Next Generation
Oleochemical & Surfactant
Technologies

for 100th AOCS Meeting
Orlando
May 09
Green Technologies

from

the Global Sulfonation Leader

The Chemithon Corporation
Value Adders from BioDiesel

Methyl Ester Sulfonate (MES)

Methyl Ester Ethoxylate (MEE)
Reduction of 1,4-Dioxane

Dioxane Reduction Process
Environmental Technologies

Flue Gas Conditioning

DeNox Systems
FRACTIONATION
Palm Oil Based Oleochemicals

Objectives

- Sustainable value creation from palm oil
- Independent platforms
  - Food (Palmolein)
  - Fuel (Biodiesel – C18 rich)
  - Detergents (C12-14 & C16 Esters)
- Based on renewable resource
- Environmentally friendly product
Mass Balance

RBD PS → 185 MT

Transesterification → Glycerine → 18 MT

Fatty Acid Methyl Ester (FAME) → 185.8 MT

Distillation

C12-14 ME → 2.5 MT
C16 ME → 110 MT
C18 ME → 71 MT
Product Specification

Specifications

C12/C14 Stream from 1st column top:  
C14 = 87 % &  
C12 = 8 %

C16 Methyl esters from 2nd column top:  
C16 = 99 %

C18 Methyl esters from 3rd column top:  
C18 = 96.5%
HYDROGENATION
Fractionated C16 ME:

C16 ME = 99%
IV = 2.0 units max
Moisture = 500 ppm
FFA = 0.1% max
Glycerol = 0.1% max

Hydrogenated C16 ME:

C16 = 99%
IV = 0.1
Ni content = less than 10 ppm
Based on Fraction C16 ME

C16 ME

Hydrogenation

Saturated C16 ME

Ethoxylation

Methyl Ester Ethoxylate (MEE)

EO: Ethylene Oxide
ME: Methyl Ester

Sulfonation/\(\text{SO}_3\)

Methyl Ester Sulfonate (MES)

HPC Products Detergents
Cont. Fixed Bed Hydrogenation Plant
(Supplied to Carotino, Malaysia, 2008)
Oleochemicals Based on Fraction C18 ME

C18 ME

- Epoxidation
  - Epoxy C18 ME
  - Bio-Polyol
    - MEG/BF3
      - Synthesis of Polyurethane

Bio-Diesel

- Compliant with EN Standard
  - Blending of Bio-Polyol+Petrochemical-based polyols and isocynate
  - Rigid Polyurethane Foam
  - Wood like appearance, impervious to moisture, dimensionally stable
  - Potential application-decorative or structural
  - No nutritional value to insects and does not shrink, rot or decay
Advantages of the Project

- Integrated complex with maximum value addition
- Sustainability using renewable raw materials
- Independent revenue platforms
  - Food (Palmolein)
  - Fuel (Biodiesel – C18 rich)
  - Detergents (C12-14, C16 & C18 Esters)
- Glycerin (pharma grade)
- MES in dry flakes form - convenience of use
- Biodiesel EN 14214 compliant (winter grade)
Fractional Distillation

Palm oil methyl ester feed - C12-C14, C16, & C18 ME

- After degassing
- Distilled under vacuum
- Continuous 3-column series distillation unit
- Designed & engineered by Chemithon
- Meets EN14214 norms for biodiesel
Hydrogenation

Pure C16 Methyl Ester fraction containing about 0.1% C16:1 Methyl Ester after degassing

- Hydrogenating in a trickle bed reactor
- 25 Bar(a) (max) & reactor temp of 200 °C
- Full set of safety features
Global Reach

Operating Companies
- Beijing, Mumbai, Seattle, and Singapore

Partners in
- Milan/Busto Arsizio and Tokyo

Manufacturing in
- Busto Arsizio, Mumbai, Seattle, and Singapore