

KANDUNGAN KARBOHIDRAT, PROTEIN, DAN LIPID PENYUSUN BIOMASSA MIKROALGA *Arthrospira* *maxima* Setchell & N.L.Gardner DALAM MEDIUM LIMBAH CAIR TAHU

INTISARI

Limbah cair tahu berpotensi menimbulkan pencemaran lingkungan apabila tidak dikelola dengan baik. Limbah cair tahu mengandung banyak senyawa organik maupun anorganik terutama nitrogen (N) dan fosfor (P) yang dapat digunakan mikroalga untuk pertumbuhan dan produksi biomasanya. Penelitian ini bertujuan untuk mengetahui pertumbuhan, kandungan karbohidrat, protein, dan lipid penyusun biomassa sel mikroalga *A. maxima* yang ditumbuhkan dalam medium limbah cair tahu, serta untuk mengetahui kemampuan *A. maxima* dalam mereduksi N dan P dalam limbah cair tahu. Penelitian dilakukan selama 12 hari kultivasi dengan menggunakan *A. maxima* yang ditumbuhkan dalam *Bold's Basal Medium* (BBM) sebagai kontrol dan medium limbah cair tahu konsentrasi 5%, 7,5%, dan 10% sebagai perlakuan. Parameter yang diamati meliputi jumlah sel, berat kering, kandungan karbohidrat, protein, dan lipid mikroalga serta reduksi N dan P dalam medium. Hasil penelitian menunjukkan bahwa pertumbuhan mikroalga *A. maxima* dalam limbah cair tahu lebih rendah dibandingkan dengan medium kontrol ditandai dengan menurunnya nilai *specific growth rate* (μ) dan meningkatnya waktu *doubling time* (dt). Jumlah sel tertinggi pada kontrol mencapai $53,4 \times 10^4$ sel/mL, sedangkan pada perlakuan mencapai $41,92 \times 10^4$ sel/mL. Produktivitas biomassa mikroalga *A. maxima* pada medium limbah cair tahu lebih rendah dibandingkan dengan kontrol. Biomassa *A. maxima* pada kontrol mencapai 1,95 mg/mL, sedangkan pada perlakuan mengalami fluktuasi dengan biomassa tertinggi mencapai 1,35 mg/mL. Kandungan karbohidrat, protein, dan lipid penyusun biomassa tertinggi *A. maxima* pada perlakuan mencapai 19%, 16%, dan 18% per biomassa. *A. maxima* mampu mereduksi N dan P pada medium limbah cair tahu berturut-turut mencapai 94% dan 72%.

Kata kunci : limbah cair tahu, medium kultur, mikroalga, *A. maxima*, pertumbuhan, biomassa

CARBOHYDRATE, PROTEIN AND LIPID CONTENT OF BIOMASS OF MICROALGAE *Arthrospira maxima* Setchell & N.L.Gardner IN TOFU WASTE WATER MEDIUM

ABSTRACT

Tofu wastewater potentially causes environmental pollution if it is not managed properly. Tofu wastewater contains a lot of organic and inorganic compounds, especially nitrogen (N) and phosphor (P) that can be used to enhance the growth and biomass production of microalgae. The aims of this research were to study the growth and biomass production in microalgae *Arthrospira maxima* grown in tofu wastewater medium, to determine the carbohydrates, proteins, and lipids content of microalgae as the main constituent parts of microalgae biomass, and to study the ability of the microalgae to reduce the N and P content in the waste. The study was conducted for 12 days of cultivation using *A. maxima* grown in Bold's Basal Medium (BBM) as control and 5%, 7,5%, and 10% of tofu wastewater medium as treatment. The parameters were the number of cell, dry weight, carbohydrate, protein, and lipid content of the biomass also the reduction of N and P in the medium. The results showed that the growth of *A. maxima* in the tofu wastewater was lower than the control medium characterized by the decreased of specific growth rate (μ) and the increase of doubling time (dt). The highest number of cells was $53,4 \times 10^4$ cells/mL in control medium, while in the treatment was $41,92 \times 10^4$ cells/mL. The biomass productivity of *A. maxima* in the liquid waste medium was lower than control. Biomass of *A. maxima* in control medium was 1,95 mg/mL, while the treatment fluctuated with the highest biomass was 1,35 mg/mL. Carbohydrate, protein, and lipid composition in the highest biomass of *A. maxima* in treatment medium up to 19%, 16%, and 18% per biomass respectively. *A. maxima* was able to reduce N and P in tofu liquid waste medium up to 94% and 72% respectively.

Keywords : tofu wastewater, culture medium, microalgae, *A. maxima*, growth, biomass