

Abstract

Identification and Characterization of a Novel Thermostable β -Galactosidase Discovered through Functional Metagenomics [†]

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Abstract: β -galactosidases (EC.3.2.1.23), which hydrolyze lactose to glucose and galactose, have two main applications in the food industry: the production of low-lactose milk and dairy goods for lactose intolerant people and the generation of galacto-oligosaccharides (GOS) by transgalactosylation reactions. Due to their thermostability, β -galactosidases from thermophilic microorganisms are very interesting for industrial processes, as the use of high temperatures can increase the initial productivity of the enzyme, gives higher solubility of substrates, and prevents microbial contamination. In this study, a novel thermostable β -galactosidase was obtained through functional screening of a metagenomic library from As Burgas hot spring (Ourense, Spain). The protein shows maximum activity at 80 °C and pH 7 and retains more than 72 % of its activity after incubation at 55 °C for 6 h. Moreover, it is able to produce up to 48 % (*w/w*) of GOS from a solution of 40 % (*w/v*) of lactose at 70 °C after a 4 h reaction. These properties make the new metagenomic-derived enzyme a very suitable catalyst for its industrial application.

Keywords: metagenomic; hot spring; β -galactosidase

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