



Università degli Studi di Napoli Federico II

PhD in Biotechnology - 36th cycle

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Discovery, characterization and engineering of enzymes involved in polymer modification for sustainable biocatalysis and biotransformation

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Enzyme discovery and engineering have a great impact on several industrial sectors. In particular, in this PhD project, the focus is on enzymes involved in the modification of polymers for biocatalysis and biotransformation.

The increase of CO₂, involved in greenhouse effect and derived from the exploitation of fossil fuels as energy source, prompt to trade on biofuels [1]. Functional metagenomics can allow to access to enzymes, in particular glycoside hydrolases from (hyper)thermophilic microorganisms, which are promising candidates for the degradation of (hemi)celluloses in harsh conditions, to produce monosaccharides fermentable to bioethanol and plastic precursors. In addition, the excessive use of plastics has caused its accumulation in nature, requiring biological processes of degradation [2]. Through *in silico* metagenomics, the aim is to discover and engineer poly(ethylene terephthalate) hydrolyzing enzymes. Then, the yields problem of oligosaccharide synthesis requires an efficient biological approach. Through protein engineering, the objective is to obtain novel *glycosynthases*, engineered glycoside hydrolases able to synthetize glycosides in quantitative yields [3].

References

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