Production of fructooligosaccharides by *Aureobasidium* sp. and *Aspergillus* sp.

A. Dominguez[1], C. Nobre[1], D. Torres[1,2], O. Rocha[1], L. Rodrigues[1,2], I. Rocha[1,2], E.C. Ferreira[1], N. Lima[1], J.A. Teixeira[1]

[1]IBB – Institute for Biotechnology and Bioengineering, Centre of Biological Engineering, University of Minho, Campus de Gualtar, 4710-057 Braga, Portugal.
[2]Biotempo – Consultoria em Biotecnologia, Lda., Praça Camilo Castelo Branco nº6, 4700-209 Braga, Portugal

The BIOLIFE project involves the development of novel biotechnological processes for the production of prebiotics, namely, galactooligosaccharides and fructooligosaccharides (FOS). A team of scientists is building strategies for the development of an industrial plant to produce oligosaccharides. Therefore, this study was done in the BIOLIFE project context.

It is generally accepted that the bacterial community resident in the human intestinal tract has a major impact on gastrointestinal function and thereby on human health. Under this scope the consumer has been increasingly confronted with functional food products; within we can highlight pro- and prebiotics.

FOS are nondigestible oligosaccharides with acknowledge prebiotic activity that can be produced by the action of enzymes with transfructosylation activity (i.e. fructosyltransferase and/or fructofuranosidase) from plants and microorganisms. FOS production by fungi in bioreactors is an emergent field of opportunities, as several fungal strains are known to produce enzymes with transfructosylation activity, namely *Aureobasidium* sp., *Aspergillus* sp. and *Penicillium* sp.

The aim of this work was to produce FOS in a bioreactor using *Aureobasidium* sp. and *Aspergillus* sp. and to evaluate the effect of oxygen in both FOS production and cell growth.

The experiments were conducted in a stirred batch reactor, using sucrose as substrate. For *Aureobasidium* sp. a higher massic yield of FOS production was achieved in anaerobic fermentation, even thought biomass growth was minor, as compared with aerobic fermentation.

The yields of FOS production by both aerobic and anaerobic fermentation of sucrose by *Aspergillus* sp. were nearly the same. Nevertheless, the presence of oxygen influenced the cell growth and physiology of the fungus. In aerobic fermentation the fungus grew in pellet form and in the anaerobic process the fungus presented a filamentous growth.

Summarising, using previously optimized operational conditions, an 80% production yield of FOS was achieved via anaerobic fermentation of sucrose by *Aureobasidium* sp.