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STUDY OF THE INHIBITION EFFECT ON THE MICROENCAPSULATED ENZYME β -GALACTOSIDASE

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Abstract

The aim of this work is to investigate the influence of an inhibitor over free and microencapsulated enzymes. Microencapsulation is one of the techniques for enzyme immobilization, which is a very common process in the industry to stabilize enzymes and to increase the time and the range of applicability. There are several microencapsulation techniques, with different adaptations and specificities. In this work we used a spray drying method which is a technology used in industry due to its low cost, availability of equipment and efficiency. Spray drying is also a clean technology because it avoids the use of organic solvents during the encapsulation process.

This study focused on the enzyme β -galactosidase, due to its importance in health and industry. Chitosan was selected as encapsulating agent considering all the advantages of this natural polymer. The microcapsules were prepared by spray drying and characterized by their particle size and surface morphology. Structural analysis of the surface of the particles was performed by Scanning Electron Microscopy (SEM). The SEM results show that the obtained microcapsules have a diameter smaller than 5 μm and a regular shape.

The activity of the enzyme was studied by a spectrophotometric method using the substrate ONPG (O-Nitrophenyl- β ,D-galactopyranoside) and MGP (methyl- β ,D-galactopyranosidase) as an inhibitor.

It was concluded that there are differences on β -galactosidase activity in the presence of the inhibitor. The results also showed that the use of an encapsulating agent increases the diffusional effect of the released enzyme, and also reduces the initial activity of the enzyme.

Key words: β -galactosidase, enzyme, immobilization, microencapsulation, spray drying

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