

SKRINING PRIMER STRAIN KHAMIR GENUS *Cryptococcus*

KOLEKSI *Indonesian Culture Collection* (InaCC) DALAM MENGHASILKAN LIPID

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INTISARI

Kebutuhan energi utama minyak di Indonesia meningkat dari tahun ke tahun seiring dengan meningkatnya pertumbuhan ekonomi dan jumlah penduduk Indonesia. Rerata peningkatan kebutuhan energi tiap tahunnya mencapai 36 juta *barrel oil equivalent* (BOE) dari tahun 2000 hingga 2014. Sementara cadangan energi tidak terbarukan, seperti minyak bumi, gas bumi, dan batu bara semakin menipis. Biodiesel merupakan salah satu sumber energi alternatif terbarukan yang bersifat *biodegradable* dan dapat digunakan sebagai pengganti bahan minyak dari fosil. Khamir *oleaginous* merupakan mikroorganisme eukariotik yang mampu mengakumulasi lipid secara intraseluler hingga mencapai 70 % dari total biomassa sel keringnya. *Indonesian Culture Collection* (InaCC) LIPI telah berhasil mengisolasi terhadap genus *Cryptococcus* yang diperoleh dari alam. Strain yang telah diidentifikasi belum pernah dilakukan pengujian terkait kemampuan produksi lipid. Pada penelitian ini bertujuan untuk mengetahui kemampuan strain dalam menghasilkan lipid, dan profil lipid yang terakumulasi. Metode yang harus dilakukan diantaranya penapisan kualitatif, penapisan kuantitatif, kultivasi strain khamir potensial, penentuan berat biomassa kering, penentuan berat lipid dan analisis profil lipid. Data yang dihasilkan akan dianalisis dengan Microsoft Office Excel 2016 dan analisis varian *One-Way ANOVA* software SPSS versi 25. Berdasarkan penelitian yang dilakukan, didapati 6 khamir strain genus *Cryptococcus* yang menunjukkan hasil positif pada penapisan kualitatif dan strain Y286 mampu mengakumulasi lipid paling tinggi pada penapisan kuantitatif. Akumulasi lipid oleh khamir Y286 setelah inkubasi selama 24 jam pada NLM cair adalah 3.16 ± 0.01 g/L dengan berat biomassa kering

sebesar 6.60 ± 0.04 g/L. Profil asam lemak pada lipid yang diakumulasi antara lain asam linolelaidat (C18:2) 45,33; asam palmitat (C16:0) 21,76%; asam linolenat (C16:3) 15,06%; asam oleat (C18:1) 8,65%; asam eikosenoat (C19:2) 2,97%; asam trikosanoat (C24:0) 1,99%; asam heptadekanoat (C18:0) 1,42%; serta asam lainnya kurang dari 1%.

Kata kunci: Biodiesel, *Cryptococcus*, Khamir *Oleaginous*, Lipid

PRIMARY SCREENING OF THE INDONESIAN CULTURE COLLECTION (InaCC)'S *Cryptococcus* YEAST STRAIN IN LIPID PRODUCTION

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ABSTRACT

The main energy demand for oil in Indonesia is increasing from year to year in line with the increasing economic growth and Indonesia's population. The average annual increase in energy demand reached 36 million barrel oil equivalent (BOE) from 2000 to 2014. Meanwhile, non-renewable energy reserves, such as oil, natural gas and coal, are dwindling. Biodiesel is a renewable alternative energy source that is biodegradable and can be used as a substitute for fossil oils. Oleaginous yeasts are eukaryotic microorganisms capable of accumulating lipids intracellularly up to 70% of the total dry cell biomass. Indonesian Culture Collection (InaCC) LIPI has succeeded in isolating the genus *Cryptococcus* obtained from nature. The strains that have been identified have never been tested for their ability to produce lipids. In this study the aim was to determine the ability of the strain to produce lipids, and the accumulated lipid profile. The methods that must be carried out include qualitative Screening, quantitative Screening, cultivation of potential yeast strains, determination of dry biomass weight, determination of lipid weight and analysis of lipid profiles. The resulting data will be analyzed using Microsoft Office Excel 2016 and One-Way ANOVA analysis of SPSS software version 25. Based on the research conducted, it was found that 6 yeast strains of the genus *Cryptococcus* showed positive results on qualitative Screening and strain Y286 was able to accumulate the highest lipids on quantitative Screening. Lipid accumulation by yeast Y286 after 24 hours of incubation on NLM broth was 3.16 ± 0.01 g/L with a dry biomass weight of 6.60 ± 0.04 g/L. The fatty acid profile of the accumulated lipids included linoleic acid (C18:2) 45.33; palmitic acid (C16:0) 21.76%; linolenic acid (C16:3) 15.06%;

oleic acid (C18:1) 8.65%; eicosenoic acid (C19:2) 2.97%; trikosanoic acid (C24:0) 1.99%; heptadecanoic acid (C18:0) 1.42%; and other acids less than 1%.

Keywords: Biodiesel, *Cryptococcus*, Yeast Oleaginous, Lipid