**Biomass productivity and lipid accumulation of three marine microalgae grown in oil refinery wastewater**

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**Abstract**

Microalgae can accumulate considerable amounts of lipids but lipid quantity and quality depend on the environmental conditions to which microalgae are exposed to. In this study, microalgae cultures previously isolated from the northern Adriatic were cultivated in 50% diluted oil refinery wastewater. Usually, the untreated petrochemical industry effluent is rich in ammonium and may represent a hostile environment for microalgal growth. The biomass and lipid productivity of 3 marine microalgae species was explored with an aim to estimate their potential for biodiesel production. Used microalgae cultures were: *Nannochloropsis gaditana*, *Picochlorum wilhelmii*, and *Synechococcus* sp. The batch experiments were conducted at three different temperatures: 18°C, 24°C and 30°C and light intensity 130 µmol m-2s-1. The highest lipid content was measured in *N. gaditana* (37%), whereas *P. wilhelmii* demonstrated highest content of polyunsaturated fatty acids (25,16%). In all 3 strains increase in saturation was noted in stationary phase. Our results confirmed that *N. gaditana* is a species with highest productivity of lipids in the entire tested temperature range. Biomass concentrations and productivities in continuous operation were predicted as a function of the specific hydraulic retention time (HRT) assumed. For mass production of high-quality biomass in oil refinery wastewater, *N. gaditana* showed to be the most suitable candidate because of the lower demand for concentrations of orthophosphate for growth in this type of wastewater.

**Keywords:** marine microalgae, lipids, wastewater