

ALGAE > Volume 34(2); 2019 > Article

Research Article

ALGAE 2019;34(2): 163-175. doi: <https://doi.org/10.4490/algae.2019.34.6.4>

Intraspecific variations in macronutrient, amino acid, and fatty acid composition of mass-cultured *Teleaulax amphioxeia* (Cryptophyceae) strains

Bae Ik Lee¹, Shin Kwon Kim¹, Jong Hyeok Kim², Hyung Seop Kim³, Jong Im Kim⁴, Woongghi Shin⁴, Jung-Rae Rho³, Wonho Yih³

¹Aquaculture Research Department, National Institute of Fisheries Science, Busan 46083, Korea

²Dinorena Co. Ltd., Gunsan 54150, Korea

³Department of Marine Biotechnology, Kunsan National University, Gunsan 54150, Korea

⁴Department of Biology, Chungnam National University, Daejeon 34134, Korea

*Corresponding Author Hyung Seop Kim, Tel: +82-63-469-4592, Fax: +82-63-469-7441,
Email: mudskip@kunsan.ac.kr

Received: February 28, 2019; Accepted: June 4, 2019. Published online: June 15, 2019.

ABSTRACT

To compare the nutritional quality of TPG (*Teleaulax* / *Plagioselmis* / *Geminigera*) clade species of cryptomonads with that of RHO (*Rhodomonas* / *Rhinomonas* / *Storeatula*) clade species 6 *Teleaulax amphioxeia* (TA) and 1 *Rhinomonas* sp. strains were mass-cultured in newly designed 500-L photobioreactors to the end of exponential growth phase. Intraspecific variations (IVs) in terms of one standard deviation among the 6 TA strains in the compositions of the three macronutrients were 41.5 (protein), 89.8 (lipid), and 15.6% (carbohydrate) of the mean. When harvested from stationary growth phase mean compositions of essential amino acids (EAAs, 47.3%) and non-EAAs (52.7%) of the 2 TA strains, CR-MAL07 and CR-MAL08-2, were similar to those of a *Chroomonas* strain. The IVs between the 2 TA strains in the composition of EAAs (10.3 and 2.4) and non-EAAs (8.5 and 2.1% of the mean) were rather smaller than those of saturated fatty acids (30.3 and 26.1) and unsaturated fatty acids (UFAs, 12.0 and 12.5% of the mean) in f/2-Si and urea-based compound fertilizer (UCF) culture media, respectively. Mean compositions of eicosapentaenoic acid (EPA, 17.9%) and docosahexaenoic acid (DHA, 12.7%) of total fatty acids of the 2 TA strains were higher than those that of a *Chroomonas* strain. EPA and DHA compositions exhibited similar level of IVs between the 2 TA strains in f/2-Si (14.6 and 11.0) and UCF media (12.6 and 13.5% of the mean). Thus, the nutritional quality in terms of amino acids, UFAs, EPA, and DHA in a TPG clade species, *T. amphioxeia* was comparable to those of RHO clade species with notable IVs. Practically, biotechnological targets for TPG clade cryptomonad strains might be subspecies or clone level.

Key words: amino acids; cryptomonads; fatty acids; mass-cultivation; photobioreactor; *Teleaulax amphioxeia*; TPG clade

