

## Kinetics of cellulase production by *Chaetomium globosum* at different levels of dissolved oxygen tension using oil palm empty fruit bunch fibre as substrate

### ABSTRACT

The effect of different levels of dissolved oxygen tension (d.o.t) at a fixed agitation speed on the production of three major components of extracellular (free) cellulase (FPase, endoglucanase and  $\beta$ -glucosidase) by *Chaetomium globosum* strain 414 was investigated. Oil palm empty fruit bunch (OPEFB) fibre (10 g/l) and peptone (6 g/l) were used as carbon and nitrogen sources for cellulase production, respectively. Growth of *C. globosum* and cellulase complex production were modelled using models based on logistic and Luedeking-Piret equations. The calculated data fitted well to the experimental data, indicating that the models were suitable for describing and verifying growth and cellulase complex production at different d.o.t levels. Cell growth and cellulase production were approximately two-fold higher in the stirred tank fermenter as compared with shake flask culture. At d.o.t of between 30-50% saturation, cell growth and cellulase production were higher than those under oxygen-limited conditions (5% saturation) and at high d.o.t (80% saturation). However, the highest activities of FPase (2.5 U/ml), CMCase (59.5 U/ml) and  $\beta$ -glucosidase (12.8 U/ml) were obtained at a d.o.t of 50% saturation and these gave the overall productivities of 20.8, 495 and 53.3 U/l.h, respectively.

**Keyword:** Dissolved oxygen tension; *Chaetomium globosum*; Cellulase production