Sociedad Argentina de Microbiología General

XIX CONGRESO DE LA SOCIEDAD ARGENTINA DE MICROBIOLOGÍA GENERAL

22 al 25 de octubre del 2024
Centro cultural y Pabellón Argentina de la Universidad Nacional de Córdoba, Córdoba, ARGENTINA.

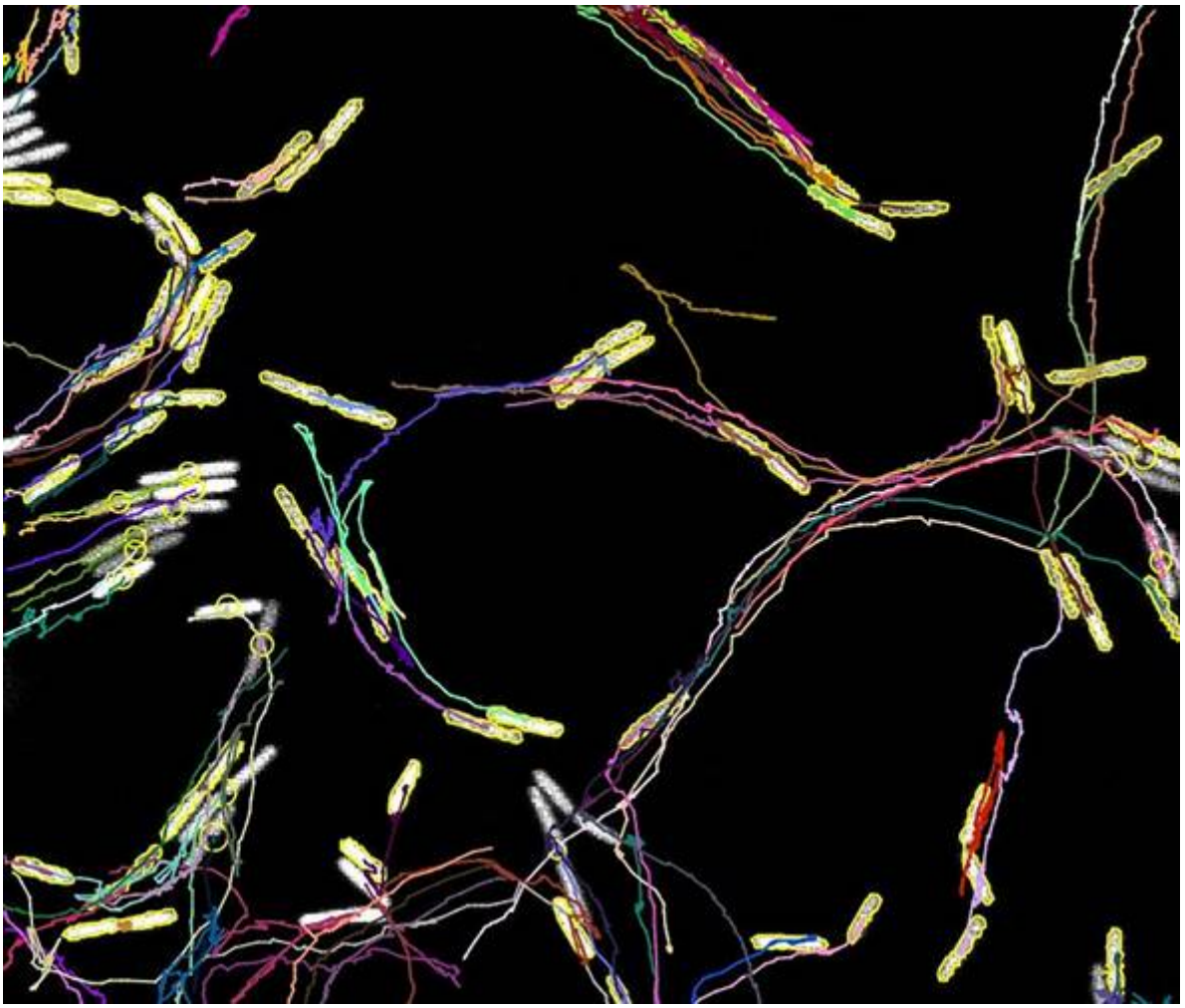

Foto: Se hace camino al andar. Celeste Dea. 1er puesto. Concurso fotográfico SAMIGE 20 años.

5 - Biotecnología y Bioprocesos

ENZYMATIC VALORISATION OF ARABINOXYLANS FROM CEREAL LIGNOCELLULOSIC BIOMASS

Ontañon, Ornella [1]- Orozco, David Leudo [1]- Landoni, Malena [2]- Topalian, Juliana [1,3]- Hracek, Victoria [1,4]- Navas, Laura [1]- Campos, Eleonora [1]

1) Instituto de Agrobiotecnología y Biología Molecular (IABIMO), Instituto Nacional de Tecnología Agropecuaria (INTA), Consejo Nacional de investigaciones Científicas y Tecnológicas (CONICET), Dr. Nicolas Repetto y Los Reseros s/n (1686), Hurlingham, Buenos Aires, Argentina
2) Centro de Investigación en Hidratos de Carbono (CIHIDECAR). Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales, Departamento de Química Orgánica, Buenos Aires, Argentina
3) Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales, Departamento de Química Biológica, Buenos Aires, Argentina
4) Universidad de Buenos Aires, Facultad de Ciencias Exactas y Naturales, Departamento de Fisiología, Biología Molecular y Celular, Buenos Aires, Argentina
Contacto: campos.eleonora@inta.gob.ar

The valorisation of the xylan fraction from plant biomass plays a critical role in the sustainability of lignocellulosic biorefineries. In particular, residual biomass from cereals, mainly composed of arabinoxylan, is heavily underutilized and presents great potential to obtain valuable bioproducts. In this work, we studied the extracellular proteome of the xylanolytic soil bacterium *Cellulomonas* sp. B6 and identified that it produces a sophisticated array of enzymes active on plant cell wall polysaccharides. To fully understand the contribution of each enzyme, four xylanases from GH10 family and the single GH11 xylanase were expressed in *Escherichia coli*, purified, and their enzymatic activities were characterized. The enzymes presented differences in their optimal pH and temperature, specific activity, and they also released a variable pattern of products from arabinoxylan, indicating a differential activity. We also studied the enzymes that act on arabinoxylan decorations, ?-L-arabinofuranosidases, specifically a GH62 (extracellular) and a GH51 (intracellular). We determined that both enzymes could act on simple arabinose substitutions, either in ?-2 or ? -3, but not on double substitutions. While CsAbf62A had activity on the polysaccharide as well as the arabino-xylo-oligosaccharides (AXOS), CsAbf51 acted mainly on the AXOS generated by the xylanases. Nevertheless, both enzymes presented similar levels of boosting activity with xylanases, rendering a significant increase of arabinose and XOS/xylose released. As a result, we have developed a process to obtain a spectrum of substituted and unsubstituted xylo-oligosaccharides. We are currently evaluating the prebiotic activity of the XOS/AXOS generated, which would lead to generate value-added products from agro-industrial cereal side streams

Palabras clave: XYLAN- ENZYMES- BACTERIA- OLIGOSACCHARIDES