CHAPTER I
INTRODUCTION

In the past, petrochemical industry had been a major producer of glycerol. At present, glycerol which is a by-product of biodiesel is also produced from reaction of triglyceride and methanol. Because of the high growth of biodiesel, glycerol is also produced at the same growing rate. This situation brings the price of glycerol to drop dramatically. Therefore, there should be a study to find the way to add more value to this by-product.

Glycerol is, a colorless, odorless and viscous compound which can be used in various manufacturers for example: food industry, cosmetic, plastic, drug, tobacco, and etc. Glycerol also has many derivatives such as glyceric acid from oxidation reaction, ethylene glycol from hydrogenation syngas from pyrolysis, ester product from esterification and tranesterification with fatty acid, polyglycerol from polymerization or etherification and solketal from condensation with acetone. Solketal is a derivative which the two adjacent hydroxyl groups of glycerol are protected and also can be blended in gasoline or biodiesel for fuel additives. In addtition, solketal is the useful chemical for synthesis mono-, di-, triglycerides because of its protected hydroxyl group. Moreover, solketal is a biodegradable chemical which is an advantage for environment.

Nowadays solketal can be produced by condensation reaction of glycerol and acetone with acid catalyst, followed by neutralization the product mixture and purification by distillation. The main problem of this process is the low conversion due to equilibrium limitation. Water that is also formed in the reaction can convert solketal back to glycerol. To increase the conversion, the use of molecular sieve 3A (Mol3A) was proposed to adsorb water. Therefore, the reaction can be shifted to the right hand side.

Benzyl solketal ether is the interesting oxygenated compound and also can be use for fuel which is produced from solketal. Currently, benzyl solketal ether was produced by oraganic synthesis. In this organic synthesis, solketal is reacted with benzyl chrolide or benzyl bromide with solvents. The main problem is using a lot of

solvents in the synthesis of benzyl solketal ether. In this case, the industries try to scale up benzyl solketal ether without solvents.

The purpose of this work is divided into two parts. First, the solketal production is studied by varying the conditions, for example: the effect of molar ratio, the use of molecular sieve 3A, the use of ion exchange resin as heterogenous catalyst. Then, the synthesis of benzyl solketal ether from solketal and benzyl alcohol is investigated in the system without solvent. The effect of molar ratio is investigated in this part and finds the optimum condition to produce benzyl solketal ether.