ABSTRACT

POTENTIAL OF MICROALGAE THAT ARE CULTIVATED ON THE WASTEWATER OF CRUMB RUBBER INDUSTRIAL MEDIA WITH OPEN POND SYSTEM AS A SOURCE OF PROTEIN

By

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Microalgae is one of aquatic biological agents that grows in alternative growth condition with strong adaptability. Crumb rubber wastewater which contains of high organic matter and nutrients can be used as a media for the growth of microalgae without the addition of nutrients. The purpose of this study was to get the kind of microalgae which were cultivated on the crumb rubber wastewater media with the highest potential to produce biomass and protein level and to decrease organic matter. The microalgae *(Spirulina* sp., *Dunaliella* sp. and *Tetraselmis* s*p.)* that had been adapted as many as 25% was cultured in crumb rubber wastewater media with open pond system reactor with 5L of working volume for 7 days, after that the harvesting method was flocculated by NaOH. The observations that were conducted are daily observation of cell density and salinity cultivation, biomass, protein content, $N\text{-}NH_3$, $P\text{-}PO_4$, *Dissolved Oxygen* and pH. This results indicated that *Spirulina* sp. with 3878 x 10^4 cells / mL of

highest cell density, was able to produce the highest biomass of 1.7282 g/L and protein content of 12.13%, and it was able to reduce organic matter 94% of N-NH_3, 71% of P-PO_4 and 22% of COD.

Key words: *Spirulina* sp., *Dunaliella* sp., *Tetraselmis* sp., Wastewater, Protein

ABSTRAK

POTENSI MIKROALGA YANG DIKULTIVASI PADA MEDIA LIMBAH CAIR INDUSTRI KARET REMAH DENGAN SISTEM *OPEN POND* SEBAGAI SUMBER PROTEIN

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Mikroalga merupakan salah satu agen biologi akuatik yang dapat tumbuh dalam kondisi pertumbuhan alternatif dengan kondisi daya adaptasi yang kuat. Limbah cair karet yang mengandung bahan organik dan nutrien yang tinggi dapat digunakan sebagai media pertumbuhan mikroalga tanpa penambahan nutrisi. Tujuan dari penelitian ini mendapatkan jenis mikroalga yang dikultivasikan pada media limbah cair karet yang paling berpotensi dalam menghasilkan biomassa dan kadar protein serta menurunkan cemaran. Kultur mikroalga (*Spirulina* sp., *Dunaliella* sp. dan *Tetraselmis* sp.) yang telah diadaptasikan sebanyak 25% dibiakan dalam media limbah cair karet remah dengan reaktor sistem *open pond* volume kerja 5L selama 7 hari, kemudian dipanen dengan metode flokulasi menggunakan NaOH. Pengamatan yang dilakukan yaitu kepadatan sel dan salinitas pada setiap hari selama kultivasi, biomassa, kadar protein, $N\text{-}NH_3$, $P\text{-}PO_4$, *Dissolved Oxygen* dan pH. Hasil penelitian ini menunjukan bahwa *Spirulina* sp.

dengan kepadatan sel tertinggi mencapai 3878 x 10^4 sel/mL, mampu menghasilkan biomassa tertinggi yaitu sebesar 1,7282 g/L , kadar protein sebesar 12,13%, dan mampu menurunkan beban cemaran N-NH_3 sebesar 94%, P-PO_4 sebesar 71%, serta mereduksi COD sebesar 22%.

Kata Kunci: *Spirulina* sp., *Dunaliella* sp., *Tetraselmis* sp., Limbah Cair, Protein