

Abstract

New Thermophilic Protein with Xylanase Activity [†]

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Abstract: Cereal hemicellulose, also called arabinoxylan (AX) or pentosan, is a polysaccharide formed by a linear skeleton of xylose monomers linked by β -1,4 bonds with ramifications due mainly to L-arabinofuranose monomers that bind to the oxygen of the C2 or C3, or even the C2 and C3 oxygen of the same xylose residue. Hemicellulose can be used to obtain different products depending on the degree of hydrolysis of the polysaccharide. The enzymes responsible for the hydrolysis of the xylan chain to xylose are generally called xylanases, the most important being the endo-1,4- β -xylanases, which together with the β -xylosidase enzymes carry out the exhaustive hydrolysis of xylan to xylose. The main objective of this work is to discover new thermoenzymes, mainly xylanases and β -xylosidases. The search for these new thermoenzymes was carried out using culture techniques and construction of metagenomic libraries, from water samples from the thermal spring of Burgas with a temperature of 67 °C and from the geothermal spring of Río Caldo with a temperature of more than 77 °C, both in the province of Ourense (Spain), using two varieties of wheat straw (Caaveiro and Castilla) as the only carbon source. Using culture techniques, strains positive for the thermophilic enzymes endoxylanase and β -xylosidase have been isolated, while a positive clone corresponding to the enzyme endoxylanase has been obtained through functional metagenomics. The enzyme with endoxylanase activity has been expressed in *E. coli* and purified by affinity chromatography. The optimal temperature and pH of the purified enzyme have been studied, as well as its thermostability and kinetics.

Keywords: xylanase; thermophilic; metagenomics

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