The effects of low temperature stress on biomass production, proximate composition and fatty acid profiles of the marine thraustochytrid *Schizochytrium limacinum*

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Abstract

The culture of the heterotrophic marine thraustochytrid *Schizochytrium limacinum* has attracted research and industrial interest due to its richness in docosahexaenoic acid (DHA) that has many uses including the production of sustainable aquaculture feeds. The enhancement of DHA production by *Schizochytrium* is only achieved when various stressful conditions are applied, but at the same time this strategy restricts the species growth. In the present study, the effects of low temperature stress were studied, where a treatment (T1) was cultured at a constant temperature 25 °C for 240 h, a second one (T2) was initially cultured at 25 °C for 96 h and then at 15°C for 144 h and a third one (T3) was initially cultured at 25 °C for 120 h and then at 15°C for 120 h. The research aim was also studied at two different nitrogen mediums: a) biogas digestate effluents and b) NH_4Cl. In both nutrient mediums, the dual-phase culture showed that T1 strategy led to a higher biomass production, lipid accumulation and DHA content, but also to lower protein content, compared to the other treatments. The findings revealed that further research is needed in order to develop proper temperature control strategies for efficient DHA production. This study was funded by the "Operational Programme Competitiveness, Entrepreneurship and Innovation - EPAnEK 2014-2020", project MIS 5045804.

Keywords: microalgae, aquaculture, sustainable aquafeeds, DHA

To be announced in the Tenth International Conference on Environmental Management, Engineering, Planning and Economics (CEMEPE 2023) and SECOTOX Conference that will be jointly held in Skiathos island, Greece, from June 5 to 9, 2023.