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Optimization of the synthesis of galacto-oligosaccharides (GOS) from lactose by two commercial β -galactosidases

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The demand for foods with demonstrable health benefits has recently increased due to the general awareness on nutrition. Galacto-oligosaccharides (GOS) are currently an interesting example of this kind of functional foods. They are polymers of glucose and galactose (Galn-Glc) which are non-digestible and act as prebiotics by stimulating the proliferation of lactic acid bacteria and bifidobacteria in the human intestine. In addition, they present low calorific content being excellent food and drink sweeteners. The enzyme β -galactosidase (EC 3.2.1.23) can synthesize GOS from lactose (transgalactosylation reaction), but also hydrolyze GOS and lactose (hydrolysis reaction). Even though both reactions take place simultaneously, the desired transgalactosylation can be favoured at high lactose concentration, elevated temperature and low water content. Moreover, the GOS composition of the reaction mixture can be influenced by a number of factors, including initial lactose concentration, enzyme source, pH and temperature. In this work two commercial enzymes have been used to evaluate the β -galactosidase activity: Lactozym Pure 6500 L, a beta-galactosidase from *Kluyveromyceslactis*, and Pectinex Ultra SP-L, a poligaracturonase from *Aspergillusaculeatus*. Both enzymes were first characterized in order to evaluate their hydrolysis activity at different pH (from 4.5 to 7.5) and temperature (from 40 to 60°C) following the well-known oNPG method. Then, the experimental conditions for the GOS synthesis such as temperature, pH, lactose and enzyme concentrations have been studied, aiming to optimize the production of tri- or higher oligosaccharides.

Biography

Isabel M González Delgado is presently undertaking her second year of her PhD in the area of Food Biotechnology in the group of Chemical and Engineering Technology of the Rey Juan Carlos University of Madrid (Spain). She gained her degree in Biotechnology at the Pablo de Olavide University. Afterwards, she undertook a Master related to Rare Diseases. During these years she has collaborated in several research projects in the area of molecular biology, genetic engineering, biocomputing and molecular modelling.

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