantages: The process of the present invention does not involve the use of any high boiling liquid and also does not involve use of costly and environmentally toxic catalysts. The recovery of the solvent is also possible which makes the process simple and economic. The process of the present invention has been developed using a very non-toxic, low-cost and medium boiling organic solvent under moderately high pressure.

Lab	Patent No. /Application No. (date of filing/ date of grant)	Inventor
NEIST	IN194684 -17/02/2006 US 6998411 -14/02/2006	Bordoloi , et al.

Title: 2-Methylheptylisonicotinate and process for production thereof.

Field of invention: The invention relates to a novel antifungal and antibacterial compound 2-methylheptylisonicotinate of formula 1 isolated from natural sources. The present invention also relates to a process for the production of 2-methylheptylisonicotinate.

Background of invention: Research is constantly on to obtain antifungal and antibacterial compounds from natural sources such as microorganisms. Several naturally occurring microorganisms form an excellent source of pharmaceutically acceptable compounds which have the advantage of being inexpensive since the expense of technology to manufacture synthetic compounds is avoided. 2-methylheptylisonicotinate is an important anti-fungal and antibacterial antibiotic which exhibits marked inhibition of bacterial strains such as, Bacillus subtilis, Shigella sp., Klebsiella sp., E. coli and Proteus mirabilis and antifungal activity against pathogenic test organisms, such as Fusarium moniliforme, F. semitechtum, F. oxysporum, F. solani and Rhizoctonia solani. It is therefore imperative to locate and identify new sources for anti-tubercular drugs.

Summary of the invention: the present invention relates to a novel antifungal antibacterial compound 2-methylheptylisonicotinate of formula 1 below obtained from natural sources.

Advantages: The present invention provide a process for the isolation of a bacteria from soil christened as Streptomyces species 201 culture filtrate which is commercially feasible and economical.

Lab	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
NEIST	IN230954 - 28/02/2009 USB7129068 - 31/10/2006 USC7273733 - 25/09/2007	Bordoloi , et al.

Title: Process For The Isolation Of Polyhydroxybutyrate From Bacillus Mycoides Rlj B-017.

Field of invention: The present invention relates to a process for the isolation of polyhydroxybutyrate from Bacillus mycoides RLJ B-017. More particularly, the present invention relates to a process for the recovery of a polyhydroxybutyrate from Bacillus mycoides RLJ B-017 by using sucrose, molasses, pine apply waste, etc. as the carbon source.

Background of invention: Commodity polymers are typically produced from petrochemical sources by well-known synthetic means. However, recent advances in technology have resulted in the promise of new sources of commodity polymers. Particularly promising is the production of plastic resins using living organisms ("bioplastic" or Biopol), including bacteria to produce polymers such as polyhydroxyalkanoate (PHA); a number of bacteria which naturally produce PHA are also promising sources of PHA. (see for example, NOVEL BIODEGRADABLE MICROBIAL POLYMERS, E. A. Dawes, ed., NATO ASI Series, Series E: Applied Sciences--Vol. 186, Kluwer Academic Publishers (1990); Poirier, Y., D. E. Dennis, K. Klomparens and C. Somerville, "Polyhydroxybutyrate, a biodegradable thermoplastic produced in transgenic plants", SCIENCE, Vol. 256, pp. 520 523 (1992). In a large scale production, for example agricultural production, isolation and culture of a new organism and cheap raw material for the production of bioplastic is a critical step for determining the practical feasibility of such technology.

Summary of the invention: The present invention provides a process for the isolation of polyhydroxybutyrate of the formula 1 said process comprising growing a culture of Bacillus mycoides RLJ B-017 in a growth medium and a carbon source selected from sucrose, molasses and pineapple waste for a time period of equal to or greater than twenty four hours, said bacterial host producing intra-cellular poly-beta-hydroxybutyrate of the structure 1, lysing said bacterial host in said culture to release said poly-betahydroxybutyrate of the structure 1, and separating the isolate of said poly-beta-hydroxybutyrate of the structure 1.

Advantages: The present invention provides a process for producing bioplastics from a biological source material.Provide improved techniques for producing polyhydroxy butyrate of the structure 1 using a new bacteria, Bacillus mycoides RLJ B-017, and sucrose and molasses as cheap carbon source.

Lab	Patent No. / Application No. (Date of filing/Date of grant)	Inventor
NEIST	IN- 1732DEL2006 - 28/07/2006	Dilip Konwar et al

Title: A Process For The Preparation Of 16-Dehydropregenolone Acetate (16-Dpa).

Field of invention: The present invention relates to an improved process for the preparation of 16- dehydropregenolone acetate [16 -DPA]. The present invention particularly relates to an improved process for the production of 16-DPA from pseudodiosgenin diacetate [PDA], where the former is an important intermediate for the synthesis of many pharmaceutically active steroidal compounds from readily available starting material PDA.

Background of invention:Oxidation of PDA to diosone is a very important reaction for the production of 16- DPA, an important intermediate for the synthesis of many pharmaceutically active steroidal compounds. It is therefore, desirable to have an efficient and simple method to obtain diosone eliminating the drawbacks stated above.

Summary of the invention: The invention provides an improved process for the preparation of 16-dehydropregenolone acetate, which comprises oxidizing pseudodiosgenin diacetate of formula 1 in a two phase solvent system of a mixture of water and polar organic solvent in a ratio of about 1 :1 (v/v), by dropwise addition of aqueous solution of potassium permanganate in presence of a phase transfer catalyst, triethyl benzyl ammonium chloride and a co-oxidant selected from $NaIO_4$, $NaClO_3$, $NaClO_4$ and $NaIO_3$, at a temperature of 25 to 30^0C, for period of 3 to 10 hours, under stirring, separating the organic layer from the resultant reaction mixture, followed by the removal of organic solvent under reduced pressure to obtain the diosone of formula 2, and finally hydrolyzing the resultant diosone of formula 2 with acetic acid to obtain the desired product 16-DPA.

Advantages: The method is very simple and can be carried out at room temperature. The work-up procedure is very simple in comparison to the reported procedures. The product 16- DPA (3) from in the reaction mixture is highly pure and the yield is: 61.23 % w.r.t. PDA (1).In this process toxic chemicals like CrO_3 is replaced by very less toxic reagent $NaIO_4$.The reaction uses only 0.2 equivalent of the oxidizing agent ($KMnO_4$) as catalyst which makes the whole process economically more viable, simple and environmentally benign.

Lab	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
NEIST	IN0382DEL2006 - 15/12/2006 US7399889 - 15/07/2008	Borthakur et al

Title: Process for the preparation of vanillin from agricultural waste.

Field of invention: The present invention relates to a process for the preparation of Vanillin (4-hydroxy-3-methoxy benzaldehyde).This invention particularly relates to a novel method for synthesis of vanillin. More particularly the present invention relates to chemical process for the preparation of vanillin by a single-step oxidation of ferulate moiety of rice straw, a renewable agricultural waste in the presence of hydrogen peroxide, manganese sulphate, cupric chloride, sodium acetate and sulphuric acid and water under reflux condition in 1-3 hours. The process does not involve any costly or hazardous chemicals.

Background of invention: Vanillin is a key additive to food products, perfumery, beverage and an intermediate in pharmaceutical industry. The world production of synthetic vanillin is estimated to be over 3000 tones per annum. With the current growth rate (5.75% annually) the global demand is likely to make an exponential growth. Vanillin is naturally obtained from Vanilla planifolia Andrew (Orchidaceae) pods. Vanilla flavour extracted from cured beans of the vanilla plant (Vanilla planifolia Andrew) is used as a flavouring agent in food and currently has high demand. The traditional method of production of natural vanillin is cumbersome as it involves cultivation of plants in restricted climatic regions, hand pollination with limited success and the tedious processes for curing and extraction of products from the beans. This `natural` vanillin, can cover only 1% of the global demand and is costly (US$4,00.00-500.00 per kilogram) [Virginia Commonwealth University News, 14.04.2003, vcunews@vcu.edu]. It is estimated that even to cater to 5% of global demand of vanillin 2.39 Lakh hectare of land has to be brought under cultivation causing deforestation of huge tract of virgin forest.

Summary of the invention: The present invention provides a process for the preparation of vanillin from agricultural waste which comprises reacting a ferulate containing renewable agro-waste with hydrogen peroxide in the presence of a catalyst selected from manganese acetate, manganese chloride, manganese nitrate and manganese sulphate and co-catalysts selected from salts of cobalt, nickel and copper, essentially with potassium and sodium salt, sodium acetate and mineral acid in water under reflux for a period in the range of 1-3 hours, cooling the above said reaction mixture to a temperature of about 25-30.degree. C.

Advantages: Agro-waste such as rice straw produces vanillin in a single-step. 2. Unlike current methods no prior separation of lignin from cellulose is required for vanillin preparation. 3. The chemicals used are cheap and commercially available. 4. Green reagent hydrogen peroxide and green solvent water are used 5. The inorganic compounds can be recycled. 6. Water, the solvent, can be recycled.

Lab	Patent No. / Application No. (Date of filing/ Date of grant)	Inventor
NEIST	IN 0835DEL2008-19/11/2008 WO PCT/IN2009/000198 -26/03/2009	Romesh Chandra BORUAH et al

Title: Simultaneous Preparation Of A Mixture Of 3- Acetoxy-17-Acetamido-16-Formyl-Androst-5,17-Diene And 3- Acetoxy-2'-Chloro-5-Androsteno[17,16-B]Pyridine.

Field of invention: The present invention relates to preparation and biological evaluation of 3-acetoxy-17- acetamido-16-formyl-androst-5,17-diene (4] and 3-acetoxy2'-chloro-5-androsteno [17,16- b]pyridine (5) as gastric proton pump inhibitor and their comparison to that of omeprazole, a clinically employed anti-gastric ulcer drug.

Background of invention. Peptic ulcer disease (PUD) is one of the most common diseases affecting GI tract. It causes inflammatory injuries in either the gastric or duodenal mucosa, with extension beyond the submucosa into the muscularis mucosa. The traditional medical approach to treating ulcers is with antacids, H_2 receptor blockers and proton pump inhibitors. Cimetidine, famotidine, nizatidine and ranitidine are examples of H_2 receptor blockers. Proton pump inhibitors (PPIs) are one of the most commonly prescribed classes of medicines in the primary care setting and are often used in the treatment of acid-peptic diseases. The PPIs reduce the production of acid by inhibiting the enzyme hydrogen-potassium adenosine triphosphatase ($H^{\wedge}K^{+}$-ATPaSe) of the gastric parietal cell that produces acid. The proton pump is the terminal stage in gastric acid secretion and it is responsible for secreting H^{+} ions into the gastric lumen. The lack of acid in the stomach aids in healing duodenal ulcers. Omeprazole (Prilosec) is a proton pump inhibitor, which blocks the production of acid by the stomach. Several other PPIs such as lansoprazole, rabeprazole, pantoprazole and esomeprazole have been introduced in the .clinical practice. However anti-ulcer drugs may increase certain allergies to food. All the PPIs under clinical practice include non-steroidal drugs.

Summary of the invention: The present invention relates to biological evaluation of 3-acetoxy-17-acetamido-16-formyl- androst-5,17-diene (4) and 3-acetoxy-2'-chloro-5-androsteno [17,16 b]pyridine (5) as gastric antisecretory and antiulcer agent.

Advantages:The steroidal compound S-acetoxy-iy-acetamido-ló-formyl-androst-Sjπ-diene (4) exhibited its activity as gastric proton pump inhibitor (anti gastric-ulcer). 2. The steroidal compound 3-acetoxy-2'-chloro-5-androsteno[17,16-b]pyridine (5) also exhibited its activity as gastric proton pump inhibitor.3. The steroidal derivative 4 further exhibited dose-dependent inhibition of histamine- stimulated acid secretion in parietal cell with IC_{50} value comparable to cimetidine.4. Compound 4 did not show acute toxicity in swiss albino mice at 1 g/kg dose.5. The steroidal derivative 4 further exhibited potent anti ulcer activity against indomethacin induced ulcer at doses comparable to the known drug omeprazole.

Lab	Patent No. / Application No. (Date of filing/ Date of grant)	Inventor
NEIST	IN0772DEL2008-26/03/2008 PCT/IN2009/000178 -16/03/2009	Dipak Kumar Dutta, et al

Title: Process For The Preparation Of 4-(4-Hydroxyphenyl)But Any- One Using Solid Acid Clay Catalyst

Field of invention: The present invention provides an ecofriendly process for the preparation of 4-(4- hydroxyphenyl)butan-2-one by selective aikylation of phenol with 4-hydroxybutan-2-one in presence of solid acid catalyst.

Background of invention: The compound 4-(4-hydroxyphenyl)butan-2-one also known as Raspberry ketone exhibits its characteristic raspberry odour and is used as an important aroma chemicals in perfume industries, food industries and also in compositions for weight loss with improved taste. Raspberry ketone was described for the first time as a characteristic component of Raspberry flavour (H. Schinz et. al. Helv. Chim. Acta. 1957, 40, 1839). However^ this substance was already known in its natural state as a component of a polygonacaea. The proportion of raspberry ketone in the raspberry is only between 9 and 174 µg per kilogram of fresh fruit depending on the variety (W. Borejsza-Wysocki et. al. J. Food Chem./ 1992, 40, 1176). Thus, the concentration of raspberry ketone in raspberry fruit is so low that extraction of thecompound from the fruit would not be economically viable. Therefore, there is no practical natural source for isolation of such important aroma chemical.

Summary of the invention: The invention provides an acid activated (HCl) solid acid catalyst Montmorillonite comprising of layered clay structures (basal spacing do_{01} ranging from about 10 to 13,5 A), highly porous {micropore in the range 5 to 15 A and mesopore in the range 30 to 80 A}, average pore volume 0.2 to 0.65 cc/g, surface acidity in the range 0.4 - 0,6 mmol/g and high surface area (250 - 400 m^2/g) siliceous layered matrix. Unmodified Montmorillonite clay does not show any catalytic activity.

Advantages: A novel and eco-friendly process for the production of an commercially important aroma compound 4-(4-hydroxyphenyl)butan-2-one. The present invention is distinguished from the prior art in that the process is highly selective (> 75 % and up to 81 %) with good yield 35 - 55 %). The alkylation process of the present invention is simple and involve single step. The present invention utilizes a clean and inexpensive clay based solid acid catalyst. The present invention utilizes a reusable catalyst with consistent activity. The present invention provides a clean process. Separation of the catalyst from the reaction mixture is easy.

Lab	Patent No. / Application No. (Date of filing/ Date of grant)	Inventor
NEIST	IN2696DEL2008- 18/11/2009 US12/626843 - 27/11/2009	Amrit Goswami, et al

Title: A novel method of inducing chirality to epoxides using 2,3:4,6 di-*o*-isopropylidene -2-keto-l-gulonic acid monohydrate.

Field of invention: The present invention relates to a method for preparation of chirally pure epoxide represented by the formula 2 and more particularly to a method which enables preparing optically pure *R*-(+)-4-hydroxy styrene oxide represented by the formula 2a by oxidation with 2,3:4,6 di-*O*-isopropylidene-2-keto-gulonic acid monohydrate generated *in situ* by lipase catalysis in presence of urea-hydrogen peroxide oxidant at a pH range of 3-5.

Background of invention: Epoxides are very important synthetic intermediates for variety of biologically active and other synthetic molecules. These are key intermediates for preparation of chirally pure □-amino alcohols used as □-blockers (*Enzyme Microb. Technology* **1993**, *15*, 266; *J. Med. Chem.* **2002**, *45*, 567; *Org. Lett.* **2002**, *4*, 3793; *Synlett* **2005**, *12*, 1948; *J. Chem. Tech. Biotech.* **1996**, *66*, 233), different antibiotics (*J. Am. Chem. Sac.* **1981**, *103*, 464), neuroprotective agents (*Biaorganic and Medicinal Chemistry Lett.* **1995**, *5*, 551), antidepressants (*Tetrahedran: Asymmetry* **2002**, *13*, 2039) apart from serving as important precursor for the production of a variety of natural and clinical products.

Summary of the invention: The present invention relates to a recyclable method to prepare chirally pure epoxides directly from olefins using a novel chiral acid 2,3:4,6-di-*O*-isopropylidene-2-keto-L-gulonic acid monohydrate as chiral inducer and anhydrous hydrogen peroxide in the form of urea hydrogen peroxide adduct (UHP) as oxidant and lipase enzyme as catalyst. Under the influence of lipase, the chiral acid 2,3:4,6-di-*O*-isopropylidene-2-keto-L-gulonic acid monohydrate is converted to per-acid *in situ* by the oxidant urea hydrogen peroxide which in turn transfers oxygen to olefin inducing chirality to the product epoxide. Using this technique, important epoxide building blocks of different industrially important compounds can be prepared with good yield and moderate enantioselectivity. Chiral Epoxidation of olefins with environment friendly catalytic system that can be recycled is highly desirable in the context of Green Chemistry for preparation of many industrially important compounds.

Advantages: It is a one-pot reaction.The system is recyclable and hence efficient and economic.The reaction condition is mild.The method is eco-friendly.

Lab	Patent No. / Application No. (Date of filing / Date of grant)	Inventor
NGRI	IN 0447DEL2003-26/03/2003 US 6937960 - 30/08/2005	Ramesh Khanna et al

Title: Smooth contouring software for generating geophysical data having less artifacts.

Field of invention: The present invention relates to a method and a system for generating smooth contours of geophysical data generated by USGS smooth contouring and plotting system with less artifacts, based on Surfer compatible minimum curvature program.

Background of invention:. Geo-potential methods have been primarily used to delineate the sub-surface configuration and determine the magmatic and tectonic activity of the earth. These measurements are forerunners to other geophysical methods to provide the first hand information to the constituents of the earth. Preparation of contour maps is one of the important steps in the analysis of geophysical data for interpretation of 3-dimensional causative sources. Before the advent of computers laborious hand contouring is the only way. With the invention of computers these procedures became very fast in main frame computers and through personal computers. As a result, the time and labor involved in scientific computation has drastically cut down activity.

Summary of the invention : The present invention relates to a method and a system for generating smooth contours of geophysical data generated by USGS smooth contouring and plotting system with less artifacts, based on Surfer compatible minimum curvature program.

Advantages: The main advantage is to provide a method and a system for making a gridded file generated by USGS package compatible with other software packages available. Another advantage is that it provides a method and a system for generating smooth contour plots from data generated by USGS package.

Lab	Patent No. / Application No. (Date of filing /Date of grant)	Inventor
NGRI	US 7219115 -15/05/2007	Joseph Bernard Selvaraj

Title: Method for stable and accurate solution for an ill-conditioned system of normal equations associated with a prediction filter whose output is defined as a time advanced version of the input.

Field of invention: The invention relates to a method for obtaining a stable and accurate solution for an ill-conditioned system of normal equations associated with the prediction filter whose observed output is defined as a time advanced version of the input. More particularly, this invention relates to a method for determining the digital Weiner filter and/or autoregressive operator for time-invariant digitized data relating to reflection seismic, gravity, magnetic, resistivity, electromagnetic and magnetotelluric used for prospecting of oil, mineral and water.

Background of invention:. Calculating the prediction filter, viz., digital Weiner filter's autoregressive operator for accurately describing a time-invariant geophysical system is of considerable importance. Obtaining a stable and accurate solution for an ill-conditioned system of normal equations assocaited with prediction filter viz. digital Weiner filter or autoregressive operator for a time-invariant digitized data made available at smaller intervals has not been attempted. This problem is central to most measured data and is especially important in applications relating to the data available from reflection seismic, gravity, magnetic, resistivity, magnetotelluric used for prospecting for oil, mineral and water. The central problem is, therefore, to obtain a stable and accurate solution for an ill-conditioned system of normal equations assocaited with digital Weiner filter/or autoregressive operator or in general a prediction filter.

Summary of the invention : The present invention relates to an advantageous and beneficial method wherein a stable and accurate solution can be obtained for an ill-conditioned system of normal equations assocaited with the prediction filter, viz., digital Wiener filter or an autoregressive operator whose observed output is defined as a time advanced version of the input, without prewhitening the coefficient matrix of the ill-conditioned system of normal equations. Particularly, the present invention that conditions the ill-conditioned coefficient matrix reducing it to an identity matrix is based on mathematical rationale and results in a simple, new system of normal equations, which yields a stable and accurate solution with computational ease. The results given in numerical examples and tables show precision and accuracy, which lead to correct inferences.

Advantages of the invention: The method of invention yields accurate results which facilitates precise inference. The coefficient matrix associated with the ill-conditioned system of normal equations associated with the prediction filter is reduced to an identity matrix, obviously, a non-singular matrix. The solution of the new system of normal equations is simplified.

Lab	Patent No. / Application No. (Date of filing / Date of grant)	Inventor
NGRI	US 7440852- 21/10/2008	Srivastava K et al

Title: Stochastic analytical solution to quantify the earth's subsurface heat flow.

Field of invention: The present invention relates to obtaining the analytical closed form solution to mean and variance in heat flow by solving the stochastic heat conduction equation incorporating randomness in the thermal conductivity. The method of the present invention has a wide range of applications in quantifying the thermal state of the crust and in obtaining closed form expressions for subsurface heat flow structure along with its error bounds. The exact formulae can be used to better evaluate the thermal state for related oil and natural gas applications and also in tectonic studies and in studies related to the crystallization of minerals.

Backgrou nd of invention:. Heat flow studies play an important role in understanding the state of the lithosphere. For modeling the conductive heat transfer in the crust the important controlling parameters are the radiogenic heat production and the thermal conductivity. In case of a stabilized continental crust the conductive heat transfer in steady state condition is a reasonably good approximation. Several authors have studied the evolution of the basal heat flow from a deterministic point of view. However due to the heterogeneous nature of the crust researchers are now solving the heat conduction problem from a stochastic point of view.

Summary of the invention: The present invention relates to obtaining the analytical closed form solution to mean and variance in heat flow by solving the stochastic heat conduction equation incorporating randomness in the thermal conductivity. The method of the present invention has a wide range of applications in quantifying the thermal state of the crust and in obtaining closed form expressions for subsurface heat flow structure along with its error bounds. The exact formulae used in the invention can be used to better evaluate the thermal state for related oil and natural gas applications and also in tectonic studies and in studies related to the crystallization of minerals.

Advantages: The advantage of this invention is that exact formulae have been given to quantify the error bounds on the subsurface heat flow. The exact formula obtained for the mean and standard deviation in heat flow have not been so far given and will benefit the Geoscientific community dealing with Geodynamical problems. This study can be used in quantifying the heat flow at any given depth along with its error structure for a conductive Earth model.

Lab	Patent No. / Application No. (Date of filing / Date of grant)	Inventor
NGRI	US 7130758- 31/10/2006	Kirti Srivastava et al

Title: Method for analytically obtaining closed form expressions for subsurface temperature depth distribution along with its error bounds.

Field of invention: The present invention relates to analytical solution to error bounds on the subsurface temperature depth distribution. This invention has a wide range of application in quantifying the subsurface thermal state of the crust and has a wide range of applications. The method of the invention has helped in obtaining closed form expressions for the subsurface temperature depth distribution along with its error bounds. The exact formulae are useful in better evaluating the thermal state and have a wide range of applications in oil and natural gas prospecting, tectonic studies and mineral prospecting.

Background of invention: This invention relates for obtaining and computing the subsurface temperature depth distribution along with its error bounds. The solution has been determined for the stochastic heat conduction equation by considering different sets of boundary conditions and radiogenic heat sources and incorporating randomness in the thermal conductivity. In understanding the Earth thermal structure there are several questions which need clear answers. Many of the controlling parameters that define the Earth's processes are not known with certainty. In such situations these controlling parameters can be defined in a stochastic framework and an average picture of the system behavior together with its error bounds can be quantified.

Summary of the invention: The present invention deals with the solution to the governing stochastic heat conduction equation to obtain the mean and variance in the temperature fields. The method of the invention has helped in obtaining closed form expressions for the subsurface temperature depth distribution along with its error bounds. The exact formulae are useful in better evaluating the thermal state and have a wide range of applications in oil and natural gas prospecting, tectonic studies and mineral prospecting.

Advantages: The advantage of this invention is that exact formulae have been given to quantify the error bounds on the subsurface temperatures due to errors in the thermal conductivity for a conductive earth model. The errors in the temperatures will help in a better evaluation of the crustal thermal structure. This study can be used in quantifying the conductive thermal structure along with its error bounds for any given region and thereby help in understanding the geodynamics of the region. The exact formulae for the mean temperature and its standard deviation can be used in a better evaluation of the thermal state of oil bearing regions. These exact solutions can be used in tectonic studies and in studies related to crystallization of minerals.

Lab	Patent No. / Application No. (Date of filing / Date of grant)	Inventor
NGRI	US 7079954 - 18/07/2006	Santi K. Ghosh

Title: Method for selective recording of SH waves using an array of sensors to filter out all non SH waves.

Field of invention: The present invention relates to a novel method for selective recording of SH waves using an array of sensors that filter out all non-SH waves.

Background of invention: Reflection seismology is a widely employed tool for the exploration of hydrocarbons. A ramification in this technology consists of using horizontally polarized shear waves (SH waves) in addition to more conventional exploration involving compressional (P) waves. In principle, the source for SH wave exploration must produce only SH waves and the earth must be strictly laterally homogeneous (Garotta, 1985). Under these assumptions, the horizontally polarized receivers are oriented along the y-direction perpendicular to the seismic line (x-direction). Any departure from either the source or the earth model, would of course cause recording of undesired modes of waves (designated "noise") by the receivers.

Summary of the invention: The present invention provides a method for selective recording of SH waves using an array of sensors that filter out all non-SH waves, the method comprising: (a) deriving a formula for computing a length of an arm of a square array of sensors based on the following presumptions: a. that the far-field S motion and the curl of the wave-field are approximately equivalent b. that the far-field SH motion and the vertical component of the curl of the wave-field are approximately equivalent c. that the vertical component of the curl of the wave field is equivalent to the vector sum of the recordings in four sensors placed in the four arms of a square array (b) wherein the compounding effect of the array is that of a convolution with the impulse response of the array; and wherein (c) the removal of the compounding effect of the array is equivalent to deconvolving the effect of the array which in turn is equivalent to dividing the array response by its transfer function. (d) thereby selectively recording of SH waves while filtering out all non-SH waves.

Advantages: The SH array of the invention selectively records only SH-waves. It is effective for any type of source and also for any type of earth model including a laterally heterogeneous earth.The array will filter out all coherent noise, P-waves, micro-seismic and cultural noise of Rayleigh type which is polarized mostly in the vertical plane. The array will be effective in dispensing with the second recording, normalization and subtraction .

Lab	Patent No. / Application No. (Date of filing / Date of grant)	Inventor
NGRI	US 7307629- 11/12/2007	Ravi Prakash Srivastava et al

Title: Generation of three dimensional fractal subsurface structure by voronoi tessellation and computation of gravity response of such fractal structure.

Field of invention: The present invention relates to a method for the generation of three dimensional fractal subsurface structures by Voronoi Tessellation and computation of the gravity response of such fractal structures. The present invention has a wide range of applications in practically all geophysical exploration programs. The method provides a sub-surface basin structure; which is very close to the natural setting and hence can be very useful for modeling of hydrocarbon reservoirs and mineral deposits for optimum estimation and simulation of the reserve having known precisely the extent and shape of the anomalous region by the method, which uses a fractal approach. The fractal structure, being very irregular conforms to natural geological situations, which have been utilized to demonstrate its applicability in various geophysical exploration programs.

Background of invention: The present exemplary embodiment of the invention provides a new approach for generation of three dimensional fractal subsurface structures by Voronoi tessellation and computation of the gravity response of such fractal structure. This provides an efficient and new way of fractal subsurface generation, which removes possibilities of getting into a reentrant structure while perturbing Voronoi centers during iteration steps (involving in inverse modeling of the underlying structure and computation of the gravity response of such fractal subsurface, which constitutes forward modeling of the underlying structure for exploration of hydrocarbons and minerals).

Summary of the invention: A method is provided for the generation of three dimensional fractal subsurface structures by Voronoi tessellation and computation of a gravity response of such fractal structure. This provides a robust and efficient process for generation of fractal subsurface structures, which is very close to a natural setting of the subsurface geology and which provides computation of forward gravity responses of such structures for delineation of an underlying anomalous object.

Advantages: The main advantage is to provide a new approach for generation of three dimensional fractal subsurface structure by Voronoi tessellation and computation of gravity response of such fractal structure, this is an efficient way of fractal subsurface generation and computation of gravity response of the same. This method removes all the possibilities of getting into a reentrant structure while perturbation of Voronoi centers during iteration steps involved in inverse modelling of the underlying structure. The said method constitutes delineation of the underlying structure for exploration and production of hydrocarbons and minerals lying below the earth's surface. The technique of Voronoi tessellation has been modified using L.sup.p norm, where in p can assume any value from the set of rational numbers, provides wider possibilities of generating different realistic sub-surface structures. This is an innovative approach proposed herewith for delineation of complicated geologic structure which are favorable for oil accumulation and was never attempted by any one hitherto.

Lab	US patent application No.	Inventor
NGRI	IN 1522DEL2007 - 18/07/2007 US 11/947340 - 29/11/2007	Manglik Ajai et al.

Title: Method of predicting the dynamic behavior of water table in an anisotropic unconfined aquifer having a general time-varying recharge rate from multiple rectangular recharge basins.

Field of invention: The present invention relates a method of predicting the dynamic behavior of water table in an anisotropic unconfined aquifer having a general time-varying recharge rate from multiple rectangular recharge basins.

Background of invention: Mathematical modeling tools are an integral part of any groundwater management system. These are required to predict spatio-temporal variations of groundwater level in an aquifer system in response to recharge and pumping. These modeling tools fall under two categories: (i) analytical and (ii) numerical. While numerical methods are able to incorporate aquifer heterogeneities in the groundwater management system, analytical methods give exact solutions of groundwater flow problems having simple aquifer systems and are fast in terms of computation time.

Summary of the invention : The present invention describes development of analytical solution and associated digital implementation for the prediction of water table variation in an anisotropic unconfined aquifer which receives time varying recharge from multiple rectangular recharge basins.

Advantages: The analytical method of the present invention helps in accurate estimation of water table fluctuations in an anisotropic unconfined aquifer receiving time varying recharge from multiple rectangular basins. The effect of any general type of recharge rate on water table variation can be analyzed. Each of the recharge basins can have a different pattern of time varying recharge rate. The present invention can be used to simulate groundwater flow due to leakage from a canal or a series of canals. The method can also be used to analyze the effect of spatial variations in the recharge rate on the groundwater flow. The method provides scope for inclusion of the effect of pumping from multiple wells on the water table variations. The method can be used in sensitivity analysis of controlling parameters and validation of numerical schemes

Lab	Patent No. / Application No. (Date of filing / Date of grant)	Inventor
NGRI	IN 0031DEL2007-03/01/2007 US 12/518406- 09/06/2009 PCT/IN07/00565 -03/12/2007	Sukhija Balbir Singh et al.

Title: Process utilizing natural carbon-13 isotope for identification of early breakthrough of injection water in oil wells.

Field of invention: The present invention relates to a process utilizing, natural carbon-13 isotope for identification of early breakthrough of injection water and its movement in the oil wells. More particularly, the said process makes use of carbon-13 isotope naturally present in the injection water.

Background of invention: Water flooding (injection of water) is one of the methods in vogue for the secondary recovery of oil when the natural pressure of the reservoir gets diminished. The natural forces responsible for reservoir pressure are: i) expanding gas, ii) encroaching edge water (or bottom water), iii) expansion of oil plus dissolved gas, iv) gravity etc. As soon as a reservoir is struck and produced by a well disturbing its pressure equilibrium, the above forces begin to drain the oil and gas towards the well. During the lifetime of a field and in the course of production, the reservoir pressure and temperature are reduced. Eventually no more economically viable oil production is achieved. Under such situation if the oil production is to sustain, invariably pressure-building operations are to be resorted to in the field. Such operations include gas injection, water flooding or application of polymers etc. These secondary recoveries of oil operations are extremely important and useful for oil production. In addition to this, the secondary recovery of oil in general, is economical and involves less risk than exploration of a new oil field.

Summary of the invention : The present invention provides a process utilizing natural carbon-13 isotope for identification of early breakthrough of injection water in oil wells, the said method comprising the steps of periodic collection of water samples from different sources, followed by chemical treatment of water samples in the field itself to precipitate dissolved inorganic carbon species, then collection of precipitates and treatment with an acid, for extraction .

Advantages: The main advantage of the present invention is that the naturally present .sup.13C stable isotope in waters is made use of rather than using costly and hazardous chemicals and radioactive substances in tracing the injected water: which also involve additional expenditure on their special non-hazardous containers for transport. The ratio between two stable carbon isotopes naturally present in the waters is in the form of dissolved inorganic carbon species.

Lab	Patent No. / Application No. (Date of filing / Date of grant)	Inventor
NGRI	IN 0886DEL2006 - 30/03/2006 US 12/281153- 29/08/2008	Sukhija Balbir Singh et al.

Title Method for evaluation of performance of percolation tanks using environmental chloride as a tracer.

Field of invention: The present invention relates to a method for the evaluation of percolation tanks using environmental chloride as a tracer. The present invention particularly relates to a method for evaluation of percolation tanks performance using environmental chloride present in surface water as a tracer. The present invention relates to a method for the evaluation of percolation tanks using environmental chloride as a tracer, with regard to the contribution of such tanks for groundwater augmentation.

Background of invention: Percolation tanks are artificial recharge structures used to augment groundwater resources. Percolation tanks are simple earthen dams constructed across natural ephemeral streams, so that surface runoff is impounded in these structures. Due to evaporation losses, only a certain fraction of impounded water is subsequently expected to percolate through the tank bed and improve the yield of the downstream wells. However, scientific studies to evaluate the efficacy of Percolation tanks are very few. Water balance method (Raju, 1985) is generally employed for estimating tank contribution to groundwater augmentation. The water balance method takes into account the pan-evaporation measured at meteorological stations, rather than measuring it near the tanks. Such pan-evaporation data may not really applicable to large tanks and hence usage of such non-in situ (tank) measured pan-evaporation values in the evaluation of tank performance runs in to ambiguous results. On the other hand, tank contribution to groundwater could be qualitatively assessed by analyzing the stable isotope contents of tank water and groundwater (Nair et el., 1979) or injecting a tracer in to the tank and monitoring the tracer in the downstream wells (Nair et al., 1980). Thus the present invention offsets the ambiguity associated with the water balance and other tracer studies and provides quantitatively the contribution from percolation tank to groundwater.

Summary of the invention : The present invention provides a method for the evaluation of the performance of percolation tanks using environmental chloride as a tracer, the method comprising generating a rating curve representing stage versus volume, periodically collecting the tank water and measuring the water level in the tank, measuring evaporation levels, and measuring the chloride concentration of collected tank water samples, estimating an initial total chloride in the tank water at the time of start of process, estimating residual chloride in the tank, water at a given time, computing the loss of chloride from tank water to groundwater through percolation, mass balancing the chloride concentration in the tank water, to provide the volume of water percolated to groundwater.

Advantages: The main advantage of the present invention is that the naturally present chloride tracer in waters is made use of rather than using costly and hazardous chemicals and radioactive substances in evaluating the functional efficacy of percolation tanks, which also involve an additional expenditure while handling.

Lab	Patent No. / Application No. (Date of filing / Date of grant)	Inventor
NGRI	IN 0030DEL2007- 03/01/2007 US 12/521913- 01/07/2009 PCT/IN07/00603 - 26/12/2007	Rammohan Prasad et al.

Title: Process and device for measurement of spectral induced polarization response using pseudo random binary sequence (prbs) current source.

Field of invention: The present Invention relates to development of a process and device for the measurement of spectral induced polarization response using Pseudo Random Binary Sequence (PRBS) current source.The main utility of the invention is to take spectral induced polarization measurements in the field. These measurements are used in the exploration of minerals, ground water and hydrocarbons. These measurements will enable to understand mineral texture and discrimination of economic mineralization from barren halos. Moreover they are also useful in the environmental applications such as mapping of zones with some organic contaminants in the soil.

Background of invention: Conventional methods in taking induced polarization measurements are Frequency domain wherein measurements are taken at selected frequencies (FIG. 4-a) and time domain wherein measurements are taken from decaying wave form 3-b).Considerable time and energy is expended for taking measurements in frequency domain. In time domain even though data acquisition is faster and contains wide band information, the signal to noise ratio deteriorates at later times. Also tellurics contribute as a major source of noise while taking above measurements. The response of the ground to an externally applied excitation is measured at one or more frequencies and one or more samples of transfer function are obtained in the frequency domain. The complete information about the behavior of the system requires measurements on infinite range of frequencies, starting from d.c. which is evidently not possible in practice, and is not even useful for the purpose of exploration.

Summary of the invention : The present invention provides a device for the measurement of spectral induced polarization response using Pseudo Random Binary Sequence (PRBS) current source, which comprises a PRBS current source and a receiver.

Advantages: The main advantages of the present invention is the excitation of subsurface over a wide band of frequencies, preferably over two or three decades, with power distributed evenly over the band.It also provides a provision to tailor the bandwidth of excitation as per the application. It also provides an improved signal to noise (S/N) ratio of the measured signal in addition to the ability to reject uncorrelated noise "Tellurics" in field. The IP phase angle spectrum over useful and normal band of frequencies is obtained at one time in the field. The process of removal of the inductive coupling effects in the field can be made very effective as the discrete phase spectrum obtained is composed of several closely spaced frequencies. Current source and receiver are synchronized using precision GPS time and frequency references in order to eliminate physical linking between current source and receiver through a cable, thus facilitating easier and faster field surveys.

Lab	Patent No. / Application No. (Date of filing / Date of grant)	Inventor
NGRI	IN 2626DEL2006 - 07/12/2006 US 11/711469 - 26/02/2007	Ghosh Santi Kumar

Title: Method for computing an exact impulse response of a plane acoustic reflector at zero offset due to a point acoustic source.

Field of invention: The present invention relates to a method for computing an exact impulse response of a plane acoustic reflector at zero offset due to a point acoustic source useful for seismological applications.A novel and an exact algebraic formula for the impulse response of a plane acoustic reflector at zero offset due to a point acoustic source underlies the method cited in the present invention. An observation at zero offset represents the case when the seismic source and the receiver are located either at the same point or arbitrarily close to each other.

Background of invention: Reflection seismology is a widely employed tool for exploration of hydrocarbons. The seismic exploration industry is focused on a particular type of experiment or, more precisely, a particular type of ensemble of experiments. A source of seismic energy is set off at a shallow depth near the surface of the earth and the upward scattered signal from the subsurface is recorded at an array of receiver located on the surface, relatively near the source compared to the depth of penetration of the signal into the earth. The distance from the source to a receiver is called offset. The output of the receiver is recorded from the time the source was set off. That is, the data represents the amount of time needed for a wave to travel down to a reflector of interest and back to the recording surface. Seismic data is grouped into traces, lines and surveys. A trace is an output of a receiver and a line is a group of traces, while a survey is a collection of lines from a geographical location.

Summary of the invention : The present invention provides a method for computing an exact impulse response of a plane acoustic reflector at zero offset due to a point acoustic source, which comprises, a method for computing an exact impulse response of a plane acoustic reflector at zero offset due to a point acoustic source useful for seismological applications, a method for computing a reference standard for the zero-offset reflection response of a plane acoustic reflector against which the reflection response computed by a seismic numerical modeling algorithm can be checked; and in case of a satisfactory agreement the algorithm can be designated as validated, a method for assessing the efficacy of asymptotic method for obtaining a seismic-reflection modeling solution, a method for computing zero-offset reflection response of a circular reflector observed at its central axis and up to a limited span of time.

Advantages: The invention provides a method for computing an exact impulse response of a plane acoustic reflector at zero offset due to a point acoustic source representing the complete wave-theoretical solution. An exact algebraic formula for the impulse response of a plane acoustic reflector at zero offset due to a point acoustic source, specifically derived to serve as a basis for the invention, underlies the above-mentioned method and readily lends itself to easy computation, doing away with the formidable computations required in either the numerical evaluation of integrals or other numerical techniques for solution.

Lab	Patent No. / Application No. (Date of filing /date of grant)	Inventor
NGRI	IN-0029DEL2007-03/01/2007 US-12/448762-02/07/2009 WO-PCT/IN07/00604 26/12/2007	Devanatha Muralidharan et al

Title: Electronic level sensor and timer based falling head soil permeameter.

Field of invention: The present invention relates to development of an electronic level sensor and timer based falling head soil permeameter.

Background of invention:.The continuing physico-chemical processes ultimately dis integrate the rock into a fine soil texture and deposit in a suitable environment. In most of the semi arid environmental conditions, witnessing regular monsoon cycle, quick removal of the disintegrated rock materials and transport them to places of farther away from place of origin making them further finer particles and gets deposited as low permeable soil layers. Reference may be made to U.S. Patent Nos. 4,072,044 (Farwell et al 1976), 4,099,406 (Fulkerson, et al 1977) and 4,969,111 (Merva et al 1990) and scientific literature cited, indicating that the falling head permeameter is preferable for low permeability ranges and several errors/constraints that could affect the test results.

Summary of the invention : Present invention provides an electronic level sensor and timer based falling head soil permeameter for measuring precisely the soil permeability which comprises, a glass burette with two liquid level sensors fixed at 0 and 20 cm graduated positions attached to a burette stand and connected to top cylinder of soil permeameter assembly through a rubber hose, the said stand further attached to an electronic timer unit interfaced with the level sensor the said burette connected to three cylindrical copper tube chambers to receive water from burette by top chamber with a perforated Teflon disc at the bottom chamber and middle chamber these chambers further connected to soil core recovery tubes, which is attached to a conical flask with a discharge tube and a measuring jar.

Advantages: The falling water levels are sensed precisely. The elapsed time between two levels is measured accurately to a level of $1/100^{th}$ of a second. The application of water uniformly over the entire surface area of the soil core was achieved.

Lab	Patent no./Application No. (Date of filing/Date of grant)	Inventor
NIO	IN1482DEL2003 - 28/11/2003 USB 7341855-11/03/2008	Devi , et al.

Title: Plant mangrove-associated fungus Curvularia lunata and a simple and efficient method of obtaining high yield of pure mannitol from the same

Field of invention The present invention relates to a plant mangrove-associated fungus Curvularia lunata, Strain FM1 E 001, of International deposition no. MTCC 5109, and a simple and efficient method of obtaining high yield of pure mannitol from a plant mangrove-associated fungus Curvularia lunata, said method comprising steps of cutting the leaves into small pieces and placing it on potato dextrose agar (PDA) plates for 48 hours, maintaining the culture at temperature ranging between 26-47.degree. C. and salinity ranging between 4-32 ppt with occasional stress conditions for about 17-19 days to obtain mycelial mat, sonicating the mat to lyse the cells, extracting crude from the sonicated mat using methanol repeatedly, concentrating the crude, treating the concentrated crude extract with solvents of increasing polarity, obtaining aqueous fraction as white powder residue after the treatment containing crude mannitol, purifying the crude mannitol by chromatography to obtain pure mannitol with about 75% of the total crude extract.

Background of invention: D-mannitol is a six-carbon sugar alcohol or polyol, which is about half as sweet as sucrose and occurs widely in nature in a variety of organisms including plants, algae, fungi, and certain bacteria. L-mannitol does not occur naturally. Low levels of mannitol are found in several fruits and vegetables. Presently, mannitol is industrially produced by catalytic hydrogenation of fructose/glucose (1:1) mixture such as invert sugar. Raney-nickel is used as a catalyst and hydrogen gas is used at high temperature and pressure (Makkee et al., 1985). The disadvantage of this method is that the composition of the hydrogenated mixture consists of only about 25% mannitol and the remaining 75% was sorbitol. This production procedure makes the manufacture cost for mannitol relatively high.

Summary of the invention The present invention relates to a plant mangrove-associated fungus Curvularia lunata, Strain FM1 E 001, of International deposition no. MTCC 5109, deposited under the Budapest Treaty at the Microbial Type Culture Collection and Gene Bank, Institute of Microbial Technology, Sector 39-A, Chandigarh, 160 036, India on Jul. 4, 2003, and a simple and efficient method of obtaining high yield of pure mannitol from a plant mangrove-associated fungus Curvularia lunata, said method comprising steps of cutting the leaves into small pieces and placing it on potato dextrose agar (PDA) plates for 48 hours, maintaining the culture at temperature ranging between 26-47.degree. C. and salinity ranging between 4-32 ppt with occasional stress conditions for about 17-19 days to obtain mycelial mat, sonicating the mat to lyse the cells, extracting crude from the sonicated mat using methanol repeatedly, concentrating the crude, treating the concentrated crude extract with solvents of increasing polarity, obtaining aqueous fraction as white powder residue after the treatment containing crude mannitol, purifying the crude mannitol by chromatography to obtain pure mannitol with about 75% of the total crude extract.

Advantages: This is a novel source for mannitol. It is a common fungus (found associated with mangrove leaves of Acanthus illicifolius, collected from Goa coast). Easy to isolate and culture. The fermentation medium used for optimum yield is of low cost. The fermentation conditions are feasible and can be easily carried out in the laboratory. The secondary metabolites can be easily separated from the main compound.

Lab	Patent no./Application No. (Date of filing/Date of grant)	Inventor
NIO	IN 2420DEL2004- 02/12/2005 US 10/570749 -06/03/2006	Raghu Kumar; Chandralata ; et al.

Title: Novel processes for decolorization of colored effluents.

Field of invention The present invention relates to a novel process for decolorization of colored effluents. More particularly it relates to a process for decolorization of colored effluents of textile mills, dye-making industries, paper and pulp industries and molasses spent wash from alcohol distilleries using an unidentified marine fungus NIOCC #2a isolated from mangrove wood and deposited in the microbial type culture collection (MTCC) of the Institute of Microbial Technology, Chandigarh, India, under the accession number MTCC 5159. Further, this invention relates to decolorization of these effluents using the fungus directly, its cell-free culture supernatant or immobilized fungus or extracellular polymeric substances produced by the fungus.

Background of invention: Some of the industries that discharge highly colored effluents are paper and pulp mills, textiles and dye-making industries, alcohol distilleries and leather industries. The paper and pulp industry is one of the major polluters, discharging various kinds of gaseous, liquid and solid wastes into the environment. Some of these pollutants are naturally occurring wood extractives such as tannins and lignins, others are xenobiotic compounds that are formed during the paper making process such as chlorinated lignins and its degradation products and dioxins (Ali and Sreekrishnan, 2001, Aquatic toxicity from pulp and paper mill effluents: a review. Advances in Environmental Research 5: 175-196). In the production of high-grade paper, residual lignin is chemically liberated from wood pulp through the use of chlorine bleaching. As a result, large volumes of intensely coloured black liquors (BPEs) containing toxic chlorinated lignin degradation products, including chlorolignins, chlorophenols, chloroguiacols and chloroaliphatics are released into the environment (Reddy C. A. 1995. The potential for white-rot fungi in the treatment of pollutants. Current Opinion In Biotechnology 6:320-328). The primary contributor among these is the pulp black liquor which is intensely dark coloured, toxic and contain high molecular weight modified and chlorinated lignins. Chlorinated organic compounds are acute or chronically toxic besides being mutagenic and carcinogenic.

Summary of the invention: The present invention provides a novel process for the decolorization of colored effluents, which comprises: [0033]a) culturing the yet unidentified, filamentous, non-sporulating fungus MTCC 5159 having the characteristics such as herein described in a conventional nutrient medium optionally prepared with sea water with salinity ranging from 25 to 35 parts per thousand optionally containing assimilable C and N source for a period of 6 to 12 days to obtain a fungal biomass.

Advantages: The fungus NIOCC 2a (MTCC 5159) can be grown on a large scale in simple nutrient medium containing peptone yeast extract and glucose in seawater of 25-35 parts per thousand salinity. The production of laccase by the said fungus can be enhanced by incorporating dilute (.about.1%) textile dye in the above medium.

Lab	Patent no./Application No. (Date of filing /Date of grant)	Inventor
NIO	IN 0736DEL2006- 08/03/2007	Valsangkar, Anil, Bhimrao

Title: An apparatus for sectioning aqueous sediments.

Field of invention The present invention relates to an apparatus for sectioning the aqueous sediments in the core liners at the desired intervals.More particularly the present invention relates to an apparatus working with mechanical control for sectioning of sediments in the core liners up to millimeter level. Further the present invention relates to an apparatus having a rotatable sample holder for core liner with an attachment fixed on the top of the core liner enables precise sectioning of the sediments up to milimeter level at desired intervals without contamination.

Background of invention: The oceanographers use the spade or box corer, gravity corer, or piston corer for deep sea sediment sampling, and a small corer operated either by a diver or from the surface for sampling in shallow waters (20 m or less). Whichever type of sampler is used, the corer allows a vertical section of unconsolidated bottom sediments to be brought to the surface for analysis and testing. Because of changes in pressure, temperature, and mechanical properties of the sediment caused by removal of the core from the bottom, the sediments are required to be cut, sectioned or sub-sampled immediately after their retrieval at the desired intervals so as to make them suitable for the wide range of applications and experiments. For various applications, the geologists and biologists require the sediment core sectioned from top to bottom at different intervals. Normally, geologists prefer sediment sections at 0.25, 1 , 2, 5 and 10 cm intervals whereas the biologists require the same at 0.5, 3, and 5 cm intervals.

Summary of the invention The present invention provides an apparatus for sectioning of sediments from core liners at desired interval, wherein the apparatus consisting of the following parts-(a) a basal plate with a threaded hole in the center;(b) a rod having equally spaced normal threads, bolted at bottom of the basal plate; (c) a rotating steel disk with a threaded hole, mounted on the threaded rod;(d) a steel cup to position and hold the core liner being placed vertically above the basal plate ;(e) a grooved stopper or cap for preventing sediment falling down from core liner;(f) an adjustable acrylic coupler or gripper being fixed on the top of the core liner having collapsible steel scale; and(g) a rotatable steel slicer to cut or slice or section the sediment inside the core liner.

Advantages: The apparatus of the present invention is fully mechanical to achieve repeatable sectioning of the soft aqueous sediments at desired intervals up to millimeter levels. This is in contrast to other methods in which there is no control on the sectioning intervals, thus making them susceptible to sub-sampling errors. The mechanical control in the present apparatus provides cross sections of sediment from the core liner. This is in contrast to push core and other methods in which there is no control on cross sectioning of the sediments.The design of the apparatus in the present invention allows keeping the core liner vertical without changing physical, mechanical and chemical properties of the sediment in the core liner. This is in contrast to push core method where the core liner is held near horizontal or inclined position in hands.

Lab	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
NML	IN 2129DEL1997- 31/07/1997 US 6908599- 21/06/2005	Mishra , et al.

Title: Process for the production of zirconium boride powder

Field of invention: The present invention relates to an improved process for the production of Zirconium Boride Powder.

Background of invention: Zirconium boride/diboride is emerging as a potential advanced ceramic because of it's excellent properties--high melting point, hardness, elastic modulus and electrical conductivity, resistance to acids like HCL, HF and other non-ferrous metals, cryolite and non-basic slags. Due to these properties, ZrB.sub.2 finds several engineering applications like cathodes for electrochemical processing of aluminum (Hall-Heroult process), evaporation boats, crucibles for handling molten metals, thermowells, wear parts, nozzles, armor and as dispersoid in metal and ceramic composites for getting improved mechanical properties, cutting tools etc. It is also used as thermocouple sieves for high temperature furnaces. Zirconium Boride due to its several technological important uses, as stated above, has been synthesized in the prior art in several ways: 1. Synthesis from elements by melting, sintering or hot pressing in the process.Zirconium and boron metal ingots are melted together in inert atmosphere in furnace to obtain a final product in the form of lumps of zirconium boride. Metallurgical processes such as forging, milling are used to obtain fine powder of zirconium boride. The process uses raw material in elemental form. Therefore different powder metallurgy processing methods are required for converting from elemental to powder form. Thus the process becomes very costly and so commercially may not be viable. 2. Borothermic reduction of metal oxides. In this method, zirconium oxide is reduced using boron metal powder in furnace under inert atmosphere.

Summary of the invention: The present invention provides an improved process for the production of zirconium boride, which comprises mixing powders of zirconium chloride in the range of 20-25% wt, Boric acid (H.sub.3 BO.sub.3) in the range of 35-44 wt % and small cut turnings Magnesium (Mg) in the range of 33-40 wt % and pelletising the mixture so prepared, igniting the prepared pellets under inert atmosphere and leaching the resultant product (ZrB.sub.2 and MgO) with leachant to obtain zirconium boride.

Advantages: The present invention uses cheaper raw materials viz. zirconium chloride, boric acid and magnesium turnings compared to elemental zirconium and boron used by the known processes. It does not require any high temperature furnace as used by the known processes and time consumption is very less compared to other known process. The present invention is cost and energy effective compared to known processes.

Lab	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
NML	IN1094DEL2002 - 30/10/2002 US 7,087,210- 08/08/2006	Sinha , et al.

Title: Single-step simple and economical process for the preparation of nanosized acicular magnetic iron oxide particles of maghemite phase.

Field of invention The present invention relates to a single-step simple and economical process for the preparation of nanosized acicular magnetic iron oxide particles of maghemite phase of size ranging between 300 350 nm in magnetic field at room temperature by biomimetic route, and a method of obtaining a magnetic memory storage device using the said particles.

Background of invention: Magnetic pigments have been used in electronic recording devices since the late 1940's. The moderate cost of production and the chemical stability maghemite the principal magnetic pigment for the purpose. Though magnetite, another iron oxide, displays high magnetization and coercivity, it is less suitable for recording devices due to its magnetic instability.Much of the art of creating a good magnetic medium lies in the preparation method of the pigment. New materials for magnetic recording may be limited by the superparamagnetic relaxation produced by the small size of the particle (<30 nm). Particle shape is also an important factor as it determines the shape anisotropy and then the coercive field value. For longitudinal magnetic recording, particles must show acicular shape.The conventional route of synthesis of acicular maghemite particles through oxyhydroxide method is multistep and complicated. It becomes further difficult to produce nanosized maghemite particles through this process as a result of a poor control over the growth kinetics/in another method, oxidation of magnetite particles result in formation of either cubic or irregular maghemite particles. The crystals of <300 nm size are completely transformed to the maghemite phase at 200 250.degree. C. Whereas, for larger crystals, the oxidation is incomplete. The process being single step, however, involves a relatively higher temperature to produce maghemite particles of negligible aspect ratio.

Summary of the invention The present invention relates to a single-step simple and economical process for the preparation of nanosized acicular magnetic iron oxide particles of maghemite phase of size ranging between 300 350 nm in magnetic field at room temperature by biomimetic route, and a method of obtaining a magnetic memory storage device using the said particles.

Advantages: The invention provides a room temperature single step process for the preparation of nanosized uniformly acicular maghemite particles with a high aspect ratio for application in the field of magnetic memory storage.

LAB	Patent no./Application No. (Date of filing /Date of grant)	Inventor
NML	IN 0804DEL2005 - 31/03/2005 US 7,410,537-12/08/2008	Kumar , et al.

Title: Process for the production of Portland slag cement using granulated blast furnace slag

Field of invention The present invention relates to an improved process for the production of Portland slag cement using granulated blast furnace slag. The invention particularly relates to a process for the production of Portland slag cement using cement clinker and higher proportion of ground granulated blast furnace slag, which is a waste material from steel plants.

Background of invention: The products produced by the process of present invention may be of different particle sizes and shapes, different specific surface areas and with different reactivity. The Portland slag cement of the present invention shall be useful in buildings and other large structure such as dams, bridges, roads, etc. The hitherto known processes to produce Portland slag cement use cement clinker, granulated blast furnace slag and gypsum to produce blended slag cement. The existing possesses use cement clinker in the range of 55-90% by weight, granulated blast furnace slag in the range of 5-40% by weight and gypsum in the range of 1 to 5% by weight. The existing process to produce cement clinker which is the main raw material for Portland slag cement consisted of crushing of raw materials such as limestone, clay, quartz, quartzite etc in a jaw crusher, fine grinding of the crushed raw material in a ball mill or vertical roller mill, proportioning of raw materials, blending in the silos and firing in the coal fired rotary kiln. The existing processes (N. Patzelt, Finish grinding of slag, World Cem. Vol 10, 1993, 51-8) to produce Portland slag cement consisted of inter-grinding of cement clinker, granulated blast furnace slag and gypsum for 30 to 60 minutes in a mill. Air is circulated in the mills for homogeneous grinding. The product obtained after grinding is Portland slag cement.

Summary of the invention: The present invention provides an improved process for the production of Portland slag cement using granulated blast furnace slag, which comprises: (i) forming of cement clinker by known process, (ii) ball-milling of cement clinker for a period ranging between 30-60 minutes in dry condition, (iii) reducing size of granulated blast furnace slag by any process to obtain the size in the range between 210 to 100 .mu.m for using as feed for attrition mill, (iv) wet milling of granulated blast furnace slag for a period ranging between 5-15 minutes in an attrition mill using granulated blast furnace slag to water ratio in the range of 1:1 to 1:2 and granulated blast furnace slag to grinding ball ratio in the range of 1:5 to 1:15, (v) removing water from the slurry obtained after attrition milling by known process, (vi) drying of the obtained slurry by known process, (vii) mixing intimately of: attrition milled slag obtain in step (vi) in the range of: 50 to 95% by weight ball-milled clinker obtain in step (ii) in the range of: 05 to 45% by weight gypsum in the range of: 01 to 05% by weight for a period in the range of 15 to 30 minutes.

Advantages: The process utilizes higher proportion of abundantly available industrial waste as major raw material to produce Portland slag cement, thereby the cost of production is considerably reduced in comparison to the known process. The process of the present invention is helpful in resource conservation by replacing cement clinker, which uses costly raw materials e.g. limestone, clay, quartz, quartzite, etc for its production by an industrial wastes.

Lab	Patent no./Application No. (Date of filing/ Date of grant)	Inventor
NML	IN 3331DEL2005-09/12/2005 US 11/386575 -21/03/2006	Agrawal, Archana etal

Title: A process for recovery of iron from copper slag.

Field of invention The present invention relates to a process for recovery of iron from copper slag. This invention particularly relates to a process for recovery of iron from a waste like granulated copper slag generated during the production of copper from its ores by a pyrometallurgicai method. The present invention will be useful for solving the ecological and environmental issues with an added economic advantage of utilising the dump slag generated in the copper plants.

Background of invention: Generation of waste (solid/liquid/gases) in varying amounts is a part of almost every metal casting industry. These wastes can be converted to wealth if processed for eventual recovery of valuables provided it is economical. Unsystematic disposal / dumping of these wastes may lead to environmental degradation and therefore, presently the reuse or recycling of the waste is often stressed upon. Copper smelter slag generated during the processing of copper concentrate for the production of copper is no exception. It is reported that for every tonne of copper metal production about 2.2 tonnes of slag is generated. Initial studies were carried out on physical and chemical characterisation and toxicological studies to decide about the waste management practice for granulated and slow cooled slag of the copper plant. Since the quantity of slag generated shall be accumulating thus requiring increased dumping space, the recovery of some of the value added product has been attempted.

Summary of the invention: The present invention provides a process for the recovery of iron from copper slag which comprises: i. selecting and grinding the copper slag to the size in the range of 2-15mm, ii. mixing homogeneously copper slag, reductant and flux in the ratio range between 20:1 :4 to 20:3:10. iii. creating molten pool of metal having carbon percentage in the range of 3-4.5 % in arc furnace by known method, iv. inducting the mixture obtained in step (ii) in the molten metal pool at a slow rate so that vigorous reaction can be avoided, v. maintaining the temperature of the furnace in the range of 1350 to 1500^0C for a period ranging betweeni - 3 hours, vi. sprinkling reductant material into the molten bath so that foam can be avoided, vii. tapping the melt from the furnace and casting by known method.

Advantages: The recovery of iron from the copper slag which was otherwise considered as a waste.The produced alloy has the potential to be used as grinding media applications.Copper slag acts as a alternative raw material for the production of alloyed cast iron compared to conventional one.Recovery of iron is very high and is around 75 to 85 weight %.Melting can be carried out in the open top or closed top arc furnace.

Lab	Patent No. / Application No. (Date of filing / date of grant)	Inventor
NPL	IN0837DEL2004-06/05/2004 US6881582- 19/04/2005	Rastogi ak, etal

Title: Thin film ethanol sensor and a process for the preparation.

Field of the invention: The present invention relates to a sensitive, fast response thin film ethanol sensor. More particularly, the present invention relates to preparation of thin film of bismuth molybdate useful as an ethanol sensor. The present invention also refers to a process for the preparation of a precursor solution of bismuth molybdenum hexanoate for preparation of thin films of bismuth molybdate for ethanol sensing.

Background of the Invention: Alcohol consumption is a commonplace during festivities and also it is rather common that people do take to driving under drunken state and pose real danger to passer by and of the vehicles. As per laws of almost all the countries there is highest permissible limit of alcohol concentration in humans while driving. Not only this, a drunken subject is a cause of nuisance while on job and is endangered while working on a machine. All these situations warrant measurement of presence of alcohol in humans to meet the legal requirements. This social and legal objective is met by use of means which help in detection of alcohol.

Summary of the Invention: The present invention provides a sensitive, fast response thin film ethanol sensor comprising a substrate coated with a thin film of bismuth molybdate and having electrode contacts deposited on said substrate coated with the thin film.In an embodiment of the present invention the substrate may be selected from the group consisting of alumina, titania, zirconia, glass, quartz glass and silica.

Advantages of the invention: The precursor solution can be made at low cost. The precursor material is very stable and has a long shelf life. The thin film of bismuth molybdate does not need any post deposition heat treatment. The ethanol sensing can be achieved in a short time interval of 10 seconds.

Lab	Patent No. / Application No. (Date of filing / date of grant)	Inventor
NPL	IN-2372DEL2007 13/11/2007 US-12/134635 06/06/2008	Harish chander, etal

Title: A process for preparation of metal oxides with dopants in lower valence state by combustion synthesis technique in nanowire form.

Field of the invention: The present invention relates to a process for the preparation of nanowires of metal oxides with dopants in lower valence state. Particularly, the present invention relates to a process for the preparation of nanowires of metal oxides with dopants in lower valence state by combustion synthesis technique. More particularly, the present invention provides a process for the preparation of nanowires/nanomaterials of one or more metal oxides with a dopant element in lower valence state requiring reducing atmosphere. Nanowires have size of less then 100 nm in transverse direction and length from one to several micrometers.

Background of the Invention: Nanomaterials have become important in recent years because of the markedly different electrical, optical and structural properties of these as compared to those in the conventional bulk form. For example, semiconductor nanocrystals exhibit a continuous shift of the absorption energy to higher energies due to quantum confinement. Further, it is an observed fact that morphology of nanomaterials like spheres, rods, needles, wires and tube play an important role in deciding application of these. This makes study of nano-structured materials one of the frontier areas of research in synthesis chemistry and condensed matter physics. The enormous global interest in the field is also due to the fabrication of devices using nanomaterials with special and advanced features.

Summary of the Invention: The present invention provides a process for the preparation of nanomaterials of metal oxides doped with metal ions in low valence state and the said process comprising the steps of: [0018]a) mixing the precursor of nitrate salt of metal belonging to IIA, IIIA or IIIB group with one or more dopant precursor of nitrate salt of lanthanide metals, b) homogenizing the above said nitrate metal salts precursors herein described as oxidizer in water along with activated charcoal and combustible organic fuel to obtain a paste like mass,c) heating the above said homogenized mass obtained in step (b) in a especially designed container, as herein described, uniformly at a temperature in the range of 200.degree.-1000.degree. C., for a period till a bright yellow flame is produced and volatile gases are removed from the top of the said container, d) cooling the above said container and removing the fluffy mass of nanomaterial in the form of nanowires of the desired metal oxides with dopant of lanthanide in low valence state.

Advantages of the invention: The main advantages of the present invention are: The present invention is suitable for preparation of oxide types of nanomaterials in the form of nanowires useful for the varieties of applications such as luminescent materials, semi conducting, insulating, magnetic and optical material. The process provides nanomaterials in dry powder form. The process provides nanomaterials with dopants in lower valence state. The process is less cumbersome due to very limited number (almost one) of process steps involved.

Lab	Patent No. / Application No. (Date of filing / date of grant)	Inventor
NPL	IN-0062DEL2008 07/01/2008 PCT/IN2008/000717 31/10/2008	vipin kumar, jain kiran etal

Title: Combustible gas sensor.

Field of the invention: The present invention relates to a sensor for combustible gas. Particularly, the present invention relates to the fabrication of a LPG gas sensor with planar thick film technology. The present invention also relates to a method of manufacturing of semi conducting oxide based bi - layer sensor where the composition of the top layer is such as to provide stability and selectivity to the sensor.

Background of the Invention: The early development in the fabrication of combustible gas sensitive detectors involved deposition of a gas sensitive material on a fine alumina tube, taking electrical contacts from the two ends of the tube and heating the tube by inserting a fine heater wire inside the tube. Each step in this process is required to be done manually. The later development is the deposition of gas sensitive material on a planar substrate by techniques such as screen printing, depositing a planar heater on the same or opposite side of the substrate and taking out electrical contacts by parallel gap welding method. The difficulties involved in this process are (a) the drift in the electrical characteristics of the sensing material, (b) non-selectivity of the sensing material to a particular gas, say LPG over alcohol vapors, (c) sensitivity to humidity, (d) drift in the electrical characteristics of the heating layer, (e) size of the heater, (T) fragility of the parallel gap welded contacts, (g) poor adhesion of gold films used for electrical contacts, such as gold fingers. Various attempts have been made to solve the problems (b) and (c) by using a two - layer structure. Thus, reference may be made to Pi-Guey Su and I-Cherg Chen, entitled "Laminating two - layer thick films structure tin oxide - based butane gas sensor operating at low temperature" (Sensors and Actuators B 99(2004) 304-309) wherein a two layer structure has been used where the first layer contains mainly $Sn\theta_2$ and antimony as the dopant. The second filter layer consists of tin oxide - aluminum oxide activated with palladium. The second layer gives selectivity for sensing of butane gas over interfering gases such as ethyl alcohol, carbon monoxide, humidity, etc.

Summary of the Invention: The present invention provides a stable, sensitive thick film ceramic combustible gas sensor comprising:I. Pt resistance heater printed on one side of a ceramic substrate, II. gold finger electrodes printed on same side on heater or on the opposite side of the substrate,III. a thick film of Pt and rare earth metal containing SnO2 formed on the above said gold finger,IV. a second thin film of Pt and niobium containing silicon dip coated on the above said thick film of SnO2 and the said bilayer film defining a gas sensing element,V. electrical leads attached to metal pads on ceramic substrate to provide strength and contact and integrating the said device with alarm circuit.

Advantages of the invention: The device has selective response for liquid petroleum gas (LPG) over ethanol and humidity.The device has made the miniature size application possible in the invention, due to the small size of platinum heater working at 5 volts.The device is free from ageing effect for a considerable period of time.The fast anchored electrical leads to the sensor provide accident and fault - free working of the device.

Lab	Patent No. / Application No. (Date of filing / date of grant)	Inventor
NPL	IN-2750DEL2007 -28/12/2007 PCT/IN08/00371- 13/06/2008	Kumar Sushil; etal

Title: A process for the preparation of photo luminescent nanostructured silicon thin films.

Field of the invention: The present invention relates to a process for the preparation of nano structured silicon thin film. More particularly, the present invention relates to a process for the preparation of nano structured silicon thin film using radio frequency (rf) plasma discharge useful for light emitting devices such as light emitting diode, laser etc.

Background of the Invention: Silicon has shown dominance over other materials over the years but, because of its indirect band gap nature, it was believed that it cannot find use in photonic devices. However, very recently there were some successes to make light emitting diodes and Laser using nano-silicon. References- in this- connection may be made to M.A. Green, J Zhao, A Wang, PJ Reece, and M GAL in Nature 412, 805(2001) and also L. Pavesi L Dal Negro, G Mazzoleni, G Franzo and F Priola in Nature 408, 440 (2000).

Summary of the Invention: The present invention provides a process for the preparation of photo luminescent nanostructured silicon thin films and the said process comprising the steps of:- (i) cleaning the substrate by^known method -and - placing it on an anode in- a plasma enhanced chemical vapour deposition (PECVD) chamber, (ii) pumping the above said PECVD chamber to a base pressure of 10^{-7} to 10^{-8} torr to remove the residual gases, - • (iii)heatiπg the -substrate at a temperature πrthe range of 160-250 ^{0}C,(iv) depositing the nano structured silicon thin film over the substrate by feeding the hydrogen diluted silane gas(SiH_4) at a rate of 30-50 standard cubic centimeter (seem) and argon gas at a partial pressure of 30-90%, to the above said PECVD chamber, for a period of -10-60 minutes, at a chamber pressure of 0.5-10 torr, (v) applying a radio frequency of 13.56 MHz to a cathode in the above said PECVD chamber, at a power density of 100-1000 mW/cm^2, (vi) cooling the above said PVCED chamber to a temperature of 25- 30^{0}C, followed by breaking of vacuum by inserting the nitrogen gas to obtain the desired nano structured silicon film.

Advantages of the invention: Photoluminescence has been shown in nanostructured silicon thin films deposited on low cost glass substrates using plasma enhanced chemical vapour deposition technique. This could be advantageous for integration of silicon photonic devices with the existing silicon microelectronic technology.

Lab	Patent No. / Application No. (Date of filing / date of grant)	Inventor
NPL	IN 0313DEL2009 - 18/02/2009 PCT/IB2010/000133 - 27/01/2010	Kumar sushil, dixit prakash narain

Title: An improved process to deposit diamond like carbon as protective coating on inner surface of a shaped object.

Field of the invention: The present invention relates to an improved process to deposit diamond like carbon (DLC) films as protective coating on inner surface of a shaped object such as plastic or metallic bottles. More particularly, the present invention relates to an improved process using radio frequency (rf, 13.56 MHz) plasma discharge for the deposition of hard hydrogenated amorphous carbon (a-C:H, also called Diamond Like Carbon, DLC) thin films as protective coating on inner surface of hollow objects.

Background of the Invention: It is well known that diamond-like carbon (DLC) films offer a wide range of exceptional physical, mechanical, tribological, electrical, optical and biomedical properties that make them commercially attractive for numerous industrial applications. Certain DLC films are extremely hard, chemically inert and also tribologically they show some of the lowest known friction and wear coefficients. Their optical and electrical properties are extraordinary and can be tailored to meet the specific requirements of a given application. Because of their excellent chemical inertness, these films are resistant to corrosive and/or oxidative attacks in acidic and saline media. Main constituent of DLC is carbon (and also hydrogen, varies from few atomic percent to 60 percent) and because of its inertness property, it is also a biocompatible material.

Summary of the Invention: The present invention provides an improved process for deposition of diamond like carbon (DLC) films as protective coating on inner surface of a shaped object such as plastic or metallic bottle.

Advantages of the invention: There is a huge demand of polyethylene terephthalate (PET) or polyethylene naphthalate (PEN) bottles, meant for the storage of potable water, carbonated soft drinks, wines, medicines etc. However, the higher cost prohibits their wide spread use. The cheaper alternative is to use plastic bottles inside coated with chemically inert material such as Diamond-Like Carbon (DLC). Ion bombardment on the surface of PET (or any other plastic) bottles is avoided due to energy of ions used ~60-80 eV with corresponding self bias 150-200 Volts to get hard enough (8-12 GPa) diamond like carbon films with better adhesion on the inner surface of the shaped object.

Lab	Patent no./Application No. (Date of filing/Date of grant)	Inventor
NPL	IN0445DEL2009 -26/02/2010 PCT/IN2010/000134 - 09/03/2010	Mehrotra Ravi, et al

Title: A compact ecg monitoring device with a filter for impulse and channel switching adc noise and error correction for sequential sampling of ecg leads.

Field of invention: The present invention relates to a ECG (Electrocardiograph) device with Impulse and Channel Switching ADC Noise filter and Error correction for Sequential Sampling of ECG signals. The present invention more particularly relates to implementation of a Burst Sampling technique for removing Impulsive and Channel Switching ADC Noise from the ECG signal and an interpolation algorithm for correction of errors in Derived ECG Leads caused by sequential sampling of directly measured ECG leads.

Background of invention: Reference may be made to Article: A suppression of an impulsive noise in ECG signal processing Pander, T.P. Engineering in Medicine and Biology Society, 2004. IEMBS '04. 26th Annual International Conference of the IEEE .Volume 1, 1-5 Sept. 2004 Page(s):596 - 599. Digital Object Identifier 10.1109/IEMBS.2004.1403228.Biomedical signals are commonly recorded with accompanying noise. Many different kinds of noise exist in the biomedical environment. One of the components of noise is a waveform due to electrical activity of the muscles. This "natural" distortion is usually modeled with a white Gaussian noise. But such assumption is not always true, because real-life muscle noise has sometimes impulsive character. First objective of this paper is an application of the alpha-stable distribution as a model of the real-life muscle noise in the ECG signal.

Summary of the invention: Accordingly, the present invention provides an ECG device with Impulse and Channel Switching ADC Noise filter and Error Correction for Sequential Sampling of ECG signals. The device is light weight, portable, convenient, high throughput and low cost to allow standard ECG measurements.

Advantages: ECG device with a rich set of features including self calibration, efficient noise filtering and ECG parameter extraction facility. Compact, light weight and highly cost effective due to reduced number of hardware components. Improved Maintainability as up gradation of firmware is simpler than re-building the circuitry/hardware .Improved accuracy of Derived ECG Leads. Multi operating system support for end user software. Facility to store and retrieve ECG data as well as patient information

Lab Code	Lab Name
AMPRI	Advanced Materials and Processes Research Institute (AMPRI), Bhopal
CBRI	Central Building Research Institute, Roorkee
CCMB	Centre for Cellular & Molecular Biology, Hyderabad
CDRI	Central Drug Research Institute, Lucknow
CECRI	Central Electrochemical Research Institute, Karaikudi
CEERI	Central Electronics Engineering Research Institute, Pilani
CIMFR	Central Institute of Mining and Fuel Research, Dhanbad (CFRI Campus)
CFTRI	Central Food Technological Research Institute, Mysore
CGCRI	Central Glass & Ceramic Research Institute, Kolkata
CIMAP	Central Institute of Medicinal & Aromatic Plants, Lucknow
CLRI	Central Leather Research Institute, Chennai
CMERI	Central Mechanical Engineering Research Institute, Durgapur
CMMACS	CSIR Centre for Mathematical Modelling & Computer Simulation, Bangalore
CIMFR	Central Institute of Mining and Fuel Research, Dhanbad (CMRI Campus)
CRRI	Central Road Research Institute, New Delhi
CSIO	Central Scientific Instruments Organisation, Chandigarh
CSIR-Cx	CSIR Madras Complex, Chennai
CSMCRI	Central Salt & Marine Chemicals Research Institute, Bhavnagar
IGIB	Institute of Genomics and Integrative Biology, Delhi
IHBT	Institute of Himalayan Bioresource Technology, Palampur
IICB	Indian Institute of Chemical Biology, Kolkata
IICT	Indian Institute of Chemical Technology, Hyderabad
IIP	Indian Institute of Petroleum, DehraDun
IIIM	Indian Institute of Integrative Medicine(IIIM), Jammu
IITR	Indian Institute of Toxicology Research , Lucknow
IMTECH	Institute of Microbial Technology, Chandigarh
IMMT	Institute of Minerals and Materials Technology(IMMT), Bhubaneswar
NAL	National Aerospace Laboratories, Bangalore
NBRI	National Botanical Research Institute, Lucknow
NCL	National Chemical Laboratory, Pune
URDIP	CSIR Unit for Research and Development of Information Products,Pune
NEERI	National Environmental Engineering Research Institute, Nagpur
NGRI	National Geophysical Research Institute, Hyderabad
NIIST	National Institute for Interdisciplinary Science & Technology, Thiruvananthapuram
NIO	National Institute of Oceanography, Goa
NISCAIR	National Institute of Science Communication And Information Resources, New Delhi
NISTAD	National Institute of Science, Technology And Development Studies, New Delhi
NML	National Metallurgical Laboratory, Jamshedpur
NPL	National Physical Laboratory, New Delhi
NEIST	North - East Institute of Science and Technology, Jorhat
SERC	Structural Engineering Research Centre, Chennai

For any further queries, please contact the following:-

Interface: Mr. RK Gupta,
Head,Intellecutal Property Management
Division (IPMD), 14 Satsang Vihar Marg,
Special Institutional Area, New Delhi-67
Tel No. 011-26965613, Fax No. 011-26968819
Email: guptark04@yahoo.com; head.ipmd@niscair.res.in

1. Dr AK Gupta - 0755-2457105
Director, AMPRI
Advanced Materials and Processes Research Institute
Hoshangabad Road, Near Habibganj Naka
Bhopal 462064 (Madhya Pradesh)

2. Dr M.O. Garg – 01332 -272391
Director, CBRI
Central Building Research Institute
Roorkee 247667 (Uttarakhand)

3. Dr Ch Mohan Rao -040- 27160789
Director, CCMB
Centre for Cellular and Molecular Biology
Uppal Road
Hyderabad 500007 (Andhra Pradesh)

4. Dr Tushar K Chakraborty -0522 -2610932
Director, CDRI
Central Drug Research Institute
Chattar Manzil Palace, Post Box No. 173
Lucknow 226001 (Uttar Pradesh)

5. Dr V Yegnaraman -04565 -227777
Acting Director, CECRI
Central Electrochemical Research Institute
Karaikudi 630006 (Tamil Nadu)

6. Dr Chandra Shekhar -01596-242111
9414081740(M)
Director, CEERI
Central Electronics Engineering Research Institute
Pilani 333031 (Rajasthan)

7. Dr V Prakash 0821- 2517760
Director, CFTRI
Central Food Technological Research Institute
Mysore 570020 (Karnataka)

8. Prof. Indranil Meena 033 – 24735829
Acting Director, CGCRI
Central Glass & Ceramic Research Institute
196, Raja SC Mullick Road
Kolkata 700032 (West Bengal)

9. Prof Ram Rajasekharan – 0522 -2359623
Director, CIMAP
Central Institute of Medicinal and Aromatic Plants
PO CIMAP, Near Kukrail Picnic Spot
Lucknow 226015 (Uttar Pradesh)

10. Dr Amalendu Sinha – 0326 - 2296023
Director, CIMFR
Central Institute of Mining and Fuel Research
Barwa Road
Dhanbad 826015 (Jharkhand)

11. Dr AB Mandal -044 - 24910897
Director, CLRI
Central Leather Research Institute
Adyar
Chennai 600020 (Tamil Nadu)

12. Prof Gautam Biswas -0343- 2546749
Director, CMERI
Central Mechanical Engineering Research Institute
Mahatma Gandhi Avenue
Durgapur 713209 (West Bengal)

13. Dr AR Upadhya – 080- 25224667
Scientist-in-Charge (Addl Charge), CMMACS
CSIR Centre for Mathematical Modelling and Computer Simulation
NAL Belur Campus
Bangalore 560037 (Karnataka)

14. Dr S Gangopadhyay – 011- 26848917
Director, CRRI
Central Road Research Institute
Delhi-Mathura Road, PO CRRI
New Delhi 110020

15. Dr Pawan Kapur -0172 -2657190
Director, CSIO
Central Scientific Instruments Organisation
Sector-30
Chandigarh 160030

16. Dr Nagesh R Iyer- 044- 22542139
Coord. Director,
CSIR Madras Complex
PO TTTI Tharamani
Chennai 600113 (Tamil Nadu)

17. Dr Pushpito K Ghosh - 0278 -2569496
Director
Central Salt & Marine Chemicals Research Institute
Gijubhai Badheka Marg
Bhavnagar 364002 (Gujarat)

18. Dr KC Gupta – 0522- 2205848
    Director
    National Botanical Research Institute
    Rana Pratap Marg, PB No. 436
    Lucknow 226001 (Uttar Pradesh)

19. Dr S Sivaram - 020 -25902600
    Director
    National Chemical Laboratory
    Pashan Road
    Pune 411008 (Maharashtra)

20. Dr RR Hirwani – 020- 25383558
    Head
    CSIR-Unit for Research and Development of Information Products
    'Jopasana', 85/1, Paud Road
    (Near Vanaz Engineering Company)
    Kothrud, Pune 411038 (Maharashtra)

21. Dr Tapan Chakrabarti - 0712 -2249999
    Acting Director
    National Environmental Engineering Research Institute
    Nehru Marg
    Nagpur 440020 (Maharashtra)

22. Dr PG Rao – 0376- 2370012
    Director
    North-East Institute of Science & Technology
    Jorhat 785006 (Assam)

23. Dr YJ Bhaskar Rao - 040 - 23434600
    Acting Director
    National Geophysical Research Institute
    Uppal Road
    Hyderabad 500007 (Andhra Pradesh)

24. Dr Suresh Das - 0471 – 2490324
    Director
    National Institute for Interdisciplinary Science and Technology
    Industrial Estate PO, Pappanamcode
    Thiruvananthapuram 695019 (Kerala)

25. Dr SR Shetye - 0832 - 2450200
    Director
    National Institute of Oceanography
    Dona Paula
    Goa 403004

26. Dr Gangan Prathap - 011 -25846024
    Director
    National Institute of Science Communication and Information Resources
    Dr KS Krishnan Marg
    New Delhi 110012

27. Dr P Banerjee - 011 -25843227
    Director
    National Institute of Science, Technology and Development Studies
    Dr KS Krishnan Marg
    New Delhi 110012

28. Dr Sukomal Ghosh – 0657- 2270092
    Acting Director
    National Metallurgical Laboratory
    Jamshedpur 831007 (Jharkhand)

29. Prof RC Budhani - 011 - 45609201
    Director
    National Physical Laboratory
    Dr KS Krishnan Marg
    New Delhi 110012

30. Dr Nagesh R Iyer - 044 22542139
    Director
    Structural Engineering Research Institute
    CSIR Campus, TTTI Taramani
    Post Bag No. 8287
    Chennai 600113 (Tamil Nadu)

31. Dr Rajesh S Gokhale – 011- 27662407
    Director
    Institute of Genomics and Integrative Biology
    University Campus, Mall Road
    Delhi 110007

32. Dr PS Ahuja - 01894 230411
    Director
    Institute of Himalayan Bioresource Technology
    Post Box No. 6
    Palampur 176061 (Himachal Pradesh)

33. Prof Siddhartha Roy – 033- 24131157
    Director
    Indian Institute of Chemical Biology
    4, Raja SC Mullick Road, Jadavpur
    Kolkata 700032 (West Bengal)

34. Dr JS Yadav -040 - 27193030
    Director
    Indian Institute of Chemical Technology
    Uppad Road
    Hyderabad 500007 (Andhra Pradesh)

35. Dr Ram A Vishwakarma - 0191 2569111
    Director
    Indian Institute of Integrative Medicine
    Canal Road
    Jammu 1800001 (Jammu & Kashmir)

36. Dr MO Garg - 0135 2660205
    Director
    Indian Institute of Petroleum
    PO IIP, Mohkampur
    Dehradun 248005 (Uttarakhand)

37. Dr KC Gupta - 0522 2621856
    Director
    Indian Institute of Toxicology Research
    Mahatma Gandhi Marg, Post Box No. 80
    Lucknow 226001 (Uttar Pradesh)

38. Prof BK Mishra - 0674 - 2581126
    Director
    Institute of Minerals & Materials Technology
    Bhubaneshwar 751013 (Orissa)

39. Dr Girish Sahni - 0172 -2690785
    Director
    Institute of Microbial Technology
    Sector 30A
    Chandigarh 160036

40. Dr AR Upadhya - 080 25270584
    Director
    National Aerospace Laboratories
    Post Bag No. 1779
    Bangalore 560017 (Karnataka)