

## PREBIOTICS PRODUCTION: FROM MICROORGANISMS TO INDUSTRIAL PROCESSES

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BIOTEMPO – Biotechnology Consulting Ltd., is a spin-off company from the Department of Biological Engineering, University of Minho, Braga, Portugal focused on the development and optimization of industrial biotech processes and specifically the production of functional food ingredients, namely prebiotics. Prebiotics are food ingredients that stimulate the growth and/or activities of gut microbiota, conferring on the host beneficial effects. Also, these ingredients present interesting technological functions that can be further explored by the food processing industry. The prebiotics are obtained normally through enzymatic processes or extraction from natural food, thus allowing very low production yields and high cost. The first step in our process consists of screening potential prebiotic-producers from microbial culture collections which are characterized with regard to activity and production yields. The selected organisms are further used for process development. Process optimization is conducted at several levels, namely medium composition, operational conditions including downstream processing, and scale-up. Finally, the produced compounds are tested for their prebiotic activity using an *in vitro* gut model. The project BIOLIFE consists of developing alternative fermentative processes for the production of the prebiotics, fructooligosaccharides (FOS) and galactooligosaccharides (GOS) using agrofood by-products as raw materials. The production yields, FOS and GOS characteristics, and scale-up validation were crucial for the next step of industrial implementation of the developed processes (project SORUS). The industrialization of FOS and GOS technologies involved engineering work on the equipment, facilities and resources. An important aspect of SORUS involves building an industrial plant in Minas Gerais, Brazil focused on the integral valorization of cheese whey and other residues for the production of added value compounds, including FOS and GOS.

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