

INTISARI

Mikroalga adalah organisme bersel tunggal yang mampu mengkonversi sinar matahari menjadi karbohidrat dan lipid melalui proses fotosintesis. Dengan proses fermentasi, karbohidrat dalam mikroalga berpotensi dikembangkan menjadi bioetanol yang merupakan bahan bakar nabati generasi ketiga. Disebut generasi ke-3 karena mikroalga merupakan bahan baku *biofuel* non pangan dan non limbah. Sehingga, jika *biofuel* berbasis mikroalga dikembangkan dan diproduksi secara masal tidak akan mengganggu ketahanan pangan.

Penelitian ini memberikan informasi terkait potensi sel kering dan karbohidrat pada mikroalga kultur campuran Glagah dan *Arthrospira maxima* sebagai bahan baku bioetanol. Percobaan dilakukan pada *thin-layer photobioreactor* kondisi *batch* dengan system terbuka. Parameter yang diamati dalam penelitian ini antara lain berat sel kering, konsentrasi karbohidrat, dan klorofil **a** yang terbentuk selama 7 hari kultivasi. Proses kultivasi menggunakan tiga jenis medium yaitu *Bold's Basalt Medium* (BBM), medium Farm pion, dan medium Toriq Eko Arief (TEA). Hasil pengamatan selama proses kultivasi menunjukkan, berat sel kering dan klorofil **a** tertinggi ditemukan pada medium Farm pion, kemudian konsentrasi karbohidrat tertinggi ditemukan pada kultur dengan medium BBM. Simulasi menggunakan persamaan Monod dilakukan untuk mengetahui nilai dari parameter kinetika laju pertumbuhan mikroalga pada masing – masing medium.

Keywords : mikroalga, kultur campuran mikroalga, konsorsium Glagah, *Arthrospira maxima*, *thin-layer photobioreactor*, persamaan Monod, kinetika laju pertumbuhan.

ABSTRACT

Microalgae are single-celled organism that capable to converting sunlight into carbohydrates and lipids through photosynthesis. The fermentation process, carbohydrates in microalgae can potentially be developed into bioethanol which is a third generation biofuel. Due to microalgae is the raw material of non-food and non-waste biofuel. Thus, if microalgae-based biofuel is developed and mass-produced it will not interfere with food security.

This research provides informations of the potential of dry cells and carbohydrates in the mixed culture microalgae of Glagah and *Arthrospira maxima* as bioethanol feedstock. The experiments were conducted on a thin layer of photobioreactor batch conditions with an open system. The observed parameters are dry cell weight, carbohydrate concentration, and chlorophyll **a** formed during 7 days of cultivation. The cultivation process uses three media types: Bold's Basalt Medium (BBM), Farmpion medium, and Toriq Eko Arief medium (TEA). The observations during the cultivation process showed dry cell weight and chlorophyll **a** were found in Farmpion medium and the highest carbohydrate concentration was found in culture with BBM medium. Furthermore, kinetic study was conducted to identify growth rate of mixed cultures microalge of Glagah Consortium and *A. maxima* on each medium using Monod equation. In addition, mathematical approach by using Monod equation was used to find out the growth rate of microalgae cultivation in each medium.

Keywords : microalgae, mixed culture microalgae of Glagah, *Arthtrospira maxima*, thin-layer photobioreactor, Monod equation, kinetic growth rate.