OPTIMASI PRODUKSI LIPID MENGGUNAKAN *CO-CULTURING* ANTARA *Zygosaccharomyces siamensis* AP1 DAN MIKROALGA OLEAGINOUS

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INTISARI

Mikroalga *oleaginous* dan khamir merupakan mikroorganisme yang diketahui mampu mengakumulasi lipid. Lipid yang dihasilkan berpotensi sebagai bahan baku untuk produksi biodiesel. Khamir *Zygosaccharomyces siamensis* AP1 berhasil diisolasi dari madu hutan Sulawesi Tengah, Indonesia, dilaporkan mampu mengakumulasi lipid sebesar 0,28 g/L dari berat kering selnya. Lipid yang dihasilkan relatif rendah terutama pada kultur tunggal. Oleh karena itu, untuk mengoptimasi produksi lipid digunakan metode *co-culture. Co-culture* merupakan metode yang berpotensi untuk meningkatkan produksi lipid dari *Z. siamensis* AP1. Pada penelitian ini, dilakukan *co-culture* antara *Z. siamensis* AP1 dan mikroalga *oleaginous*. Tujuan penelitian ini adalah untuk seleksi pasangan *co-culture* antara *Z. siamensis* AP1 dengan mikroalga *oleaginous,* mengoptimasi produksi lipid dan mengetahui interaksi antara khamir dan mikroalga *oleaginous* yang signifikan terhadap produksi lipid. Prosedur kerja yang dilakukan yaitu peremajaan khamir dan mikroalga *oleaginous*, seleksi pasangan *co-culture* yang signifikan terhadap produksi lipid, dan mempelajari interaksi yang terjadi. Hasil penelitian menunjukkan bahwa seleksi pasangan *co-culture* yang mampu menghasilkan lipid total tertinggi yaitu *Chlorella sorokiniana* dan *Z. siamensis* AP1 sebesar 0,8185±0,0466 g/g sedangkan biomassa yang diperoleh sebesar 3,3±0,4320 g/L. Interaksi yang terjadi yaitu interaksi positif sehingga lipid total dari kedua kelompok tersebut lebih tinggi daripada kultur tunggal. Parameter seperti konsentrasi glukosa, nitrogen, jumlah sel, oksigen terlarut, dan pH berpengaruh terhadap *co-culture Z. siamensis* AP1 dan *C. sorokiniana*. Penggunaan *co-culture* pada *C. sorokiniana* dan *Z. siamensis* AP1 dapat berpotensi mengoptimasi kondisi kultur dan berpotensi sebagai sumber untuk produksi biodiesel.

Kata kunci: *Zygosaccharomyces siamensis* AP1, mikroalga *oleaginous*, *co-culture, Chlorella sorokiniana,* produksi lipid.

OPTIMIZATION OF LIPID PRODUCTION USING CO-CULTURING BETWEEN *Zygosaccharomyces siamensis* AP1 AND OLEAGINOUS MICROALGAE

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ABSTRACT

Oleaginous microalgae and yeast are microorganisms known to be able to accumulate lipids. The lipids produced have the potential as raw materials for biodiesel production. Yeast *Zygosaccharomyces siamensis* AP1 was isolated from forest honey in Sulawesi Tangah, Indonesia, and was reported to be able to accumulate lipids of 0.28 g/L of the cell dry weight. The lipid yield was relatively low, especially in monoculture. Therefore, the co-culture method is used to optimize lipid production. Co-culture is a method that has the potential to increase lipid production from *Z. siamensis* AP1. In this study, co-culture was conducted between *Z. siamensis* AP1 and oleaginous microalgae. The aims of this study were to select co-culture partners between *Z. siamensis* AP1 and oleaginous microalgae, to optimize lipid production and to determine the significant interaction between yeast and oleaginous microalgae on lipid production. The working procedures carried out were rejuvenation of yeast and oleaginous microalgae, selection of significant co-culture partners for lipid production, and studying the interactions that occurred. The results showed that the selection of co-culture partners that were able to produce the highest lipid total were *Chlorella sorokiniana* and *Z. siamensis* AP1 of 0.8185±0.0466 g/g while the biomass obtained was 3.3±0.4320 g/L. The interaction that occurred was a positive interaction so that the lipid total of the two groups was higher than monoculture. Parameters such as glucose concentration, nitrogen, cells number, dissolved oxygen, and pH have affected to co-culture between *Z. siamensis* AP1 and *C. sorokiniana*. The use of co-culture on *C. sorokiniana* and *Z. siamensis* AP1 could potentially optimize culture conditions and could potentially be a source for biodiesel production.

Keywords: *Zygosaccharomyces siamensis AP1, oleaginous microalgae, co-culture, lipid production*