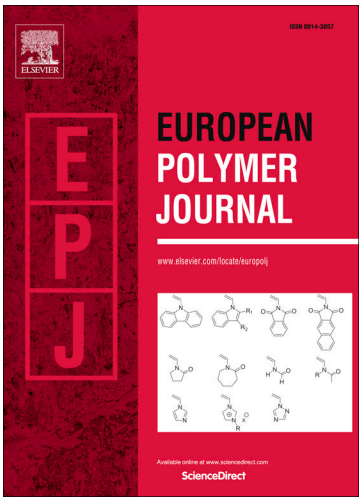

Short communication

A Green Strategy for the Synthesis of Poly(ethylene succinate) and its Copolyesters via Enzymatic Ring Opening Polymerization

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A Green Strategy for the Synthesis of Poly(ethylene succinate) and its Copolyesters via Enzymatic Ring Opening Polymerization

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Abstract:
Poly(ethylene succinate) (PES) with weight-average molecular weight above 60,000 g·mol^{-1} was efficiently obtained by enzymatic ring opening polymerization of cyclic oligo(ethylene succinate)s *c*(ES)$_n$, which in turn were prepared by lipase-catalysed cyclocondensation in solution of dimethyl succinate and ethylene glycol. The methodology was demonstrated to be also applicable to the synthesis of high molecular weight PES-copolyesters containing butylene succinate, ε-hydroxycaproate or L-lactate units with a random distribution.

Keywords: *Poly(ethylene succinate), enzymatic synthesis, ROP, cyclic oligoesters.*

1. Introduction

Sustainable polymers coming from renewable feedstocks and able to be biodegraded at convenient periods of time constitute nowadays a distinguished group of materials with high industrial potential and high interest in the biomedical field. [1,2] Among them, aliphatic polyesters of both AA-BB and A-B types, are by far the most studied and commercially used. [3,4] The easy accessibility to the bio-based blocks suitable for building these polyesters, their notable susceptibility to biodegradation, and their favourable basic properties, are good reasons accounting for their outstanding position.

Ring opening polymerization (ROP) of strained lactones is the method of choice for the synthesis of poly(hydroxyalkanoate)s whereas poly(alkylene alkanedioate)s are preferably produced by polycondensation of alkanediols with dicarboxylic acids or their esters. [5,6] ROP usually takes place at milder conditions than polycondensation