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Título:
b-galactosidase from Aspergillus lacticoffeatus: production, characterization and potential application in prebiotic synthesis

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Comunicación:
The enzyme b-galactosidase, also known as lactase, is widely used in the dairy industry to produce lactose-free milk. This enzyme is able to hydrolyse lactose from milk into galactose and glucose, thus enabling the consumption of milk by lactose-intolerant people. Under suitable conditions, some b-galactosidases can also catalyze transgalactosylation reactions and produce interesting compounds with recognized prebiotic effect, namely galactooligosaccharides (GOS) or lactulose. The enzyme can be obtained from different biological sources such as microorganisms, plants and animals. Nevertheless, the most interesting b-galactosidases for technological applications are those obtained through microbial routes since higher production yields can be achieved. In this study, the fungus Aspergillus lacticoffeatus is described as a new and promising source of b-galactosidase. Preliminary chromogenic tests performed in agar plates suggested that this strain was able to produce the enzyme and additional studies carried out under submerged fermentation conditions confirmed the presence of b-galactosidase in the fermentation broth, as well as in the cell extract obtained after ultrasonic cell disruption. The enzyme production was evaluated in different fermentation media: synthetic medium composed by lactose (20 g/L), yeast extract (4g/L), peptone (4g/L) and salts; and fermentation media with some industrial by-products as cheese whey and/or corn steep liquor. However, the higher values of enzymatic activity (444 U/L) were obtained using the synthetic medium. The enzyme presented a molecular weight around 130 kDa and optimal pH and temperature in the range 3.5-4.5 and 50-55 ºC, respectively. The effect of some metal ions (Na+, K+, Li+, Ba2+, Fe2+, Mg2+, Zn2+, Mn2+, Co2+ and Cu2+), detergents (Triton, SDS and Tween), additives (EDTA, PMSF and ascorbic acid) and sugars (glucose, fructose and galactose) on the enzymatic activity was also evaluated. Afterwards, the potential of the enzyme for the synthesis of prebiotics was studied and it was demonstrated that b-galactosidase from A. lacticoffeatus is able to catalyze the transfer reactions involved in the formation of lactulose and GOS.