FP2. Dissolved oxygen limitation: friend or foe of neutral lipids production by *Alcanivorax borkumensis* SK2?

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Alcanivorax borkumensis is a marine hydrocarbonoclastic bacteria (HCB) capable of converting hydrocarbons (HC) into neutral lipids and therefore can be used for treatment and valorization of saline hydrocarbon-contaminated wastewaters. When submitted to stress conditions, HCB can increase neutral lipids accumulation. In this study, the effect of dissolved oxygen (DO) concentration on the production of bacterial lipids by *A. borkumensis* SK2 was investigated in a sequencing batch airlift reactor (SBAR) fed with oilfield produced water (PW). Periods of feast (carbon addition (2 g PW L^{-1} COD)) and famine (nitrogen addition (15 or 30 mg L^{-1})) were performed. Dissolved oxygen concentrations of 7 - 8 mg L^{-1} and 2 – 3 mg L^{-1} were tested. For all the conditions applied, intracellular lipids production was higher than extracellular lipids. The maximum intracellular lipids concentration attained (0.23 g L^{-1}) was achieved when lower COD/N ratios (79) and dissolved oxygen of 7 - 8 mg L^{-1} were applied (3 times higher than extracellular lipids concentration). Increasing the feast stage duration from 3 to 5 days led to an increase of the intracellular lipid concentration, from 0.07 g L^{-1} to 0.23 g L^{-1}. The application of 2 - 3 mg L^{-1} DO decreased the intracellular lipid production from 0.23 g L^{-1} to 0.10 g L^{-1}. Triacylglycerol (TAGs) and fatty acids (FA) were only detected at DO concentration of 7 - 8 mg L^{-1}. Throughout the reactor operation, a total petroleum hydrocarbon (TPH) removal efficiency up to 98% was achieved. This work shows that, although lipids production was decreased, the application of low DO concentrations did not compromise the biological treatment of PW in terms of hydrocarbons removal, which can be advantageous by reducing SBAR operation costs with aeration.

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