Technology Offer

IMPROVED ENZYMATIC PROCESS FOR THE SYNTHESIS OF ALIPHATIC POLYESTER

KEYWORDS

PCL synthesis; Biocatalysis; Biopolymers

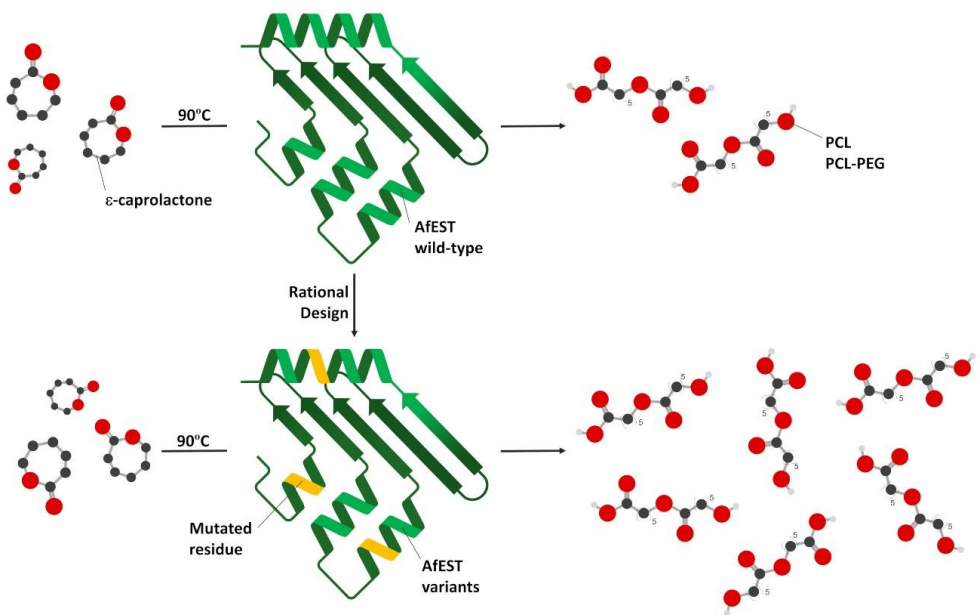
TECHNOLOGY DESCRIPTION

Improved process of **aliphatic polyesters synthesis** (polycaprolactone or PCL and polycaprolactone-polyethylene glycol or PCL-PEG) through **engineered variants** of a non-immobilized enzyme

Improvements:

- Higher polyester yield
- more homogenous size of the polyesters produced
- no immobilization required

Possible industrial applicability of PCL and PCL-PEG enzymatic synthesis



ADVANTAGES OVER ALTERNATIVE TECHNOLOGIES

Chemical synthesis of polyesters: eco-friendlier, more precision in the construction of polyesters with well-defined structures, less toxic side products

Enzymatic synthesis with standard immobilized enzymes: reduced costs, eco-friendlier (no need for immobilization), less variability in the polymer's molecular weighs and polydispersity

Enzymatic synthesis with standard non-immobilized enzymes: higher product yield, more homogenous size of the polyesters produced, less difficulty in producing the enzymes, less risks from bacterial contamination, less aggregation of the polyester products due to viscosity of the medium where the polyesters are produced

APPLICATIONS

Polyesters such as Polycaprolactone (PCL) and Polycaprolactone-Polyethylene Glycol (PCL-PEG) are widely used in biomedical applications:

- systems for drug and gene delivery, but has also extended to include proteins, peptides, vaccines and other bioactive molecules (antigens, antibodies, ribozymes, nerve growth factor, heparin, steroids, hormones and vitamins, among others)
- coatings in implant materials for tissue engineering (bone, cartilage, cardiovascular, blood vessel, skin, nerve, tendon, dental and ligament engineering, among others)
- cell culture and others

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