

Aeration and agitation strategies for the improvement of red pigment production by *Monascus purpureus* FTC 5391

ABSTRACT

The influence of agitation speed and aeration rate on mycelial morphology and red pigment production of *Monascus purpureus* FTC 5391 was investigated in 2-litre stirred tank bioreactor. At agitation speed of 400 rpm or less, serious mycelia aggregation and fluffy pellets were present with pigment yields of approximately below 0.27 UA500/g.litre. At this speed, *M. purpureus* FTC 5391 formed long hairy mycelia, resulting in the formation of viscous cultures. As the agitation speed increased from 200 to 1,000 rpm, the KLa value also increased gradually. The specific oxygen uptake rates (QO₂) at 800 and 1,000 rpm were lower than the rate at 600 rpm. Mycelia had short branches and appeared to be damaged by mechanical shear forces due to high agitation speed. The dissolved oxygen tension (DOT) levels were varied within the ranges of 30 to 100% saturation in fermentation with agitation speed fixed at 600 rpm. The maximum cell concentration of *M. purpureus* FTC 5391 was about 13.2 g/litre and yield of red pigment production of about 0.411 UA500/g.litre was achieved with DOT of 100% saturation. The highly branched cell morphology and vacuolated cell morphology were observed in a high DOT level (100% saturation). Fermentation was successfully developed in 2-litre stirred tank bioreactor based on a constant agitation speed of 600 rpm and DOT levels higher than 90% saturation, which was the best condition for pigment production and cell morphology.

Keyword: *Monascus purpureus*; Agitation speed; Aeration; Non-growth associated