

# LIPID SCIENCE AND TECHNOLOGY



Short Path Distillation Unit

7. Bagaria Agro Products, Aurangabad
8. Balmer Lawrie & Co. Ltd., Chennai
9. Bhatinda Chemicals Ltd., Bhatinda, Punjab
10. Chemical Constructions International (P) Ltd., New Delhi
11. Design Research Institute for Petroleum Engineering, China
12. Dutta Agro Mills Pvt. Ltd., Kolkata
13. Food, Fats and Fertilisers Ltd, Tadepalligudem, A.P.
14. Ganpati Solvex Pvt. Ltd., Rajnandgaon, Chhattisgarh
15. Glampotech Agro Process Pvt. Ltd., Mumbai
16. Gujarat Olechemicals Ltd., Ankleswar, Gujarat
17. Gujarat State Fertilizer Corporation, Baroda
18. Innova Agro Laboratories Ltd., Hyderabad
19. Jay Shree Solvex (I) Pvt. Ltd., Durg, Chhattisgarh
20. Kamal Solvent Extractions Pvt. Ltd., Rajnandgaon, Chhattisgarh
21. Lipid System Engineers Pvt. Ltd., Pune
22. Lohiya Vanaspati P Ltd., Hyderabad
23. Mecpro Heavy Engineering Ltd., New Delhi
24. Mectech Process Engineers Pvt. Ltd., New Delhi
25. Muez-Hest Process Technologies Ltd., Mumbai
26. Murugarajendra Oil Industry Ltd., Chitradurga, Karnataka
27. Paceman Sales Promotion Pvt. Ltd., Kolkata
28. Paras Vansapati Ltd., Raipur, Chhattisgarh
29. Ramcharan Oil Industries Ltd., Hyderabad
30. PEG Consultants & Engineers Pvt. Ltd., Mumbai
31. Saraiwala Agro Refineries Ltd., Hyderabad
32. Sarda Agro Oil Limited, Hyderabad
33. Sona Oil & Chemical Industries Ltd., Nagpur
34. SSD Oil Mills Company Ltd., Chennai
35. Sunrise Oils Ltd., Hyderabad
36. Surana Oils & Derivatives Ltd., Hyderabad
37. Tripura Biotech. Ltd., Hyderabad

## INFRASTRUCTURE

- Autoclaves (20, 7.5 and 1 litre)
- Autotitrator (Karl-Fischer, Potentiometric, pH stat)
- Bench scale continuous esterification plant



Membrane separation unit

- Bench scale continuous centrifuge for gums and soap-stock separation from vegetable oils
- Bench scale extruder for soap noodles
- BOD Analyzer
- CO<sub>2</sub> Incubator
- Evaporation Loss Determination Equipment
- Flash Point Apparatus
- Fluorescence Microscope with attached CCD camera and computerized data Processor
- Foam Tendency Equipment
- Gas Chromatographs
- GC-MS
- High Performance Liquid Chromatograph (HPLC) with Diode array, ELSD, Fluorescence and RI Detectors
- Infrared Spectrophotometer
- Laser Light Scattering Instrument equipped with Zetasizing capacity
- Lovibond Tintometer (Manual and Digital)
- Membrane separation unit for vegetable oil and waste water treatment with flame-proof arrangement for non-aqueous use
- Microplate Luminometer
- Oxidative Stability & Corrosion testing facility for Lubricants
- Pour Point Equipment
- Pulsed NMR
- Short Path Distillation Unit
- Titanium Probe Sonicator
- Undecenoic acid pilot plant
- UV-Visible Spectrophotometer
- Viscometer

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# LIPID SCIENCE AND TECHNOLOGY

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## VISION AND GOALS

- Newer Processing Methodologies for Vegetable Oils
- Oleochemicals and Speciality Chemicals
- Biodiesel
- Nutraceuticals
- Lipid Based Gene Delivery Systems

## CORE COMPETENCIES AND ACTIVITIES

- Technology development for the processing of rice bran and soybean oil with a major thrust to enzymatic and membrane approaches
- Newer methods for the extraction of oils without disturbing its natural integration
- Process development for value added products from the by-products of vegetable oil processing industry
- Preparation of oleochemicals for surfactant, perfumery, lubricant and specialty applications
- Development of a green process for biodiesel production from vegetable oils
- Development of newer fats like trans-free vanaspati, reduced calorie fats, diacylglycerol and structured fats with designed fatty acid composition
- Preparation of nutraceuticals (food grade lecithin, novel phospholipids, glycolipids, oryzanol, tocopherols, phytosterols, stanol esters, GLA, CLA, etc.) of vegetable oil origin
- Design & Synthesis of cationic lipid based novel gene delivery systems



Enzymatic degumming section in a rice bran oil refinery

## CURRENT RESEARCH AREAS

- Process technologies for vegetable oils and fats
- Value added products from vegetable oils
- Biodiesel
- Synthetic aviation lubricants
- Biodegradable lubricants
- Nutraceuticals
- Novel phospholipids
- Reduced calorie fats
- Liposomal gene delivery
- Candidates for cancer gene therapy



Facilities for Synthetic Aviation Lubricant (SAL) Project

## TECHNOLOGIES AVAILABLE

- Enzymatic degumming of rice bran oil
- BSS grade castor oil
- Dehydrated castor oil
- DCO fatty acids
- Hydrogenated castor oil
- Ricinoleic acid
- 12-Hydroxy stearic acid
- Methyl Ricinoleate
- Methyl 12-Hydroxy stearate
- Hard fat from castor oil
- Polyricinolic acids and esters
- Undecenoic acid/heptaldehyde
- 11-Bromo undecanoic acid
- 11-Amino undecanoic acid
- Sebacic acid / 2-Octanol
- Ethoxylated derivatives from castor oil
- Dimer acids from castor oil
- Isostearic acid
- Polyamides
- Guerbet alcohols and acids
- Alkyl lactates
- Sodium stearoyl lactylate
- High performance esters for cosmetics and lubricants
- Food grade and modified lecithins
- Tocopherols and Phytosterols from vegetable oil deodorizer distillates
- Value added products from rice bran oil
  - Rice bran wax
  - Oryzanol
  - Triacotanol, Octacosanol / Polycosanol
  - Soapstock to methyl esters
  - Long chain saturated fatty acids (C<sub>22</sub> and C<sub>24</sub>)
- Diacylglycerol
- Reduced calorie fats

## MAJOR CLIENTS

1. A P Organics Ltd., Dhuri, Punjab
2. A.P. Solvex Ltd., Dhuri, Punjab
3. Abhay Solvents Pvt Ltd., Koppal, Karnataka
4. Alfa Laval (India) Ltd., Pune
5. Anil Modi Industries, Pilibhit, Uttar Pradesh
6. Arihant Petrochemicals Ltd., Bangalore