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Short communication

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Improving docosaehaenoic acid productivity of *Schizochytrium* *sp.* by a two-stage AEMR/shake mixed culture mode

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Abstract:

In this work, an aeration-enhanced membrane reactor (AEMR) was built to control dissolved oxygen in *Schizochytrium sp.* broth. The effect of culture modes, i.e. single shake and AEMR mode, on the docosaehaenoic acid (DHA) productivity of *Schizochytrium sp.* was investigated. Experimental results showed that the biomass production in the AEMR mode was higher than that in the single shake mode, while the final DHA productivity in single shake mode was higher than that in the AEMR mode. A two-stage mixed culture mode was proposed, in which *Schizochytrium sp.* was cultured in AEMR mode at a flow rate of $0.2 \text{ L} \cdot \text{min}^{-1}$ for 60 h to first increase biomass production, and then shifted to shake mode to improve DHA productivity. Compared to the single shake mode, the DHA productivity in mixed mode costed 40% less culture time and the DHA productivity at 96 h exhibited a relative increase of 60%.

Keywords: docosaehaenoic acid; membrane reactor; dissolved oxygen; two-stage culture

1 Introduction

Docosaehaenoic acid (DHA) plays a significant role in human cognitive ability and brain physiology, including the structural growth, functional development and maintenance of the brain (Nettleton et al., 1993). Although the demand for DHA in medical care is considerable, the

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