

Effects of nitrate and salinity on fatty acid composition of marine tetraselmis sp.: potential as biodiesel

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Abstrak

Identifying sources of renewable energy is extremely important. The potential of *Tetraselmis* sp. in biodiesel production

was investigated using a completely randomized design with four treatments. *Tetraselmis* sp. was cultured on media

containing different concentrations of nitrate there are 2 mM and 15 Mm and s 25 ? and 35 ? salinity. The treatments

namely are (N2S25), (N2S35), N15S25) and (N15S35). Analysis of the fatty acid content using gas chromatography-mass

spectrometry (GC-MS). The results showed that the highest growth occurred in culture that contained 15 mM of nitrate

and 35 ? salinity. The lowest growth occurred in culture containing 2 mM of nitrate and 25? of salinity. The highest

lipid content was found in cultures containing 2 mM of nitrate and 25? salinity, it is 34.83%. Seven fatty acids were

detected in culture containing 2 mM of nitrate and 25? salinity namely myristic acid (4.02%), palmitic acid (40.59%),

palmitoleic acid (29.06%), stearic acid (0.95%), oleic acid (12.52%), gamma-linolenic acid (2.56%), and arachidonic

acid (9.38%). Four fatty acids palmitoleic acid (8.99%), palmitic acid (37.34%), oleic acid(44.89%), and stearic acid

(8.78%) were detected in 2 mM of nitrate with 35? salinity. The fatty acids have potential to be used as raw material

for biodiesel production.

Efek Nitrat dan Salinitas terhadap Mikroalgae Air Laut *Tetraselmis* sp. sebagai Bahan Biodiesel. Sumber energi

terbarukan perlu diteliti. Penelitian untuk mengetahui potensi *Tetraselmis* sp. untuk biodiesel dilakukan menggunakan

Rancangan Acak Lengkap pada 4 perlakuan. *Tetraselmis* sp. Mikroalgae dikultur pada medium yang mengandung nitrat

dan salinitas pada beberapa formula yaitu 2 mM25? (N2S25), 2 Mm 35? (N2S35), 15 mM 25? (N15S25), serta15

mM35? (N15S35). Kandungan asam lemak dari *Tetraselmis* sp. diuji menggunakan Gas Chromatography-Mass

Spectrometry (GC-MS). Hasil menunjukkan pertumbuhan tertinggi terjadi pada kultur N15S35, sedangkan pertumbuhan terendah terjadi pada kultur N2S25. Kandungan lipid tertinggi ditemukan pada *Tetraselmis* sp yang dikultur pada medium N2S25 yaitu 34.83%. Hasil penelitian terhadap asam lemak menunjukkan adanya 7 jenis asam lemak dari *Tetraselmis* sp yang dikultur pada N2S25 yaitu asam myristic (4.02%), asam palmitic (40.59%), asam palmitoleic (29.06%), asam stearic (0.95%), asam oleic (12.52%), asam gamma-linolenat (2.56%), dan asam arachidonic acid (9.38%). Sementara itu pada *Tetraselmis* sp yang dikultur pada kultur N2S35 terdeteksi 4 jenis asam lemak, yaitu: asam palmitoleic (8.99%), asam palmitat (37.34%), asam oleic (44.89%), dan asam stearic (8.78%). Asam-asam lemak tersebut berpotensi untuk dijadikan bahan pembuatan biodiesel.