

I10. Industrial and Food Microbiology and Biotechnology

P417. *Zymomonas mobilis* as a whole-cell biocatalyst for the production of prebiotics

Adelaide Braga, Cláudia Amorim, Joana L. Rodrigues, Beatriz Cardoso, João Rainha, Eduardo J. Gudiña, Sara S. Silvério, Lígia R. Rodrigues
CEB-Centre of Biological Engineering, Universidade do Minho, Braga, Portugal

E-mail: abraga@deb.uminho.pt

The increasing demand for “natural” labeled products and the adoption of a healthy life style drive the consumers preferences towards new foodstuffs that enhance the quality of life. Prebiotics belong to this group of products shown to improve well-being and general health. They are selectively fermented by the beneficial colonic bacteria improving the host health, being the fructooligosaccharides (FOS) one of the most commonly used prebiotics. FOS are non-digestible and calorie-free sweeteners, that can be obtained from sucrose using fructosyltransferase or β -fructofuranosidase enzymes from different microbial sources. Other important components of functional food include levan that is a fructan with prebiotic and antitumor activity; and sorbitol that is a non-cariogenic prebiotic sugar.

Zymomonas mobilis is an extensively studied bacteria for ethanol production, being also an interesting chassis to produce other added value products such as levan and sorbitol, since it contains native enzymes able to convert glucose and fructose into other sub-products. Although FOS production by different organisms has been widely reported, the use of *Z. mobilis* strains is poorly explored.

In this study, *Z. mobilis* ZM4 was evaluated as a producer of the described prebiotics. Shake flask experiments were performed at different temperatures (30 and 37°C) and substrate concentrations (100, 200 and 300 g/L). The initial sucrose concentration was found to have a significant influence on the production of all compounds. However, the shift of temperature did not affect significantly the production of sorbitol, FOS, as well as ethanol. The maximum concentration of levan (5.8 g/L) was obtained at 30°C. Overall, the results demonstrated that *Z. mobilis* ZM4 was able to produce a FOS content up to 30 g/L, from 300 g/L of sucrose, under static conditions, being FOS 1-kestose, nystose and 6-kestose the main FOS produced. Under these conditions, around 18 g/L of sorbitol, 5.8 g/L of levan and 50 g/L of ethanol were also produced.

This study demonstrated the potential of a faster and sustainable process for simultaneous production of FOS, sorbitol and levan using *Z. mobilis* ZM4 as a whole-cell biocatalyst.