

2.2 Biotechnology and Sustainability II

O.5. *Zymomonas mobilis*: a promising microorganism for prebiotic production

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Zymomonas mobilis (ZM) is an ethanologenic bacterium with outstanding characteristics which makes it an interesting chassis for the biotechnological production of prebiotics. Fructooligosaccharides (FOS) are promising prebiotics in the increasing market of functional food. In this work, a Box-Behnken design approach was used to optimize the medium composition and maximize the FOS content. Under optimal conditions, 45.3 g/L of FOS were obtained. Sucrose was the most significant variable; thus, its concentration was further increased to 350 g/L leading to a 1.13-fold enhance in FOS titer. Afterwards, a scale-up to bioreactor was performed resulting in a high yield, content and productivity of FOS (58 %, 156.5 g/L 4.8 g/L h). Furthermore, 45 g/L of sorbitol and 8 g/L of levan were also produced. After purification of the FOS mixture through an activated charcoal column, an *in vitro* model using human fecal inoculum was used to assess its prebiotic potential. The results suggest that the produced prebiotic mixture has potential to be used to improve the human health.

The present work describes for the first time the production of a prebiotic mixture with ZM ZM4 in an *in vivo* single-step approach that has potential to be commercialized as functional food ingredient.

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