

Effects of Oxygen Supply on Growth and Carotenoids Accumulation by *Xanthophyllomyces dendrorhous*

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The effects of oxygen supply on growth and carotenoids accumulation by *Xanthophyllomyces dendrorhous* were studied. Initial volumetric oxygen transfer coefficients (K_La) within the range 21.5–148.5 h⁻¹ had significant effects on growth and carotenoids accumulation, and an increase of the initial K_La value led to higher carotenoids, astaxanthin and biomass yields by *X. dendrorhous*. At an initial K_La value of 148.5 h⁻¹, a maximal cell concentration of 19.37 g l⁻¹ and optimal carotenoids and astaxanthin productions of 18.1 and 14.5 mg l⁻¹ were obtained, as well as a maximal astaxanthin content of 0.8 mg g DCW⁻¹, respectively. A higher oxygen supply was advantageous to astaxanthin biosynthesis and the ratio of astaxanthin in the total carotenoids. An increasing initial K_La value gave stronger fluorescence intensities by *X. dendrorhous*, resulting in the maximal intensity of fluorescence at the K_La value 148.5 h⁻¹. The cell growth of *X. dendrorhous* was significantly inhibited when dissolved oxygen tension (DOT) was controlled at ~20% air saturation, which was due to the oxygen limitation in broth. The astaxanthin yield and content at ~50% DOT were higher than those at ~20% DOT.

Key words: Volumetric Oxygen Transfer Coefficient, Total Carotenoids, *Xanthophyllomyces dendrorhous*