



Process Optimization of Microwave Assisted Lime Pretreatment on Ramie Decortication Waste Using Response Surface Methodology

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Abstract: Abstract-Lignocellulosic materials are promising alternative feedstocks for production of bioethanol. One of the lignocellulosic material that can be used for bioethanol production is ramie decortication waste (RDW). This study investigated pretreatment of RDW using microwave assisted alkaline. Calcium hydroxyde was used as the alkaline agent. Response Surface Methodology was used for the optimization of pretreatment. A 2³Central Composite Design (CCD) was used to develop statistical model and analyze the effect of each variables, which are pretreatment time (10-30 min), solid liquid ratio(0,1-0,3) and alkaline/lime concentration (3-7%). Data obtained from RSM were subjected for analysis of variance (ANOVA) and analysis using second order polynomial equation. The isoresponse contour plot were used to study the interaction between three variables. The optimal condition resulted was 28,8 minutes pretreatment time, solid liquid ratio 0,28 and lime concentration 5,65% with percentage of lignin removal was 38,8%.

Keywords : bioethanol, optimization, pretreatment, ramie decortication waste, microwave assisted alkaline.

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