Optimization of bioethanol production from raw sugar in Thailand / Woranee Mungkalasiri, Boonchuay Pan-in

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Abstrak

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Since the increasing demand of molasses as raw material for ethanol production in Thailand, the feasibility of applying raw sugar as an alternative raw material for ethanol production is studied in this research. However, although raw sugar has higher sugar content and pure quality than molasses, raw sugar costs are higher than molasses. Thus, it is necessary to evaluate the optimum proportion of raw sugar by considering the value of fermentation efficiency by analyzing the ratio of raw sugar to molasses from 0%:100% to 100%:0%. The results showed that the mixture of raw sugar and molasses in Experiment No.1 at a ratio of 20%:80% gained the highest fermentation efficiency at 82.71%. With the addition of enzyme (Experiment No.2), it would enhance the fermentation efficiency to 84.27% at a ratio of 60%:40%. Moreover, by adding enzyme and ferment nutrients (Experiment No.3) it could enhance the fermentation efficiency to 85.98% at a ratio of 80%:20%. These results indicated that the higher amount of applying raw sugar, the more fermentation efficiency in ethanol production. Furthermore, the economic results shown that even though a ratio of 80%:20% from Experiment No.3 had the highest fermentation efficiency, a ratio of 20%:80% presented the best economic result (profit) with high fermentation efficiency (around 85%). Moreover, when the prices of raw sugar and molasses were changed, the Experiment No.3 had more appropriate operation than Experiment No.1 and No.2, because the Experiment No.3 provieded the best economic results with any conditions.