Università degli Studi di Napoli Federico II

PhD in Biotechnology - 38th cycle

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Identification, characterisation and modification of (hyper)thermophilic carbohydrate active enzymes and of new enzymes for biocatalysis and biotransformation processes

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Lignocellulosic waste represents, as an alternative to fossil fuels, a sustainable source of energy and high added value bioproducts. Complete bioconversion of the carbohydrate component of waste products needs a multi-step process whose fundamental steps are: pre-treatment, saccharification to break down polysaccharides into sugar monomers, microbial fermentation of the monosaccharides to ethanol or to chemical building blocks, and separation and concentration of the final bioproducts [1]. As a result, enzyme-based methods are designed to make the degradation and biotransformation of many kinds of waste residues easier and more sustainable by recovering value-added compounds. This drives efforts to identify and characterize new Carbohydrate-active enzymes (CAZymes) and set up new enzymatic cocktails, showing remarkable stability to high temperatures and resistance to extreme pHs and high concentrations of detergents and organic solvents, which are of particular interest for biotechnological applications requiring industrial processes in harsh conditions [2].

References

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[2] Strazzulli, A., Cobucci - Ponzano, B., Iacono, R., Giglio, R., Maurelli, L., Curci, N., ... & Moracci, M. (2020). Discovery of hyperstable carbohydrate - active enzymes through metagenomics of extreme environments. The FEBS journal, 287(6), 1116-1137.