

UNIVERSITI TEKNOLOGI MARA

**HYDROLYSIS OF RUBBER SEED
OIL**

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ABSTRACT

Rubber seed from the rubber tree are in abundance in most of country which non-edible oil could be obtained. However, the seeds are wasted in the rubber plantations annually event though the extractable oil has potential technical applications. If the full potentials of an oil are to be realized, there is no need to have a data base oil information on the oil extraction process and its properties. The objective of this research is to produce fatty acid from rubber seed oil through hydrolysis. Existing methods of fatty acids production are based on chemical methods. In this study *Thermomyces lanuginosus* lipase reactions were utilized to hydrolysis rubber seed oil. Besides, the effect of different parameters, such as pH value, temperature and moisture contain on the fatty acids had been studied using hydrolysis. The optimum conversion was found 0.68% fatty acids, 1:3 molar ratio oil to water at 30⁰C, pH 8, 200rpm for 120 minutes reaction of time. The studied also found that the enzyme was very sensitive to heat and pH which can be denatured easily if exposed at extreme stage. Therefore, this research conducted to solve the agriculture waste problem by producing fatty acids from non-edible oil which is rubber seed oil.

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CHAPTER 1

INTRODUCTION

1.1 Research Background

Rubber seed is a waste product from rubber plantations contains a nutritive value that can be used as food for animals or as an energy which is biodiesel and several other products. Research shown that seed of rubber tree is a rich source of oil which is 40 -60% wt (Reshad et al., 2015). Meanwhile inside the rubber seed oil contain 17-82 % fatty acids (Ebewe et al., 2010). Fats and oils are esters of triglycerides and fatty acids. The oil from rubber seed can be used as feedstock to produce fatty acid. Fatty acid has widely used in food industry and detergent.

Hydrolysis can break down a fat or oil and release the triglycerides and fatty acids. Hydrolysis is the chemical breakdown of substance by water. Hydrolysis of fat using water produced two- phase system. The oil phase produce glyceride, fatty acid, glycerol and water and the other phase is a water phase produced glycerol and water (Antia et al., 2012). The chemical reaction example of hydrolysis of rubber seed oil showed as Figure 1 below.

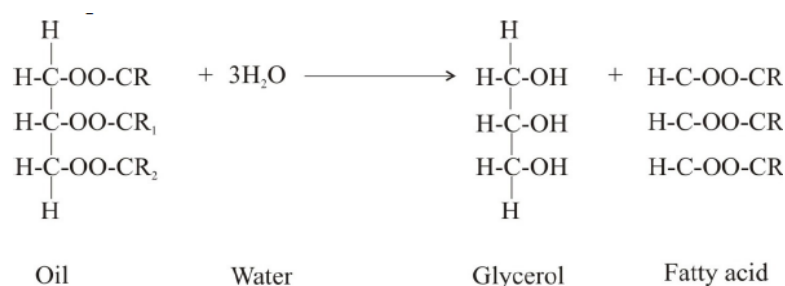


Figure 1.1: Hydrolysis of Oil to Glycerol and Fatty Acids (Antia et al., 2012)

Fatty acids are known as a carboxylic acids and can be classified into three type which is saturated, monosaturated and polyunsaturated fatty acids (Zolkarnain & Yusof, 2007). Fatty acids are widely used as a raw material in biotechnology industry such as food, cosmetic, pharmaceutical, detergent, greases and other type