Highly efficient and scalable process for manufacturing Azelaic acid from oleic acid

EXECUTIVE SUMMARY

CSIR- NCL has developed a patent-pending continuous process for 100 % conversion of oleic acid to azelaic acid with 91 % yield#. Azelaic acid is active pharmaceutical ingredient and additives for lubricants, plastics (#of theoretically expected)

BACKGROUND

- Azelaic acid is a value added product produced from oleic acid. It finds applications in the plastic and lubricants as an additive, in pharmaceutical industry as an API
- Current manufacturing process is a semi-batch operation mode which requires significant capital investment in plant features, higher temperature, longer operational time and results in lower yield (75 %). The current method also suffers from challenges in separation of the end product
- Azelaic acid: **CAS 123-99-9**/Chemspider 2179

TECHNOLOGY DESCRIPTION

- NCL Scientist has developed a continuous process for 100 % conversion of oleic acid to azelaic acid with 91 % yield.
- The process technology is a scalable process where oxidation steps are optimized within 02 minutes
- Separation of end product (which is crucial process challenge) results in poor yield/loss has been addressed by efficient way

MARKET POTENTIAL

- Current (2019) global market for azelaic acid is USD 130 million*
- The market is expected to grow at 7.7 % CAGR in coming years and reach USD 210 million by 2024*
- India Imports most/all of its requirement. Oleic acid sells at 80 INR/Kg while azelaic acid sells at 700 INR/Kg (88 % purity/chemical grade) and 20000 INR Kg (98 % pure/Pharma –cosmetic use); thus represents significant value addition **

*https://www.decisiondatabases.com/ip/21811-azelaic-acid-market-analysis-report
**https://www.zauba.com/import-azelaic+acid-hs-code.html
Average selling prices have been considered

VALUE/ADVANTAGES

- Continuous and Scalable process technology for making azelaic acid (20000 INR/Kg) from oleic acid (80 INR/Kg)
- Efficient process with 100% conversion of oleic acid and 91% yield of azelaic acid (75 % as in conventional).
- Reaction time for oxidation steps is of 02 minutes as compared to several hours for conventional
- Almost complete recovery and recycle of solvents
- Purity: > 99 %

APPLICATIONS

- Additive in plastics and lubricant industries (this application represent 70 % of global consumption)
- Thickening agent in lithium complex grease
- API in pharma/cosmetic industry

TECHNOLOGY STATUS

- Demonstrated and validated at 50 gm/hr scale
- Pilot plant of few Kg/day is under development
- Patent pending
- CSIR-NCL is looking forward for licensing/co-development partners

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