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.