

**PENGARUH KOMPONEN *Nitrogen Limited Medium* TERHADAP PRODUKSI BIOMASSA DAN LIPID *Lipomyces starkeyi* (Lodder & Kreger van-Rij, 1952) Y853**

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**INTISARI**

Khamir *oleaginous*, seperti *Lipomyces starkeyi*, mampu mengubah sumber karbon dan nitrogen menjadi lipid hingga 50% dari berat kering sel. Penelitian oleh Mar'atussholihah (2023) memperoleh persentase lipid sebesar 53,5% menggunakan *Nitrogen Limited Medium* (NLM) sebagai media kulturnya karena dapat meningkatkan akumulasi lipid. Hal tersebut menunjukkan komponen NLM memiliki peran dalam produksi biomassa dan lipid. Namun, pengaruh signifikan dari masing-masing komponen belum diketahui secara kuantitatif. Oleh karena itu, Desain Plackett-Burman (PBD) digunakan untuk analisis enam variabel pada dua level guna menentukan kontribusi masing-masing terhadap produksi biomassa dan lipid. Hasil penelitian menunjukkan bahwa tidak ada variabel yang signifikan terhadap produksi lipid berdasarkan *P-value* uji ANOVA  $\geq 0,05$  (95%), tetapi hasil signifikan diperoleh pada berat biomassa kering ( $P < 0,05$ ). Selain itu, *main effect plot* digunakan untuk mengamati efek negatif dan efek positif komponen terhadap produksi biomassa dan lipid. Keduanya menunjukkan bahwa pepton dan *yeast extract* sebagai sumber nitrogen merupakan komponen yang diperlukan dalam konsentrasi tinggi untuk meningkatkan produksi biomassa dan lipid. Hal ini terjadi karena konsentrasi yang digunakan dalam eksperimen ini terlalu rendah (*yeast extract* = 0,5 g/L ; pepton = 0,3 g/L) dibandingkan dengan kondisi optimal (*yeast extract* = 8 g/L ; pepton = 3 g/L). Dengan demikian, konsentrasi keduanya perlu dikaji kembali dan menambahkan faktor lain di luar komponen medium (pH, suhu, kecepatan *shaker*) untuk memperoleh hasil yang lebih signifikan terhadap produksi biomassa dan lipid

**Kata kunci:** Akumulasi Lipid, *Lipomyces starkeyi*, NLM, Plackett-Burman

**EFFECT OF NITROGEN LIMITED MEDIUM COMPONENTS ON  
BIOMASS AND LIPID PRODUCTION OF *Lipomyces starkeyi* (Lodder &  
Kreger van-rij, 1952) Y853**

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**ABSTRACT**

Oleaginous yeasts, such as *Lipomyces starkeyi*, have the capacity to convert carbon and nitrogen sources into lipids at a rate of up to 50% of the cell dry weight. In a study conducted by Mar'atussholihah (2023), a lipid percentage of 53.5% was achieved using Nitrogen Limited Medium (NLM) as the culture medium. This approach has been shown to effectively enhance lipid accumulation. This evidence indicates that the components of NLM play a role in the production of biomass and lipids. Nevertheless, the precise quantitative impact of each component remains to be determined. Accordingly, the Plackett-Burman Design (PBD) was used for the analysis of six variables at two levels, with the objective of determining the influence of each on lipid accumulation. The results of the analysis indicated that none of the variables had a significant impact on lipid production, as determined by the ANOVA test with a P-value > 0.05 (95%). However, the analysis did yield statistically significant results for dry biomass weight ( $P < 0.05$ ). Moreover, main effect plots were generated to identify the negative and positive effects of the components on biomass and lipid production. Both results indicate that peptone and yeast extract, which serve as nitrogen sources, are necessary components in high concentrations to increase biomass and lipid production. This outcome was due to the fact that the concentrations utilized in this experiment were insufficient (yeast extract=0.5 g/L; peptone=0.3 g/L) in comparison to the optimal conditions (yeast extract= 8 g/L; peptone= 3 g/L). Therefore, it is necessary to review the concentrations of both components and consider the addition of other factors outside the medium components (pH, temperature, shaker speed) to obtain more significant results on biomass and lipid production.

**Keywords:** Lipid Accumulation, *Lipomyces starkeyi*, NLM, Plackett-Burman