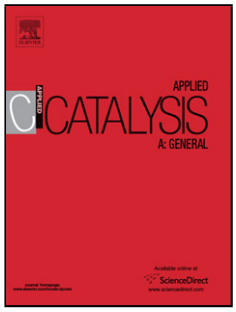

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Magnetic separation and high reusability of chloroperoxidase entrapped in multi polysaccharide micro-supports

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Highlights

- Magnetic micro-supports were developed based on a multi polysaccharide shell.
- All supports were characterized in terms of chemical stability under reaction conditions.
- Chloroperoxidase was successfully entrapped in multi polysaccharide magnetic supports.
- Leakage of the enzyme was observed with single-shell polysaccharide coating.
- High CPO reusability was measured with a polymeric double-shell magnetic micro-support.

Keywords: Chloroperoxidase; polysaccharides; enzyme immobilization; reusability; magnetic nanoparticles; micro-supports.

Abbreviations: PDA = magnetic nanoparticles coated with polydopammine; CS = magnetic micro-supports coated with single chitosan shell; ALG = magnetic micro-supports coated with single alginate shell; CS-ALG = magnetic micro-supports coated with a chitosan-alginate double shell; ALG-CS = magnetic micro-supports coated with an alginate-chitosan double shell; CS-BS3 = magnetic micro-supports coated with a chitosan-alginate double shell and covalently crosslinked with BS3); MMS = magnetic micro-supports.

Abstract

Enzyme immobilization on magnetic supports represents a great advantage for the industrial application of enzymatic catalysis since it allows an easy recovery of the catalyst, avoiding any contamination of the product by residual enzyme. Iron oxide nanoparticles are very useful for this purpose. Using a polymer to diminish the interaction between the magnetic cores themselves, can improve the colloidal stability of the support and prevent any interaction with the environment that would affect both support properties and enzyme stability. For this reason, in this work different magnetic micro-supports, based on polydopamine-coated iron oxide nanoparticles with a multi polysaccharide shell, have been developed. These supports have been used to immobilize chloroperoxidase, a very interesting enzyme, able