

## Production of dry extract lipase from *pseudomonas aeruginosa* by the submerged fermentation method in palm oil mill effluent

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### Abstrak

Palm Oil Mill Effluent (POME) is an agro-industrial waste product with high availability and which contains high quantities of organic compounds that are necessary for microbial growth. Cultures of *Pseudomonas aeruginosa* were grown in POME to produce lipase using the submerged fermentation method. The objective of this study is to obtain the optimum value of lipase activity produced by the cultures of *Pseudomonas aeruginosa* using POME as the substrate through the submerged fermentation method and to obtain the dry extract of lipase. In the study, the one factor at a time (OFAT) method was applied, which allowed observation of the effect of inoculum and additional nutrient concentrations, such as  $\text{Ca}^{2+}$  ion, olive oil, peptone and Tween 80, on the activity of lipase. These factors were investigated in shake flask fermentation at  $30^{\circ}\text{C}$  over 96 hours. The activity unit of lipase was determined by the titrimetric reaction of olive oil hydrolysis using crude lipase. The optimum value of the lipase activity unit (1.327 U/mL) was gained when 3% (v/v) of inoculum, 4 mM of  $\text{Ca}^{2+}$  ion, 0.4% (v/v) of olive oil, 0.9% (m/v) of peptone, and 0.9% of Tween 80 were added into the medium. Crude lipase was then dried using a spray dryer. Subsequently, 15.643 g of dry extract lipase was obtained from 500 mL of cell free supernatant. In further research, the lipase activity assay would be better achieved using the p-nitrophenyl palmitate hydrolysis method and examined by a spectrophotometer.