

Kinetics of cellulase production by *Aspergillus terreus* at various levels of dissolved oxygen tension in a stirred tank bioreactor

ABSTRACT

In this study the effect of different levels of dissolved oxygen tension (d.o.t) on the production of three main components of extracellular cellulases (FPase, CMCase and α -glucosidase) at a fixed agitation speed by *Aspergillus terreus* was investigated. Growth of *A. terreus* and cellulase production were modeled based on logistic and Luedeking-Piret equations. The results from the model fit well with the experimental data, confirming that the models were appropriate for describing and representing growth and cellulase production at various d.o.t levels. The models showed that the production of FPase and CMCase were growth-associated processes. Cell growth and cellulase production were approximately two-fold higher in a stirred tank bioreactor compared with a shake-flask culture. At a d.o.t of 55% air saturation, cell growth and cellulase production were higher than at low d.o.t (40% air saturation) or high d.o.t (80% air saturation). The highest activities of FPase (2.33 U ml⁻¹), CMCase (51.10 U ml⁻¹), and α -glucosidase (16.18 U ml⁻¹) were obtained at a d.o.t of 55% air saturation, yielding overall productivities of 19.40, 425.00, and 67.40 U l.h⁻¹, respectively.

Keyword: Kinetics; Cellulase; *Aspergillus terreus*; Oil palm empty fruit bunch; Stirred tank bioreactor