



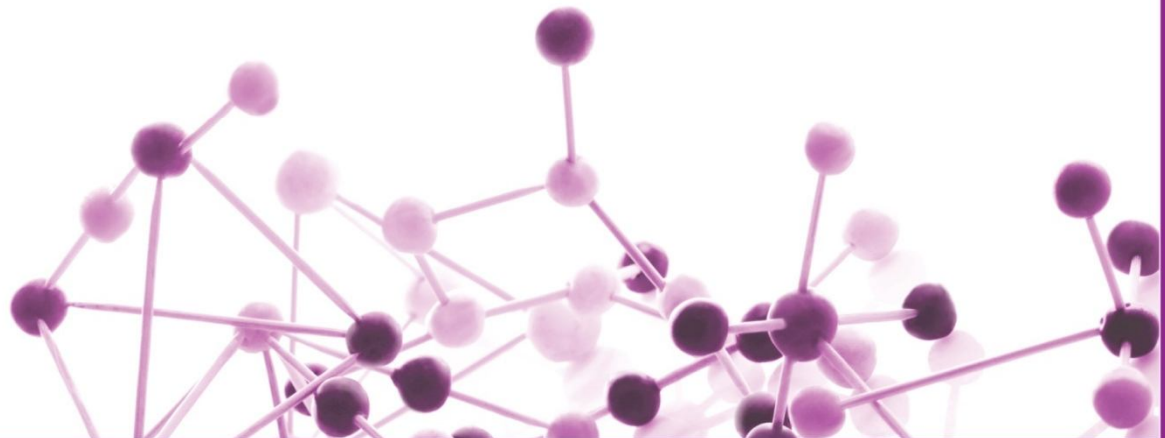
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# *Biodiesel*





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# Introduction

- **Biofuels**
  - Wide range of fuels including solid, liquid or gas fuel.
  - Such as: fuelwood, charcoal, bioethanol, biodiesel, biogas (methane) or biohydrogen.
  - Biofuel made from fermentation of sugar found in grains are called bioethanol.
  - Meanwhile, vegetable oils derived from palm oil or other crops are processed to make biodiesel.
  - In Asia, palm oil and jatropha are grown and used as feedstock for production



# Major Producers

- Production for Bioethanol
  - USA and Brazil, followed by Germany, France and China
  - In 2009, global ethanol production: 30.1 billion tones of oil equivalent.
  - Of which corn-based (from US) and sugarcane-based (from Brazil) accounted for 87.7%
- Production for Biodiesel
  - Europe is the largest producer
  - In 2009, global production stood at 13.4 billion tones of oil equivalent and EU accounted for 68.8%



# What is Biodiesel?

- Biodiesel is a fuel comprised of fatty acid alkyl esters.
- Made from feedstock such as vegetable oil and animals fats with methanol (or ethanol) and NaOH or KOH as catalyst
- Through a process called transesterification.



# What is Biodiesel?

- Biodiesel is used mainly in transportation replacing diesel.
- Usually. It is mixed with fossil diesel as B10 (10% biodiesel) or B20. Some use 100% biodiesel.
- Neste Oil has claimed to come with Neste Green 100 biodiesel (100%) that can be used to replace conventional diesel totally.

# Building Production Hub in Asia

- Due to strategic location, well-developed port and terminaling facilities, and proximity to abundant feedstock from Indonesia and Malaysia, Singapore is developing a biofuel hub.
- Singapore has negligible local market. The produced biodiesel will be mostly for export.
- Becoming on Asia's major biodiesel production center, with a total combined capacity of close to 2 million tones/per year

# Building Production Hub in Asia

- Total investment in this sector close to S\$2 billion.
- Singapore's biodiesel production output is expected to exceed 1 million tons per annum by 2010, and reach 3 million tons per annum by 2015.



# Fuel/biodiesel Standards in Singapore

- Singapore does not have any National Standard for biodiesel.
  - Only three commenced biodiesel producers: Continental Bioenergy, Peter Cremer and Natural Fuel, and their products are for export.
  - International standards are followed by biodiesel producersL European EN14214 and/or ASTM 6751 specifications, depending on the buyer.



# Development of Biodiesel Production

- Continental Bioenergy (150,000 tones per year) started running 2008, multi feedstock (Palm/soy/jatropha)
- Nexsol, joint venture with Germany's Peter Creamer and Kulim Group from Malaysia
  - Built 100,000 tones/year biodiesel plant on Jurong Island, using palm oil feedback.
- Australia's Natural Fuel building a S\$199.95 million (US\$130 million) state-of-art biodiesel production facility
  - With annual production capacity of 600,000 metric ton (700 million litres)



# Company selling biodiesel in Singapore

- Alpha Biofuels and Fuelogical
- They converting waste oil into biodiesel mainly for local consumption and Neste oil using palm oil for European and American market.



# Biodiesel in Singapore

- The National Environment Agency (NEA) is in charge of promoting clean air and setting vehicular emissions standards.
- NEA allows the use of biodiesel for vehicles so long as the vehicle operators can demonstrate via certification by reputable independent testing bodies.
- There is no government mandate to regulate the use of biofuel in Singapore,
- Therefore, the adoption of bio-diesel is highly dependent on free market forces.



# Conclusion

- Future of Biofuel depends largely on:
  - Price of oil
  - Government policies
  - Technological developments (R & D)



# Thank You