

## Effects of dual impeller system of Rushton turbine, concave disk turbine and their combinations on the performance of kojic acid fermentation by *Aspergillus flavus* Link 44-1

### ABSTRACT

In the present work, the effects of dual impeller configurations comprising of Rushton turbine (RT) and Concave-bladed disk turbine (CD-6) on the oxygen transfer profile and fermentation performance of kojic acid production by *Aspergillus flavus* Link 44-1 was investigated. Batch cultivations of *A. flavus* Link 44-1 were performed in 2 L stirred tank bioreactor. The fermentations were conducted using different dual impeller systems; (1) RT-RT, (2) CD6-CD6, (3) RT-CD6, and (4) CD6-RT (bottom-top impeller). It was perceived that dual CD-6 system was able to improve oxygen transfer rate by about 25–45% over the hybrids of RT and CD-6 and the typically configured dual RT system. While no substantial disparity could be seen on the fungal growth rate by the manipulation of the impeller, high concentration of kojic acid ( $44.93 \text{ g L}^{-1}$ ) was attained with the use of dual CD-6 as the mixer. Efficient agitating system that can facilitate good gas dispersion capability is crucially required in order to counteract the problem of oxygen solubility limitation faced in such viscous fungal fermentation broth. The results from this work suggested the promising capability of dual CD-6 configuration in enhancing productivity of kojic acid fermentation in stirred tank bioreactor.

**Keyword:** Concave disk turbine; Rushton turbine; Dual impeller system; Kojic acid; Oxygen transfer; Volumetric mass transfer coefficient