

Aksorn Riengsilchai 2014: Screening the Microorganism for Lipid Accumulation on Glycerol a by-product from Biodiesel Production. Master of Science (Chemistry), Major Field: Chemistry, Department of Chemistry. Thesis Advisor: Associate Professor Vittaya Punsuvon, Ph.D. 93 pages.

In this work, two kinds of oleaginous microorganisms: *M. isabellina* and *R. glutinis* were screened for their abilities to utilize glycerol, a by-product which is partially purified from palm oil-biodiesel production plant, as a carbon source for biomass and lipid productions. The optimization of lipid production of the most promising oleaginous strains was conducted using response surface methodology (RSM). A 5-level 2-factor central composite design (CCD) was used to build the statistical model. The optimum cultivation conditions for *M. isabellina* NBRC 105998 found in this study were: the glycerol concentration in the medium (44.14 g/L), the fungal colony for 2 piece fungal discs ( $7.48 \times 10^6$  spores), 7 mm diameter and incubated at 30°C for 12 days. This optimum conditions gave 45.13% of the lipid content. The optimum cultivation conditions for *R. glutinis* NBRC 1099 found in this study was: the glycerol concentration in the medium (34.14 g/L), the inoculum volume was 1.6 mL ( $4.5 \times 10^7$  cell) and incubated at 30°C for 24 hours. This optimum condition *R. glutinis* NBRC 1099 gave 43.65% of the lipid content. Furthermore, the biodiesel production potencies of the best lipid accumulation strains were also investigated. The percentage of fatty acid methyl ester of biodiesel produced from *M. isabellina* NBRC 105998 was 95.15% and the percentage of fatty acid methyl ester of biodiesel produced from *R. glutinis* NBRC 1099 was 88.36%. *M. isabellina* NBRC 105998 and *R. glutinis* NBRC 1099 provided high quantity of lipid content for biodiesel production. Therefore, the biodiesel produced by these oleaginous fungi and yeast strain, which can grow rapidly without any environmental or ethical issues, can be an excellent alternative source for *biodiesel production* in the future.

---

Student's signature

---

Thesis Advisor's signature