

**Biomassa, Kandungan Karbohidrat, Lipid, dan Pigmen Konsorsium Mikroalga dari Daerah Aliran Sungai Limbah Lindi Tempat Pembuangan Sampah Terpadu (TPST) Piyungan, Bantul, Daerah Istimewa Yogyakarta**

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**INTISARI**

Limbah lindi berpotensi sebagai sumber nutrisi karena dapat digunakan sebagai media pertumbuhan mikroalga. Saat ini khususnya di Indonesia belum terdapat teknologi pengolahan limbah lindi berbasis mikroalga sehingga perlu dilakukan penelitian untuk mengeksplorasi potensi kultur alami konsorsium mikroalga dari daerah aliran sungai limbah lindi TPST Piyungan, mengetahui proses pembentukan biofilm fototrofik dari mikroalga dan bakteri dan potensi produk yang dapat dihasilkan. Penelitian dilakukan dari isolasi konsorsium mikroalga dengan *scrapping* batuan, karakterisasi dan identifikasi, kultivasi di dalam medium 3N BBM + Vit dan Si 30 ppm, analisis pertumbuhan sel dengan *haemocytometer* dan berat kering, analisis profil biokimia seperti karbohidrat dengan *phenol-sulphuric acid*, lipid dengan *Bligh and Dyer*, klorofil dan karotenoid dengan spektrofotometri serta analisis terbentuknya biofilm melalui pewarnaan *Alcian Blue*. Konsorsium mikroalga penyusun komunitas perifiton tersusun atas 11 spesies dari Divisi Cyanobacteria, Chlorophyta, Bacillariophyta dan Xanthophyta. Biofilm fototrofik terbentuk antara asosiasi mikroalga dan bakteri di dalam matriks EPS. Pertumbuhan sel didominasi oleh *Oscillatoria* sp. dengan laju pertumbuhan spesifik yang lebih rendah yaitu  $1,18 \times 10^4$  sel mL<sup>-1</sup> hari<sup>-1</sup> dan produktivitas total berat kering yang lebih rendah mencapai 0,0485 mg mL<sup>-1</sup> hari<sup>-1</sup>. Produktivitas total karbohidrat (K), lipid (L) dan karotenoid (*Car*) yang lebih rendah yaitu berturut-turut 0,002 mg mL<sup>-1</sup> hari<sup>-1</sup>, 0,0050 mg mL<sup>-1</sup> hari<sup>-1</sup> dan 0,1509 µg mL<sup>-1</sup> hari<sup>-1</sup> serta produktivitas total klorofil-ab dan klorofil-ac (*Chl-ab* dan *Chl-ac*) yang lebih tinggi yaitu 0,4356 µg mL<sup>-1</sup> hari<sup>-1</sup> dan 0,5143 µg mL<sup>-1</sup> hari<sup>-1</sup>.

**Kata kunci:** limbah lindi, biofilm, konsorsium, Piyungan, *Oscillatoria*

**Biomass, Carbohydrate, Lipid, and Pigment Contents of Microalgae Consortium from Leachate Waste Watershed at Piyungan Integrated Waste Disposal Sites (TPST), Bantul, Special District of Yogyakarta**

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**ABSTRACT**

Leachate has potential as a source of nutrients because it can be used as medium for microalgal growth. Nowadays, especially in Indonesia has not been found leachate wastewater treatment technology based on microalgae hence this research was conducted to explore the potential of the natural culture of microalgae consortium from leachate waste watershed (TPST) Piyungan, find out the process of phototrophic biofilm formation of microalgae and bacteria and potential products that can be produced. The study was conducted by isolation of microalgae consortium by scrapping rocks, characterization and identification, cultivation in the medium 3N BBM + Vit and Si 30 ppm, the analysis of cell growth by haemocytometer and dry weight, the analysis of the biochemical profile as carbohydrates with phenol-sulfuric acid, lipids with *Bligh and Dyer*, chlorophyll and carotenoids by spectrophotometry and analysis of the interaction of biofilm formation by Alcian Blue staining. The microalgae consortium is composed of 11 species microalgae of Division Cyanobacteria, Chlorophyta, Bacillariophyta and Xanthophyta. Phototrophic biofilm was formed between the association of microalgae and bacteria in the EPS matrix. Cell growth was dominated by *Oscillatoria* sp. with lower specific growth rate at  $1.18 \times 10^4$  cells mL<sup>-1</sup> day<sup>-1</sup> and lower total biomass productivity (P) 0.0485 mg mL<sup>-1</sup> day<sup>-1</sup>. Total carbohydrates productivity (K), lipid (L) and carotenoids (Car) were lower, respectively 0.002 mg mL<sup>-1</sup> day<sup>-1</sup>, 0.0050 mg mL<sup>-1</sup> day<sup>-1</sup> and 0.1509 µg mL<sup>-1</sup> day<sup>-1</sup> and total chlorophyll-ab and chlorophyll-ac (Chl-ab and Chl-ac) were higher at 0.4356 µg mL<sup>-1</sup> day<sup>-1</sup> and 0.5143 µg mL<sup>-1</sup> day<sup>-1</sup>.

**Keyword:** leachate, biofilm, consortium, Piyungan, *Oscillatoria*