

## EnzyDesign4PolySyn: Improved Enzymatic Process for the Synthesis of Aliphatic Polyesters

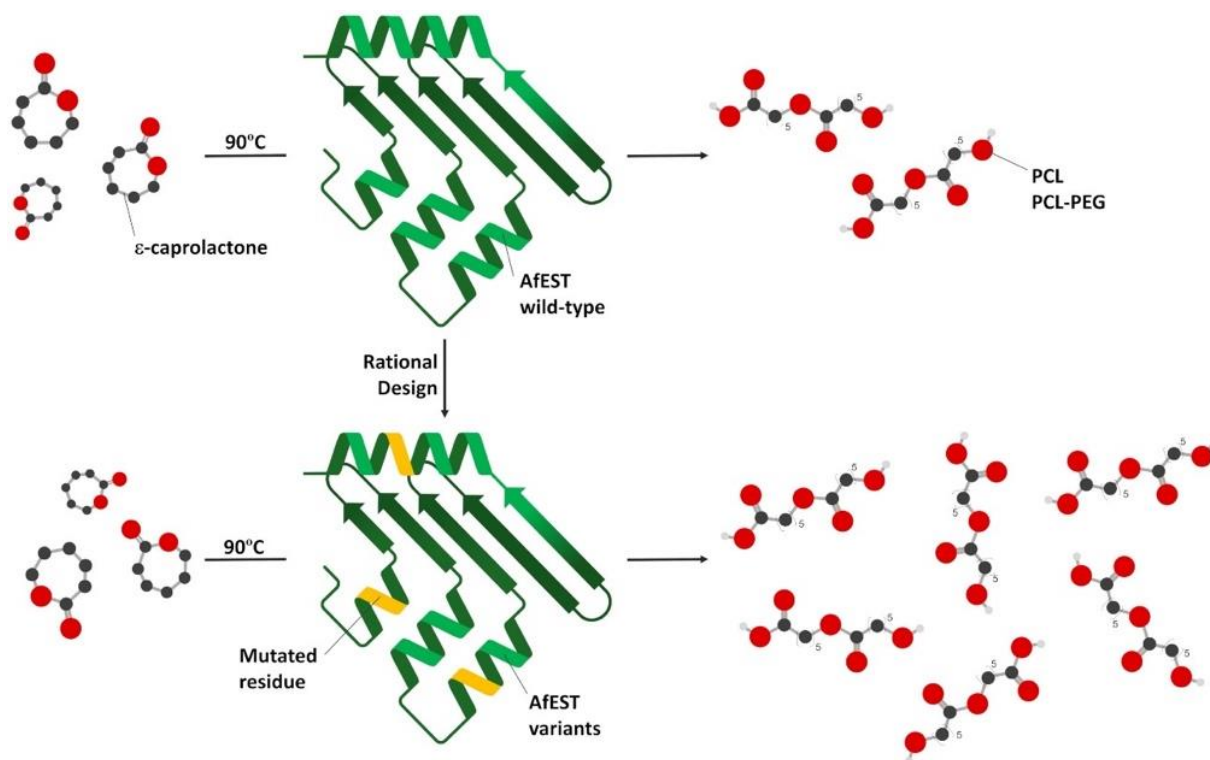
**KEYWORDS:** Biocatalysis; Biopolymers; PCL Synthesis.

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	APPLICATIONS
<ul style="list-style-type: none"> <li>• Chemical synthesis of polyesters: eco-friendlier, more precision in the construction of polyesters with well-defined structures, less toxic side products.</li> <li>• Enzymatic synthesis with standard immobilized enzymes: reduced costs, eco-friendlier (no need for immobilization), less variability in the polymer's molecular weights and polydispersity.</li> <li>• 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.</li> </ul>	<p><b>Polyesters such as Polycaprolactone (PCL) and Polycaprolactone-Polyethylene Glycol (PCL-PEG) are widely used in biomedical applications:</b></p> <ul style="list-style-type: none"> <li>• 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).</li> <li>• Coatings in implant materials for tissue engineering (bone, cartilage, cardiovascular, blood vessel, skin, nerve, tendon, dental and ligament engineering, among others).</li> <li>• Cell culture and others.</li> </ul>

**VIDEO (QR Code or YouTube):**



**STAGE OF DEVELOPMENT:** TRL 3

**IPR LEGAL STATUS:** Patent Pending n.º PCT/IB2022/051111 filed on 08/02/2022.

**OWNERSHIP:** The rights to the technology are held by the University of Coimbra and the University of Aveiro.

**COLLABORATION SOUGHT:** Licensing for further developments or R&D partnership.

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