

Sujitra Rodmuan 2013: Ethanol Production from Aquatic Weed Plants by Using Yeast *Candida shehatae* TISTR 5843 Fermentation in Bioreactor. Master of Science (Environmental Science and Technology), Major Field: Environmental Science and Technology, Division of Science. Thesis Advisor: Miss Prapa Sohsalam, Ph.D. 146 pages.

Comparative study of ethanol production from aquatic plant using *Candida shehatae* TISTR 5843 in packed bed reactor by different immobilization technique using entrapment method with calcium alginate and adsorbtion method with natural supporting materials such as bagasse, corncob and sweet sorghums stem were investigated. The experiment of batch, fed batch and repeated batch used fermentation condition carried at initial pH, of 5.0, shaking speed, 120 rpm, temperature, 30 °C. The result showed that fed batch technique with more frequencies additions of aquatic plant medium reduced fermentation time and increased ethanol production. The repeated batch of using immobilization with a bagasse showed the highest efficiency. Although, The highest of ethanol production was used at least 3 times in the repeated-batch fermentation. The maximum of ethanol concentration from water hyacinth, water lettuce and cattail were  $13.82 \pm 0.83$ ,  $6.10 \pm 0.32$  and  $7.29 \pm 0.41$  g/L, respectively. The continuous ethanol fermentation in a packed-bed reactor used immobilization in alginate and bagasse with the flow rate of 1.0 mL/ min and initial sugar concentration of 220 g/L. It was optimum condition for ethanol fermentation from aquatic plant. Ethanol concentrations from water hyacinth, water lettuce and cattail were  $94.79 \pm 0.46$ ,  $78.09 \pm 0.48$  and  $85.46 \pm 0.62$  g/L, respectively. The productivity of ethanol ( $Q_p$ ) were 1.97, 1.63 and 1.78 g/L.h, respectively. and percent efficient fermentation were  $84.48 \pm 0.02\%$ ,  $69.60 \pm 0.13\%$  and  $76.17 \pm 0.24\%$ , respectively. The ethanol production costs, from water hyacinth, water lettuce and cattail were 9.89, 14.03 and 11.98 baht/L, respectively which less than the cost of production from sugarcane, corn and molasses. The experimental results could use aquatic plants was raw material for the production of ethanol. Moreover, its application and management for sustainable use as renewable energy in the future.

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Student's signature

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Thesis Advisor's signature