

Value added chemicals from Cashew Nut Shell Liquid (CNSL)

EXECUTIVE SUMMARY

Value added chemicals (specialty monomers and polymers) from cashew nut shell liquid that have wide ranging industrial and consumer applications

TECHNOLOGY DESCRIPTION

A range of difunctional monomers (dihalides, diacids, diisocyanates, diamines, diacyl hydrazides, diphenols, dialdehydes etc.) and polymer additives are produced utilizing 3-pendadecyl phenol derived from cashew nut shell liquid (CNSL) using NCL's technology. A host of high-performance polymers (polyimides, polyamides, polyesters, poly(amide-imide)s etc.) can be prepared using the difunctional monomers mentioned above.

MARKET POTENTIAL

- There is significant margins involved in producing value added chemicals from CNSL
- CNSL sells for about \$500/ton whereas, Cardanol a CNSL constituent, when separated sells for over \$3000/ton*
- India exports close to 10,000 tons of CNSL a year** - abundant availability of raw materials
- CNSL production capacity in India over 20,000 tons/year

*H. S. Couto1, J.B. F.Duarte1 and D. Bastos-Netto, Biomass Combustion Chamber for Cashew Nut Industry, The Seventh Asia-Pacific International Symposium on Combustion and Energy Utilization December 15-17, 2004, **<http://www.cashewindia.org/>

VALUE/ADVANTAGES

- High performance polymers produced from CNSL have improved processability characteristics
- Produced from low cost raw materials that are widely available in India
- Sustainable, renewable source

APPLICATIONS

- Thickeners in paints, cosmetics, oils, food and textiles
- Electrical insulating varnishes
- Enamels & adhesives
- Auto brake lining
- Substitute for linseed oil (in manufacturing foundry core oil, which is used as a binder)
- Cement hardening agent
- Used in lamination industry (for reduced brittleness and improved flexibility)
- Epoxy resins & rubber compounding resins

TECHNOLOGY STATUS

- Demonstrated at the lab scale
- On the lookout for potential partners for spin-off and licensing
- Patents granted: US [7,572,863](#), US [7,446,234](#), US [7,297,822](#), US [7,709,687](#), IN [242391](#), IN [231770](#)