

Siwaporn Wannawilai 2010: Repeated Fed-batch Production of Xylitol by *Candida magnoliae* TISTR 5663. Master of Science (Biotechnology), Major Field: Biotechnology, Department of Biotechnology. Thesis Advisor: Associate Professor Sarote Sirisansaneeyakul, Dr.rer.nat. 199 pages.

In this study, the optimal yeast strain for xylitol production was compared between *Candida mogii* TISTR 5892 and *C. magnoliae* TISTR 5663. It was found that *C. magnoliae* was the better yeast strain grown optimally at pH 4.0 under aerobic condition and produced xylitol maximally at pH 7.0 under oxygen limiting condition. Moreover, glucose, the co-substrate showed no improvement in xylitol production by *C. magnoliae*.

As the dissolved oxygen plays an important role for growth and xylitol formation, the volumetric oxygen transfer coefficient ( $k_La$ ) was selected to both monitor and control xylitol fermentation. Studying a correlation of  $k_La$  affecting by agitation and aeration was investigated under condition with and without yeast cells.

The repeated fed-batch productions of xylitol with high-cell density of *C. magnoliae* were carried out under oxygen limiting condition and nitrogen sources controlled feeding. The xylitol yields of 0.838 0.938 and 0.997 g g<sup>-1</sup> were obtained at average cell concentrations of 22 50 and 54 g l<sup>-1</sup>, respectively with using an initial xylose concentration of 60 g l<sup>-1</sup> controlled at agitation rate 300 rpm, aeration rate 1.0 vvm, pH 7.0 and temperature 30 °C. For the total of 682.25 hours of three repeated fed-batch xylitol fermentation, the average xylitol productivity was 1.79 g l<sup>-1</sup> h<sup>-1</sup> with the final xylitol concentration of 306 - 336 g l<sup>-1</sup>.

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