

Ampon Luadsongkram 2010: Optimization of Protease and Lipase Production by Taguchi Method from *Jatropha Curcas* Seed Cake in Solid State Fermentation. Master of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Assistant Professor Anusith Thanapimmetha, D.Eng. 122 pages.

The utilization of *Jatropha curcas* seed cake as substrate for protease and lipase productions by *Rhizopus oligosporus* and *Aspergillus oryzae* was investigated. The result showed that lipase activity from the fermentation of *R. oligosporus* was greater than *A. oryzae* by 71.30%. In contrast, protease activity from the fermentation of *A. oryzae* was greater than *R. oligosporus* by 10.47%. Therefore, the optimum conditions for lipase production by *R. oligosporus* and protease production by *A. oryzae* were further investigated using Taguchi method by orthogonal array $L^{27}(3^5)$. In addition, five parameters: moisture content of substrate, inoculum size, fermentation temperature, substrate type and fermentation time were studied in this experiment. The result showed that the optimum condition of the lipase production by *R. oligosporus* was 50% moisture content of substrate, 15% inoculum, 35 °C incubation temperature and 84 hours of incubation time with *Jatropha curcas* seed cake as substrate which obtained 278 unit lipase/ g dry weight substrate. Moreover, lipase production increased 59% comparing to the non-experimental design. Furthermore, the optimum condition of the protease production by *A. oryzae* was 45% moisture content of substrate, 10% inoculum, 30 °C incubation temperature and 84 hours of incubation time with the substrate mixed of *Jatropha curcas* seed cake and cassava baggase at the ratio of 4 to 1 as substrate which obtained 14,108 unit protease/ g dry weight substrate. Likewise, the protease production increased 78% comparing with non-experimental design production.

Student's signature

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