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Cultivation of *Nannochloropsis oculata* and *Isochrysis galbana* microalgae in produced water for bioremediation and biomass production

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Abstract

This work investigates the viability of growing two microalgae species Nannochloropsis oculata and Isochrysis galbana in culture medium containing oilfield produced water (PW) for simultaneous wastewater treatment and biomass production. Several batch experiments were conducted using different effluent loadings (10 to 50 %) of PW with modified BG-11 medium. The effect of PW effluent loadings on oil and COD removals from PW were studied. The progressive adaptation method was used for that purpose. Results showed that both strains can survive and grow efficiently on PW when a proper successive adaptation is provided. In general, Nannochloropsis oculata showed better growth and adaptation properties than Isochrysis galbana in the presence of PW media. Significant biomass yields were obtained at studied cultivation conditions (1.123, 1.0166, 0.856 and 0.31 g/l for Nannochloropsis oculata and 1.01, 0.899, 0.638 and 0.314 g/l for Isochrysis galbana at 0, 10, 25 and 50 % PW respectively). Nannochloropsis oculata show better oil and COD removal efficiencies than Isochrysis galbana in 10 and 25 % PW loadings and was able to remove up to 89 and 81 % oil content and 90 and 72 % COD from PW when cultivated in 10 and 25% PW loading respectively.

Keywords: Produced water; *Isochrysis galbana; Nannochloropsis oculata;* Biomass; oil removal; COD removal.