IONIC LIQUID PRETREATMENT OF *ACACIA AURICULIFORMIS* AND *MITRAGYNA SPECIOSA*

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ABSTRACT

Production of bioethanol from lignocellulic biomass has become a better alternative in replacing non-renewable fuel source such as petroleum. However, in many investigations on bioethanol field, the crucial part of this process is pre-treatment in order to breakdown the crystallinity structure of biomass to contribute the positive result in successful hydrolysis and downstream operations. In other hand, harsh conditions of pre-treatment create unfriendly and costly pre-treatment. Therefore, this research is conducted in order to investigate the effectiveness of conventional physco-chemical pre-treatment technologies by using two different type of dilution ionic-liquids ([EMIM]Cl and [BMIM]Cl) in Bio-shake IQ reactor on different two type lignocellulic biomass (*Acacia auriculiformis),* and *Mitragyna speciosa*) and cellulose crystalline powder. Furthermore, the purpose of varies parameter (temperature, rpm and concentration) during pre-treatment are to determine and identify the ambient pre-treatment condition for the three different type of samples.

Yet, based on recent study, researchers discover about high potential of ionic liquids (ILs) in biomass dissolution but ionic liquid cost is too expansive. Therefore, the purpose of dilution is to identify the concentration of ionic-liquid corresponding to the ambient pre-treatment condition as well as to reduce cost.

The complex structure and the disrupt structures of lignocellulic biomass were analysed using Fourier transforms infrared spectroscopy (FTIR) and and X-Ray Diffractometer (XRD).

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CHAPTER 1

INTRODUCTION

1.1 Research background.

Nowadays, many researches were found the potential of biofuel such as bioethanol that can replace and implement better source of fossil fuel because of the environment concern. To avoid conflict between human foods (Kim and Dale April 2004), bioethanol generally produce from disposal residue and environmental friendly substance. Basically, there are three classification of bioethanol production and use of lignocellulic biomass is referred as second generation which is focus in this investigation as raw material (Espinoza-Acosta, et al. 2014)

Ethanol is an alcohol which produces from fermented sugar (Chundawat, et al. 2011). The four major aspects in bioethanol production include are type of feedstock use, conversion technology (pre-treatments), hydrolysis or saccharification process and fermentation. The examples of sugar source materials for ethanol production are lignocellulosic biomass, agricultural residues such as sugarcane bagasse, herbaceous crops, forestry residues and other wastes (Espinoza-Acosta, et al. 2014). The carbon source is cost effectively, abundance and renewable (Chundawat, et al. 2011). Theoretically, lignocellulosic biomass consists of complex components of lignin, cellulose and hemicellulose. Lignin plays important role to plant as it is supported and linked closely to both cellulose and hemicellulose. Because of this fact, lignocellulosic biomass is complicated (Espinoza-Acosta, et al. 2014) to process due to stable cellulose structure and sugars are not readily for fermentation process. In order to