Palm oil as feedstock for Oleochemicals

Hirzun Mohd Yusof
What is palm oil?

“It has the scent of violets, the taste of olive oil and a color which tinges food like saffron but is more attractive”

Ca’da Mosto, 15th century explorer, on discovering palm oil
Palm oil is used in more than half of packaged supermarket products today.
Global Palm Oil Industry

- Today, palm oil is one of the 17 major oils traded in the global edible oils & fats market.
- Palm oil can be found in one out of every ten food products worldwide.
- Key importers of palm oil today are China, India, EU-27 & Pakistan.
Oil Palm Cultivation Area

Physical Conditions for Oil Palm Planting

- Prime Area
- Plantable Area

Plantable = +/- 10 degrees off the equator.
Prime areas = +/- 5 degrees off the equator.
- Located within the equator band
- Humid tropical climate
  - Temperature range of 24-32°C throughout the year
  - Ample sunshine (~ 5-7 hours a day in all months)
  - Evenly distributed annual rainfall of ~ 2,000mm
  - Soil pH <7.5
  - Relative humidity ~ 85%
  - No stagnant water

Oil palm hectarage in Malaysia has grown from 320,000 ha in the 1970s to over 4 million ha today.
Oil Palm Cultivation Area

- Global oil palm mature areas: 10.5m ha in 2007
  - Indonesia: 5.0m ha
  - Malaysia: 3.9m ha

- Other oil crops
  - Soybean: 94.6m ha
  - Groundnut: 21.9m ha
  - Sunflower: 24.0m ha
  - Rapeseed: 27.2m ha

- Average lifespan of an oil palm tree ~25 years
- Palm clones planted in Malaysia & Indonesia: Tenera

Relative to other oilseeds, the oil palm tree is the highest yielding oil crop at an average yield of 3.65 MT/ha
At a forecasted supply growth of 8%, palm oil is well positioned to meet global food and non-food demands. Malaysia is the second largest producer and leading exporter of palm oil.

Source: LMC – Oilseeds Outlook for Profitability to 2020 (Jan 2009)
Oil Palm Plantation at a glance.....
Crude Palm Oil Milling Process
Sime Darby: Centuries of Heritage

• **Kumpulan Guthrie** was founded in Singapore in 1821 by Alexander Guthrie as the first British trading company in South East Asia and one that introduced rubber and oil palm in Malaysia.

• **Golden Hope Plantations**, previously named Harrisons & Crosfield when founded in 1844, was a major oil palm plantation player in Malaysia.

• **Kumpulan Sime Darby**, founded in 1910 by British businessmen William Sime and Henry Darby, and grew into a diversified multinational.

• **In 2007** all three companies merged to form the new **Sime Darby Berhad**.
Sime Darby focuses on 5 core businesses...
As at 30th June 2013

<table>
<thead>
<tr>
<th></th>
<th>Malaysia</th>
<th>Indonesia</th>
<th>Liberia</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Landbank (ha)</td>
<td>349,456</td>
<td>289,422</td>
<td>220,000</td>
<td>858,878</td>
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<tr>
<td>Total Oil Palm</td>
<td>312,795</td>
<td>204,505</td>
<td>8,025</td>
<td>525,325</td>
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<tr>
<td>Planted Area (ha)</td>
<td>7,811</td>
<td>-</td>
<td>-</td>
<td>7,811</td>
</tr>
</tbody>
</table>

**Plantation Division**

**Upstream Geographical Coverage**

- **Kalimantan**
  - Planted: 130,346 ha
  - Landbank: 183,782 ha

- **Sarawak**
  - Planted: 39,793 ha
  - Landbank: 47,331 ha

- **Sabah**
  - Planted: 47,166 ha
  - Landbank: 53,822 ha

- **Sulawesi**
  - Planted: 4,239 ha
  - Landbank: 4,712 ha

- **Peninsular Malaysia**
  - Planted: 233,647 ha
  - Landbank: 248,304 ha

- **Sumatera**
  - Planted: 69,920 ha
  - Landbank: 100,929 ha

- **Liberia**
  - Planted: 8,025 ha
  - Landbank: 220,000 ha

**Total Landbank**: 349,456

**Total Oil Palm Planted Area**: 312,795

**Total Rubber Planted Area**: 7,811
Plantation Division
Downstream Geographical Coverage

- **United States of America**
  - Emery Oleochemicals

- **Canada**
  - Emery Oleochemicals

- **South Africa**
  - Sime Darby Hudson & Knight
  - Sime Darby Edible Products
  - Sime Darby Austral
  - Sime Darby Biodiesel
  - Sime Darby Bioganic
  - Sime Darby Jomalina
  - Sime Darby Kempas
  - Sime Darby Jomalina (NEO)

- **Germany**
  - Emery Oleochemicals GmbH

- **The Netherlands**
  - Sime Darby Unimills B.V.
  - CleanerG B.V.

- **Japan**
  - Emery Oleochemicals

- **China**
  - Guangzhou KeyLink
  - Rizhao
  - Rizhao

- **Thailand**
  - Morakot Industries

- **Malaysia**
  - Emery Oleochemicals
  - Sime Darby Biodiesel
  - Sime Darby Bioganic
  - Sime Darby Jomalina
  - Sime Darby Kempas
  - Sime Darby Jomalina (NEO)

- **Vietnam**
  - Golden Hope Nhabe

- **Indonesia**
  - Pulau Laut

- **United Kingdom**
  - Emery Oleochemicals

- **Singapore**
  - Sime Darby Edible Products

- **The Netherlands**
  - Sime Darby Unimills B.V.
  - CleanerG B.V.
Fully Integrated Oleochemical player through Joint venture

- **Investment Arm**
  - **50%**
  - **50%**

1,100 Employees Worldwide

>20 Nationalities

1 million Mt capacity

Worldwide Distribution Network

Revenue US$ 1 billion/yr
Global Footprint
World scale Integrated Plants, Efficiently Operated
**EMERY at A Glance:**

Product Portfolio – OleoBasics cover a wide range of commodity product portfolio with a global distribution network.

<table>
<thead>
<tr>
<th>Key Products</th>
<th>Major Applications &amp; End Markets</th>
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</thead>
<tbody>
<tr>
<td><strong>Fatty Acids</strong></td>
<td></td>
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<tr>
<td>Fractionated acids</td>
<td>Surfactants, soaps, cosmetics, rubbers, candles, defoamers</td>
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<tr>
<td>Stearic, oleic acids</td>
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<tr>
<td>Polyunsaturated acids</td>
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<td>Distilled, modified acids</td>
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<tr>
<td><strong>Glycerine Triacetine</strong></td>
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<tr>
<td>Distilled / Pharma grade glycerine</td>
<td>Humectants, solubilisers, moisturiser, preserving agent, solvents, plasticisers</td>
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<tr>
<td>Vegetable kosher / GMO free glycerine</td>
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<tr>
<td>Glycerol triacetate</td>
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<tr>
<td><strong>Fatty Alcohol Methyl Esters</strong></td>
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<tr>
<td>Broad and pre-cut alcohols</td>
<td>Surfactants, antioxidants, cosmetics, amines</td>
</tr>
<tr>
<td>Pure fractions alcohols</td>
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</tbody>
</table>
EMERY at A Glance:
Product Portfolio – Emery Oleochemicals is a global leader providing high performance and innovative development of specialties chemicals

### Key Products

- **Plastics Additives**
  - Plasticisers
  - Lubricants
  - Surface finish agents

- **Oilfields Chemicals**
  - Drilling fluids
  - Additives (emulsifiers, lubricants, corrosion inhibitors, cleaners)

- **Ozone**
  - Azelaic acids
  - Pelargonic acids

### Major Applications & End Markets

- **PVC, PE, PP, PC, PU, Polyesters, Polyamides**
- **Engineering plastics, Bioplastics, Wood Fibre Composites, Synthetic Rubber**
- **Biodegradable drilling fluids**
- **Performance additives**
- **Engineering polymers**
- **Adhesives**
- **Specialty lubricants**
- **Acne Cream**
Industrial Biotechnology Development:
Fatty acid as feedstock for fermentation of biochemicals

Metabolic engineering of microorganisms allows for industrial biochemical production using fatty acid as feed stocks, moving away from sugar/cellulose-base feedstock

Dellomonaco et al, 2010
Is sustainability going to be an issue with Palm Oil?

RSPO
Roundtable on Sustainable Palm Oil (RSPO) : In Brief

A multi-stakeholder which initially started in 2003, with 7 members

Promotes the growth and use of sustainable oil palm products through global standards & cooperation within the supply chain.

Among its principles:
- Respect for rights of land owners, farmworkers, smallholders and their families
- No primary forests or high conservation value areas sacrificed for new palm oil plantations

RSPO defined sustainability as:
“The Capability of meeting the needs of the present without compromising the ability of future generations to meet their own needs.”
Our Sustainable Practices

- Sime Darby Plantation observes best agro-management practices in all our field operations worldwide:
  
  - Full Compliance to RSPO principles
  - Zero burning replanting technique
  - Soil management & conservation
  - Integrated Pest Management (IPM)
  - Palm Oil Mill Effluent (POME) treatment
  - Optimum utilisation of oil mill by-products
  - Biodiversity conservation
  - Land use and management with EIA
  - Social Impact Assessment to protect surrounding communities
  - Water and moisture content management
  - Methane abatement through composting
  - Stringent safety and health programme

Beneficial Plants

Mangrove rehabilitation

Integrated Pest Management

Optimum utilisation of oil mill by-products

Zero Burning replanting technique
Sustainable Oil Palm brings economic progress

Gbah town, 2010

Gbah town, 2012
Thank You