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

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 ºC.

This enzyme allows reducing the use of chemicals in the treatment of plants 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.

An offer for Patent Licensing

A superenzyme that protects the environment

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).

Main applications

- Paper and pulp producing industries
- Food industry for extracting compounds of vegetable origin: coffee, vegetable oils, starch, juice clarification, etc.
- Production of prebiotic compounds (Xylooligosaccharides)
- Agricultural silage
- Degumming of vegetable fiber sources
- Fodder production
- Composting

This result is part of a project that has received funding from the Bio Based Industries Joint Undertaking under the European Union’s Horizon 2020 research and innovation programme under grant agreement No 792070

Patent Status
Priority patent application filed suitable for international extension

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