COMPARATIVE STUDY FOR OPTIMIZED ALKALINE PRETREATMENTS FOR PRODUCTION OF REDUCING SUGAR FROM VARIOUS TYPE OF BIOMASSES

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AUTHOR'S DECLARATION

I declare that the work in the thesis was carried out in accordance with the regulation of Universiti Teknologi MARA. It is original and is the results of my own, unless otherwise indicated or acknowledge as reference work.

I, hereby acknowledge that I have been supplied with the Academic Rules and Regulations, Universiti Teknologi MARA, regulating the conduct of my study and research.

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SUPERVISOR'S CERTIFICATION

I declared that I read this thesis and in my point of view this thesis is qualified in terms of scope and quality for the purpose of awarding the Bachelor of Chemical Engineering (Environment) with Honours.

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ABSTRACT

Lignocellulosic biomass is a renewable source that can be found plentifully that contribute to a global yield of up to 1.3 billion tons in a year and is an appropriate raw material that can be used in numerous applications for human sustainability. It is mainly consisting of cellulose, hemicellulose, and lignin, which are strongly associated with each other. The aim of pretreatment for lignocellulosic biomass is to break down the complex structure of biomass and to provide better accessibility to the components to be converted into useful reducing sugar, thus becoming a crucial step in a extensive range of applications mainly for biomass to energy, fuels and other useful materials. However, a main obstacle is the removal of strong and uneven lignin component which is highly unaffected to solubilization and is also a major inhibitor for hydrolysis of cellulose and hemicellulose. This has led to wide research in the development of numerous pretreatment processes. The major pretreatment methods are physical, chemical, and biological methods. Thus, alkaline pretreatment is the essential stage in production of reducing sugar from lignocellulosic biomass. The optimization of alkaline pretreatment by using Design Expert software is required to attain the optimum value for the variables affecting the pretreatment to get high conversion of reducing sugar. The total reducing sugar was determined by using DNS method. The data for comparative between of optimized alkaline pretreatment using various type of alkaline reagents for production of reducing sugar is obtained from previous studies or research. Different types of biomass have different optimum conditions for pretreatment and different types of alkaline reagents used also influenced the production of reducing sugar.