

# Study on the effects of microwave and/or ultrasound during the pretreatment with DMP of wet *Nannochloris sp.* biomass

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Under optimum growth conditions microalgae only produce small amounts of lipids, but through manipulation of the growth parameters, we can control to some extent the metabolic processes of microalgae to facilitate the accumulation of certain compounds. Many studies have been conducted to enhance the microalgae biomass, lipid productivity, and production efficiency, concurrently keeping the production cost at a minimum <sup>[1]</sup>.

The purpose of this paper is to study the effect of US and/or MW during the pretreatment of wet microalgal biomass, specifically *Nannochloris sp.*, with 2,2-Dimethoxypropane (DMP) on the transesterification process of microalgal oil. Acetone formed in the reaction between water and DMP, proved to be beneficial towards the microwave/ultrasound assisted extraction of oil from the microalgae cells, acting as co-solvent alongside the methanol. The transesterification of oils to fatty acid methyl esters was carried out in conventional and microwave/ultrasound assisted processes. The pretreatment step with US and/or MW and their synergetic effect led to modifications of the cell membrane, in terms of disrupting the cell wall and leading to the flocculation of cells, which was observed through optical microscopy.

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[1] B. Goh, H. Ong, M. Cheah, W.-H. Chen, K. Yu, T. Mahlia, *Sustainability of direct biodiesel synthesis from microalgae biomass: A critical review*, Renewable and Sustainable Energy Reviews, 107, (2019), 59–