



CHAPTER I INTRODUCTION

The biodiesel production has been expanded due to increasing of its demand. As a result, a large surplus of glycerol which is the main byproduct from biodiesel process causes a decline in glycerol price leading to the entire biodiesel production process to be less competitive. Thus, many research proposed the access which can get rid of the low price of glycerol problem via converting glycerol to more valuable chemicals.

Most of studies focused on glycerol transformation into the single-component reactions such as polymerization, oxidation, pyrolysis, etherification, and esterification. Glycerol monoesters or glycerol monoglycerides, chemical derivatives of glycerol, are obtained from esterification with fatty acid and have the applications as emulsifiers or stabilizing agent in food, cosmetic and detergents industries. Besides direct esterification of glycerol with fatty acids, there are many routes to manufacture these esters such as transesterification of triglycerides, enzyme-catalyzed esterification of glycerol with fatty acid or glycerolysis with fats and methyl esters.

However, the typical problem in the commercial routes, direct esterification of glycerol and transesterification of methyl ester, is the obtained product is a mixture which commonly contains 40-60% monoglyceride and 35-45% diglyceride and other triglyceride. Moreover, the enzymatic routes are not suitable for industrial scale because of high cost of enzymes and low productivity. Although glycerolysis with fats and methyl esters provides high ratio of monoglyceride to diglyceride, a large amount of glycerol is required.

The aim of this work is to offer the alternative route which gives a good selectivity to monoglycerides, in particular 1-monoglyceride. The procedure can be divided into 3 steps: first step is protection of glycerol, which 2-adjacent hydroxyl groups are converted to be protecting group, in order to avoid multi-esterification. The second step is transesterification of triglyceride from palm refined oil with protected glycerol. The expected results are to minimize diglycerides and triglycerides and maximize the monoglyceride by using homogeneous catalyst.