P-233 - SIMULTANEOUS SYNTHESIS OF PREBIOTIC MIXTURES CONTAINING GOS AND FOS

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Background

Prebiotics are short-chain oligosaccharides able to promote specific changes in the composition and/or activity of the gastrointestinal microflora [1]. Examples include galacto-oligosaccharides (GOS) and fructo-oligosaccharides (FOS), and several benefits associated with their consumption have been described [2;3]. GOS and FOS can be obtained by enzymatic synthesis through hydrolysis and transglycosylation reactions using lactose and sucrose, respectively, as substrates. In this work, we report for the first time the simultaneous production of FOS and GOS using a crude extract with dual enzymatic activity obtained by *Penicillium brevicompactum* fermentation.

Method

The crude enzymatic extract from *P. brevicompactum* was obtained by submerged fermentation at 28 ºC,150 rpm, 20 days, using a culture medium containing (g/L): lactose (20), peptone (4), yeast extract (4) and salts. β-Galactosidase and β-fructofuranosidase activities were determined using ONPG and sucrose, respectively, as substrate. The enzymatic synthesis of prebiotics was performed at 37 °C mixing 5 mL of crude enzyme with 5 mL of a sugar solution (200 g/L lactose + 200 g/L sucrose) at pH 4.5 [4]. Samples were taken at different time points and analyzed by HPLC.

Results & Conclusions

P. brevicompactum produced a crude extract presenting both β-galactosidase (75 ± 3.2 U/L) and FFase (10326 ± 88 U/L) activities. The crude extract hydrolyzed both substrates (lactose and sucrose), and the simultaneous formation of GOS (trisaccharide) and three FOS (GF2, GF3 and GF4) was found. The prebiotic mixture obtained after 30 hours was composed of 5.8 ± 0.2 g/L of GOS (trisaccharide) and approximately 30 g/L of FOS. The total FOS concentration corresponds to 12.4 ± 0.6 g/L of GF2, 11.8 ± 0.4 g/L of GF3 and 5.5 ± 0.3 g/L of GF4. The potential of crude extracts with dual enzymatic activity for the simultaneous synthesis of two different types of prebiotics, namely lactose-based and sucrose-based oligosaccharides, is demonstrated. This strategy of prebiotic production was never explored and could represent an interesting approach to obtain prebiotic mixtures with enhanced biological effect.

References & Acknowledgments

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