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Stabilization of industrial enzymes by coating of their surfaces with hydrophilic viscous polymers

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The physicochemical coating of enzyme surfaces with viscous polymers greatly improves the stability of enzymes against distorting agents (heat, organic solvents, lipids, etc.). Different coating approaches are discussed: (1) Utilization of dextran-aldehyde (chemically attached to the enzymes) as scaffolds to design highly viscous polymers: Dextran-PEG, dextran-glycine, dextran-PEG-glycine, dextran-PEG-polyethyleneimine, etc. (2) Direct coating with polyethyleneimine, additional adsorption of dextran sulfate and additional modification with PEG-aldehyde, etc. Enzymes are firstly stabilized by multipoint covalent attachment and lipases are stabilized by interfacial adsorption on different hydrophobic supports. Different lipases were tested as well as different endoxylanases. The highest stabilizing effects were observed at room temperature (higher viscosity of the coating polymers) with hydrophilic viscous polymers. The enzymes were highly stabilized in aqueous and anhydrous media. For example, lipase from *Rhizomucor miehie* was stabilized 1000 fold regarding the unmodified enzyme. The highly stabilized derivative was very useful to synthesize sn-2 docosahexaenyl monoacylglycerol, a very interesting food ingredient.

Biography

Jose Manuel Guisan has completed his PhD in Biochemistry at University Autonoma of Madrid in 1979. Currently he is a full Professor at Spanish Research Council (CSIC) since 2001 and a Visiting Professor at St. Bartholomew's Hospital Medical School. His research activities include a total of 400 papers in books and journals (in more than 90% as corresponding author) and 25 patent applications.

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