

Induction of Xylanolytic Activity by *Aureobasidium pullulans* Using Xerographic Paper

S. Marques¹, F.M. Gírio^{1*}, H. Pala², F.M. Gama², M. Mota², M.T. Amaral-Collaco¹

¹Unidade de Microbiologia Industrial e Bioprocessos, Departamento de Biotecnologia, IBQTA, INETI, Azinhaga dos Lameiros, 1699 Lisboa Codex PORTUGAL

E-mail: francisco.girio@ibqta.ineti.pt

²Centro de Engenharia Biológica - IBQF, Universidade do Minho, 4700 Braga, PORTUGAL

Keywords: *Aureobasidium pullulans*; xylanase; xerographic paper; de-inking.

One of the possible applications of hemicellulolytic enzymes, namely xylanases, in the pulp and paper industry is at de-inking process of wastepaper, one of the critical steps in the recycling process. Enzymatic de-inking is likely to be of industrial use, since it is less costly than chemical deinking, and it is more efficient.

Aureobasidium pullulans has previously been shown to produce extracellularly a cellulase-free endo- β -1,4-xylanase of extremely high activity that might allow the use of the culture supernatant without further purification and/or concentration for the industrial enzymatic hydrolysis of xylan or xylan-containing materials. However, the commercially-available arabinoxylan (one of the best inducers of xylanase activity by *A. pullulans*) is too expensive to allow its use for any industrial enzymatic production.

Then, the aim of this work was to investigate the effectiveness of using cheaper culture media for xylanase production by the color variant-derivative strain of *A. pullulans* NRLL Y-2311-1. In this sense, we used xerographic paper as an alternative inducer, which provided an induction of xylanase production (up to 170-fold increase). These cultures were grown with glucose, sucrose or lactose as the carbon source. To minimize the cost of enzyme production, we have also used agro-industrial residues (whey, carob syrup, molasses and wine must) as alternative carbon sources. The highest level of xylanase titer (15 U/mL) was obtained when using lactose as carbon source.

Data on alternative substrates for xylanase induction, such as brewers' spent grain, wheat germ, corn cob and hardwood wood chips are also presented. The efficiency of using *A. pullulans* xylanolytic system for improving toner removal from printed wastepaper was also carried out and will be reported.

This work has been supported by PRAXIS/BIO/1133/95.