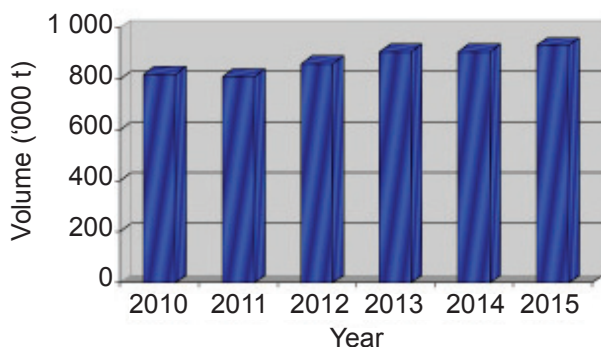


Fatty acids are one of the main basic oleochemicals that have a wide range of chemical and physical properties. In 2015, export of fatty acids increased by 3% or 24 094 t to 930 610 t compared to 906 516 t as recorded in 2014 (Figure 1) (MPOB, 2016). Fatty acids contributed about 33% of the total oleochemical exports from Malaysia.

Export of Fatty Acids (2010-2015)



Source: MPOB (2011 - 2016).

Figure 1. Malaysian export of fatty acids, 2010 to 2015.

It is well-known that the process to produce fatty acid production (Figure 2) is through the splitting or hydrolysis of the triglyceride molecules of fats and oils in the presence of water, to yield glycerine and a mixture of fatty acids (Gunstone *et al.*, 2007a). Each molecule of fats and oils will yield three moles of fatty acids and one mole of glycerol.

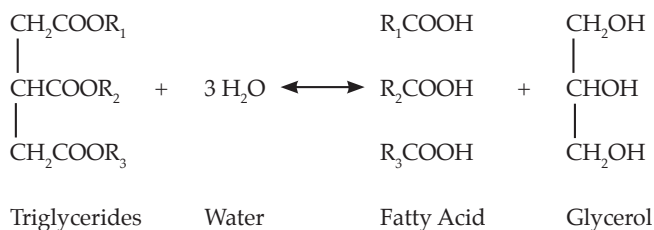


Figure 2. Splitting or hydrolysis of fat or oil triglycerides to fatty acids and glycerol.

During the splitting, a light phase containing fatty acid and the heavy phase consisting of glycerol and impurities, also known as sweetwater, are obtained.

Various fatty acids from palm oil have been produced in Malaysia, whether they are crude, refined, hardened or unhardened. Fatty acids can be used as feedstock for the production of soaps (Norashikin *et al.*, 2008), detergents (Zulina *et al.*, 2008), emulsifiers, polyols (Hoong *et al.*, 2008), plastics, textiles, cosmetics (Roila, 2008), lubricants and others.

Life Cycle Assessment (LCA) is a compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product or a service throughout its life cycle (Hannele *et al.*, 2011). LCA is also used to assess the impact of those energy and materials used and wastes released, and to identify and evaluate opportunities for environmental improvements.

OBJECTIVES

- To identify potential environmental impacts associated with the production of fatty acids produced by the Malaysian oleochemical producers.
- To gauge the greenhouse gas (GHG) emissions from the production of fatty acids.

METHODOLOGY

The system boundary of LCA for the production of fatty acids is set up based on the requirements of the assessment. The assessment will follow the ISO 14040 and 14044 requirements.

BENEFITS

- LCA is a recognised tool for gaining credibility in sustainable claims.

- The LCA results are useful in promoting the use of fatty acids as feedstock for various production of palm-based renewable and green chemical products.
- It will help to enhance global current market share of fatty acids, and credit to the Malaysian oleochemical industry.

SERVICES OFFERED

- Setting of system boundary and functional unit.
- Collection and compilation of inventory data to produce Life Cycle Inventory (LCI).
- On-site verification of data.
- Conducting Life Cycle Impact Assessment (LCIA).
- Interpretation of LCIA results.
- Calculations of the carbon footprint or GHG emissions.

COST OF SERVICE

The cost of the service will depend on the comprehensiveness of the LCA conducted.

CLIENTS

Stakeholders associated with the oleochemical industry, specifically the owners of fatty acids plants.

REFERENCES

GUNSTONE, F D; ALANDER, J; ERHAN, S Z; SHARMA, B K; MCKEON, T A and LIN, J T (2007). Non food uses of oils and fats. *The Lipid Handbook with CD-ROM*. Third edition, CRC Press, p. 591-636.

HANNELE, L; ANNA, S; JUULIA, R; MICHAEL, P and ADISA, A (2011). A review of lca methods and tools and their suitability for SMEs. *Europe Innova*. Brussel, Belgium.

HOONG, S S; KOSHEELA DEVI, P P; TUAN NOOR MAZNEE, T I; MOHD NORHISHAM, S; NURUL 'AIN, H; HAZIMAH, A H and SALMI-AH, A (2008). Fatty acid-based polyol. *MPOB Information Series No. 395*.

MPOB (2011). *Malaysian Oil Palm Statistics 2010*. MPOB, Bangi, Malaysia.

MPOB (2012). *Malaysian Oil Palm Statistics 2011*. MPOB, Bangi, Malaysia.

MPOB (2013). *Malaysian Oil Palm Statistics 2012*. MPOB, Bangi, Malaysia.

MPOB (2014). *Malaysian Oil Palm Statistics 2013*. MPOB, Bangi, Malaysia.

MPOB (2015). *Malaysian Oil Palm Statistics 2014*. MPOB, Bangi, Malaysia.

MPOB (2016). *Malaysian Oil Palm Statistics 2015*. MPOB, Bangi, Malaysia.

NORASHIKIN, A; YEONG, S K and HAZIMAH, A H (2008). DHSA - Transparency improver in clear bar soap. *MPOB Information Series No. 393*.

ROILA, A (2008). Palm oleochemicals for cosmetics and toiletries. *MPOB Information Series No. 384*.

ZULINA, A M; ROSNAH, I and HAZIMAH, A H (2008). Palm-based dishwash paste. *MPOB Information Series No. 396*.

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