

Extremophilic enzyme, active above pH 10 and 90°C temperature

DESCRIPTION OF THE TECHNOLOGY

CSIC researchers from the Institute of Agrochemistry and Food Technology (IATA) have developed an enzyme that works under extreme environmental conditions: alkaline pH above 10 and 90 °C. This enzyme allows reducing the use of chemicals in the treatment of plant material, providing environmentally friendlier processing alternatives. The development of the new enzyme was originally aimed to the paper and wood industry, but its usefulness has also been contrasted in the management of agricultural residues and its application extends to the food industry for the production of xylooligosaccharides (probiotic sugars), animal feed or composting.

One of the main components of the cell wall plants is

xylan (polysaccharide), together with lignin and cellulose. In order to obtain pure cellulose, the paper industry requires the elimination of xylan, for which xylanase enzymes can be used. The study of extremophilic xylanases has led to the discovery of a 'superenzyme'. This required the use of bioinformatic techniques and the analysis of thousands of database sequences, most of them of unknown function.

The new xylanase can reduce the environmental problems generated by the use of large amount of chemicals needed for paper bleaching. The new enzyme can be produced easily and in large quantities either from bacteria (*Escherichia coli*) or plants (*Nicotiana benthamiana*).

MARKET APPLICATION SECTORS

Applications in the cellulosic industry (timber, paper), food industry (extraction of plant materials, prebiotics), fermentation, etc.

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

- Improved efficiency in the industrial processes for the transformation of xylooligosaccharides, reducing the need of chemical additives.
- It can work in extreme pH and temperature environments, being the only discovered enzyme that can work in such conditions.
- Easy to industrialize due to its reproducibility (through biofactories) and its capacity to be incorporated into current industrial processes.

CURRENT STATE OF DEVELOPMENT

Priority application filed suitable for international extension. The enzyme has been successfully tested in an industrial environment (cellulose industry).

COLLABORATION SOUGHT

Companies interested in the license of the patent are being sought to license the patent for industrial use and/or for the commercialization of the technology.

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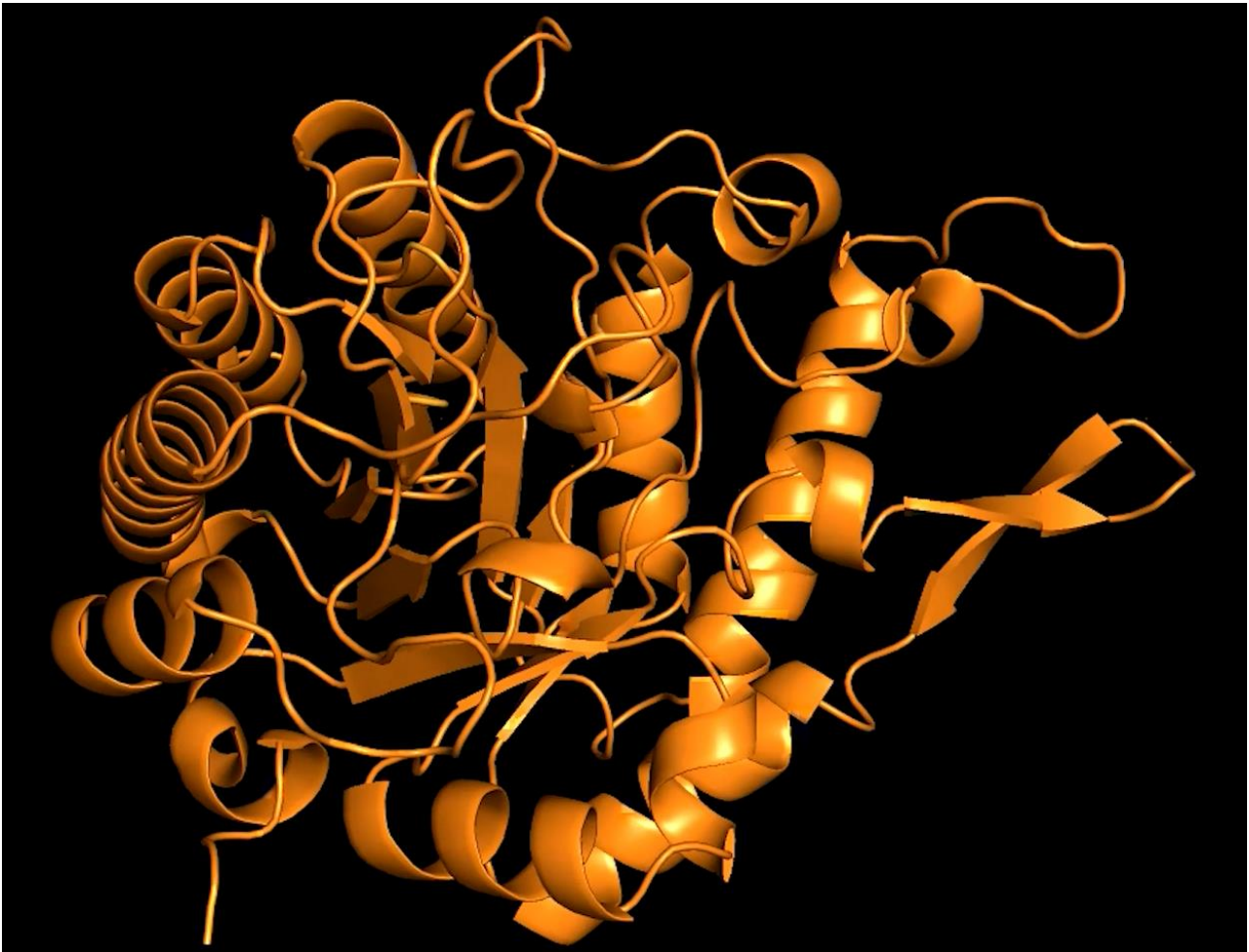


Image 1. Tri-dimensional structure of xylanase.

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