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TAN KOK TAT

Editor PPT

Biography

- Dr. Tan Kok Tat is currently an Assistant Professor, in Department of Petro Chemical Engineering, at University Tunku Abdul Rahman, Malaysia.
- His research interests include Renewable Energy (biodiesel)

Recent Publications

- Gaik Tin Ang, Kok Tat Tan, Keat Teong Lee (2014) Recent development and economic analysis of glycerol-free processes via supercritical fluid trans-esterification for biodiesel production. Renewable and Sustainable Energy Reviews.
- Man Kee Lam, Kok Tat Tan, Keat Teong Lee, Abdul Rahman Mohamed (2013) Malaysian palm oil: Surviving the food versus fuel dispute for a sustainable future. Renewable and Sustainable Energy Reviews.
- Kok Tat Tan, Keat Teong Lee (2011) A review on supercritical fluids (SCF) technology in sustainable biodiesel production: Potential and challenges. Renewable and Sustainable Energy Reviews.

Biodiesel Production

Biodiesel is a diesel fuel replacement produced from vegetable oils or animal fats through the chemical process of trans-esterification

Mono-alkyl esters

Biodiesel can be used in any diesel motor in any percent from 0-100% with little or no modifications to the engine.

Low-level blends (≤20% biodiesel) can be used in almost any existing diesel engine

High-level blends (>20% can be used in most new diesel engines

Biodiesel is not,

Unprocessed Vegetable Oil

Mixtures of vegetable oil or alcohol with diesel fuel

Ethanol or E85

Four main production methods

- Direct use and blending
- Micro emulsions
- Thermal cracking
- Trans-esterification

- Most common production method
- Uses vegetable oils and animal fats as feed stocks
- The reaction of a fat or oil with an alcohol to form esters (biodiesel) and glycerol

The Chemistry of Biodiesel

- All fats and oils consist of triglycerides

  Glycerol/glycerine = alcohol

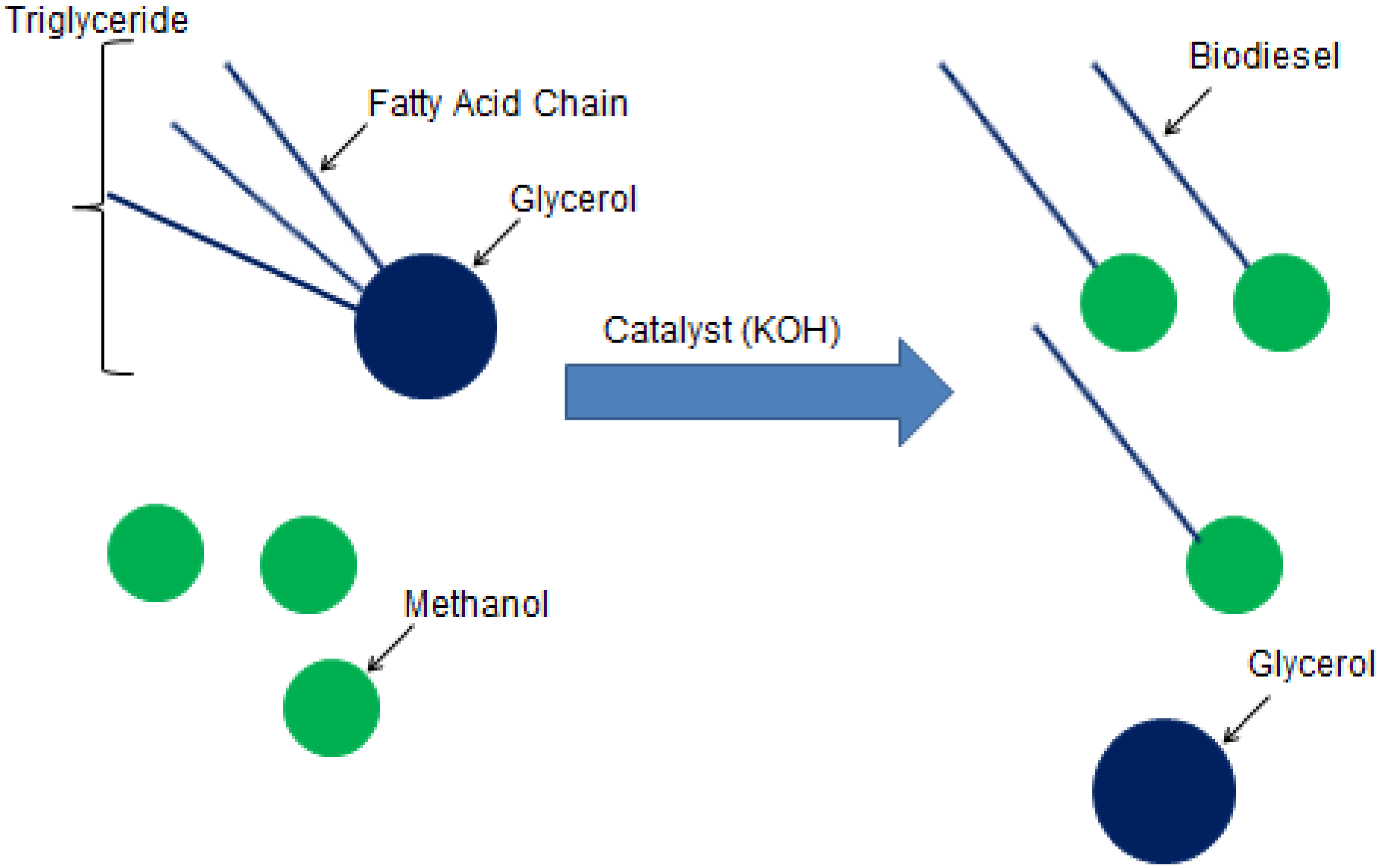
  3 fatty acid chains (FA)

- Trans-esterification describes the reaction where glycerol is replaced with a lighter and less viscous alcohol

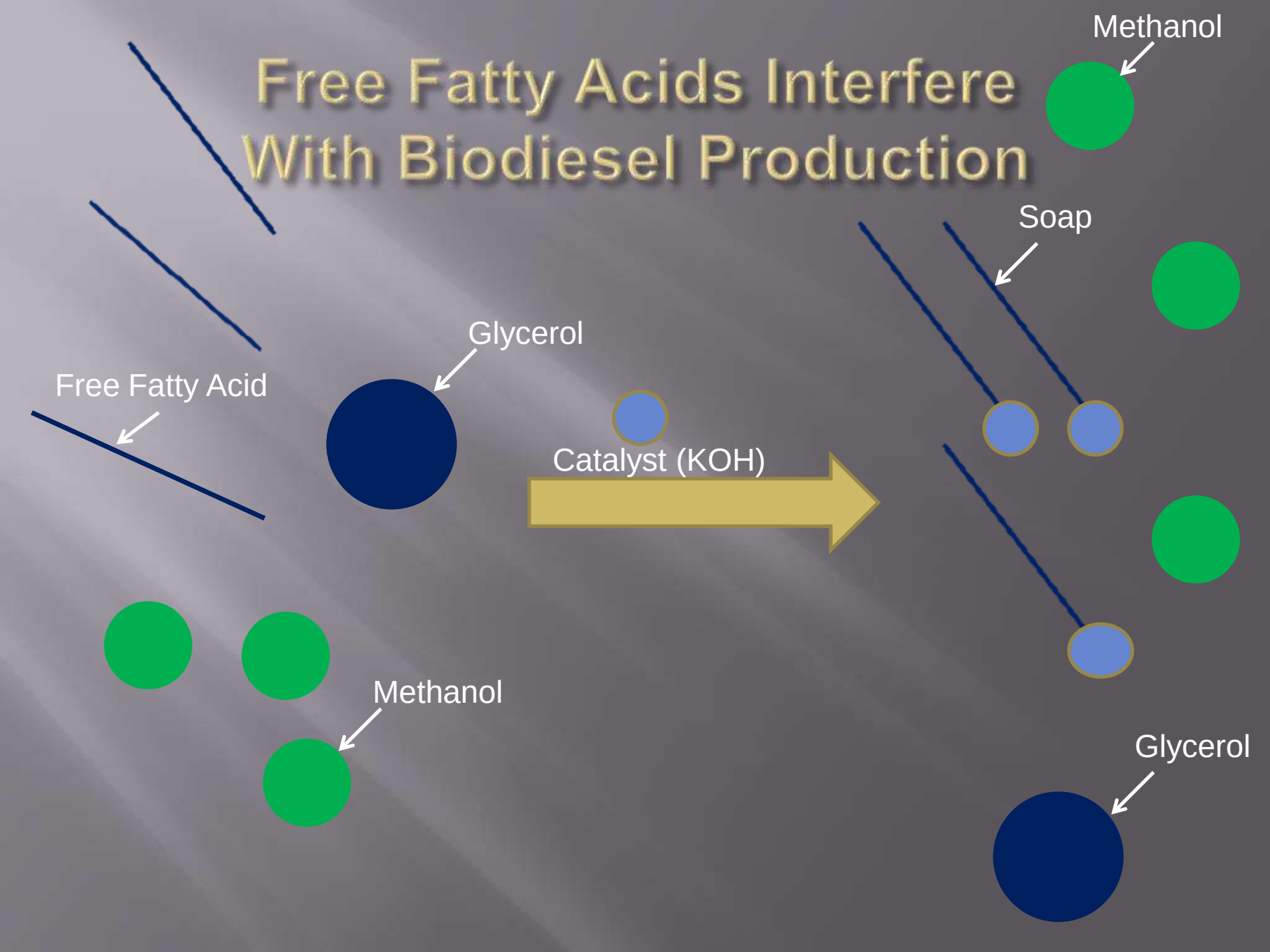
  e.g. Methanol or ethanol

- A catalyst (KOH or NaOH) is needed to break the glycerol-FA bonds

Biodiesel Production



Free Fatty Acids Interfere With Biodiesel Production



Advantages of Biodiesel

Biodegradable

Non-toxic

Favorable Emissions Profile

Renewable

Carbon Neutrality

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