UNIVERSITI TEKNOLOGI MARA

A LITERATURE REVIEW ON POSSIBLE INDUSTRIAL APPLICATIONS OF FATTY ACID

SITI NOORBAIZURA BINTI ABDUL RAHMAN

Thesis submitted in fulfillment of the requirements for the degree of

Bachelor Eng. (Hons)

Faculty of Chemical Engineering

July 2017

CONTENTS

CONTENT OF FIGURE

CHAPTER 1

CHAPTER 2

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Fatty acid is along chain of hydrocarbon which consists of methyl group(CH_3) and carboxyl group (COOH) at the both ends of the structure. Natural fatty acids commonly have 4 to 28 carbon atoms, that usually in straight line with even number of hydrogen ("IUPAC Gold Book - fatty acids", 1995). Fatty acid may come from animal and vegetable oils and fats. There are some fatty acid that can usually found such as stearic acid, palmatic acid and lauric acid. Fatty acids is being differentiate by its length, which are known as very long chain fatty acids, long chain fatty acids, medium fatty acids and short chain fatty acids. Very long fatty acids contain more than 22 carbons, long fatty acids contain 16 or more carbons while medium fatty acids have 8 to 15 carbons and short fatty acids contain less than 6 carbons.

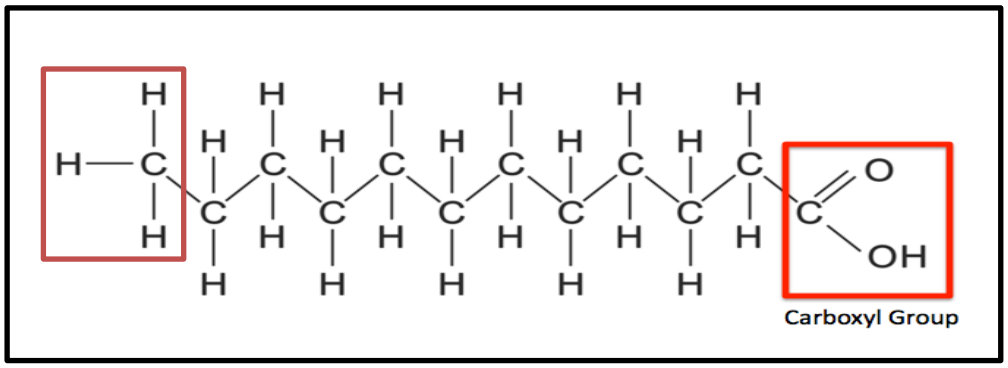

Figure 1.1: The structure of lauric acid which chain of hydrocarbon that contains methyl group and carboxyl group at the end of the structure. The carboxyl group (boxed red) is located at the end of the chain. (Garcia, 2016).

Fatty acids can be saturated or either unsaturated. Saturated fatty acids are containing straight line structure without branches. It is also contain maximum number of hydrogen atoms bounded to it. Because of saturated fatty acids only have single bond, each carbon has 2 atoms of hydrogen atom except for the last carbon that contain 3 hydrogen atoms ("Fatty acid", 2016). Table 1.1 listed example of saturated fatty acids

Unsaturated fatty acids contain at least one double bond between carbon atoms as it is lost one or more pairs of hydrogen from carbons chain. Unsaturated fatty acids include monounsaturated and polyunsaturated fatty acids. When the hydrogen is missing, the fatty acids structure will bend out of shape. Monounsaturated fatty acids are missing one pair of hydrogen , thus creating one double bound. Example is oleic acid. Polyunsaturated fatty acids are missing more than one pair of hydrogen, example linoleic acid ("Fats of Life Fat Basics - Fats of Life", n.d.). Table 1.2 listed example of unsaturated fatty acids.

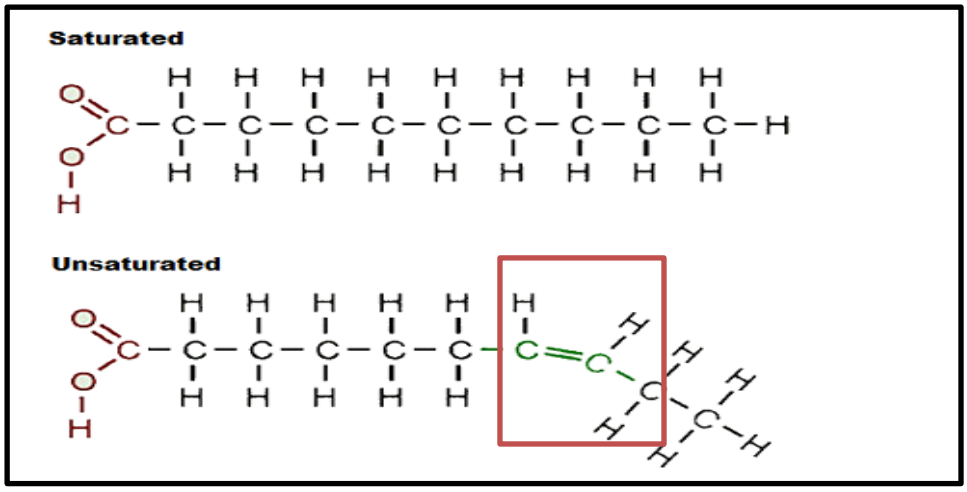

Figure 1.2: Structure of saturated and unsaturated fatty acids. The double bond (in red boxed) is happened in unsaturated fatty acids as the hydrogen is missing and causes double bond, thus the structure will bend out. ("TEXT: Biological Macromolecules", 2016).