Title:

Selection of natural materials for *Saccharomyces cerevisiae* immobilization

Authors & affiliations:

Z. Genisheva*, S. I. Mussatto, J. M. Oliveira, J. A. Teixeira

IBB – Institute for Biotechnology an Bioengineering, Centre of Biological Engineering, Universidade do Minho, 4710-057 Braga PORTUGAL

* *zlatina@deb.uminho.pt*

Abstract: (Your abstract must use **Normal style** and must fit in this box. Your abstract should be no longer than 300 words. The box will 'expand' over 2 pages as you add text/diagrams into it.)

Immobilized cells systems have been considered as a promising alternative to improve the performance of biotechnological processes, since in these systems, immobilized cells completely maintain their biological functions with increased stability that may often lead to increased cell productivity. However, the correct selection of immobilization carrier is essential to design an effective system to each particular purpose. The objective of the present study was to find a cheap and abundant natural material suitable for immobilization of *Saccharomyces cerevisiae* yeast, which is usually used in fermentation processes for wine production. Four different carriers were evaluated, namely grape seeds, grape skin, grape stems and corn cobs.

To be used in the experiments, the carriers were washed with water and dried to constant weight. The inoculum was prepared by cultivating the yeast in YPD medium under static conditions for 24 h and 30 ºC. Fermentation runs were performed in semi-defined medium composed by: glucose (120 g/L), yeast extract (4 g/L), $(NH_4)_2SO_4$ (1 g/L), KH_2PO_4 (1 g/L), and $MgSO_4$ (5 g/L). The assays were carried out in 500 mL Erlenmeyer flasks containing 200 mL of medium and 2 g of material carrier, statically incubated at 30 ˚C for 24 h. Samples were taken periodically for estimation of biomass, glucose consumption and ethanol production.

Corn cobs and grape skins were the best material carriers for *S. cerevisiae* immobilization, since they immobilized the highest amount of cells (22.2 ± 0.9 mg/g and 25.1± 10.8 mg/g, respectively) and fermentation with these immobilized cells gave elevated ethanol yield ($Y_{P/S}$ = 0.51 and 0.49 g/g, respectively) and productivity (Q_P = 3.35 and 3.41 g/(Lh), respectively). These results are of great interest since the material did not require any pre-treatment to be used as immobilization carrier.

Acknowledgement: FCT project number SFRH/BD/48186/2008

IBS 2010 - 14th International Biotechnology Symposium and Biotechnology Exhibition for the Sustainability of Human Society, Rimini - Itali, 150S, p. 399-400, 2010