

Examination of *Humicola lutea* Immobilized in Sol-Gel Matrices: Effective Source of α -Galactosidase

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α -Galactosidase production by the fungus *Humicola lutea* 120–5 immobilized in a hybrid sol-gel matrix, consisting of tetraethylorthosilicate (TEOS) as a precursor and a mixture of polyethyleneglycol (PEG) and polyvinylalcohol (PVA), was investigated under semicontinuous shake flask cultivation and compared to the enzyme secretion by free cells. The influence of the carrier weight on the α -galactosidase biosynthesis in repeated batch experiments was followed. Best results were obtained with 2 g of the sol-gel particles per culture flask using 144-h runs. The growth behaviour of the immobilized mycelium during both the growth and productive phases was observed by scanning electron microscopy. The presence of abundant mycelial growth of intact hyphae correlated with a 2-fold higher enzyme activity compared to free cells. The obtained biocatalyst retained a high level of enzyme titer exceeding the activity of free cells during four cycles of operation (24 days). This result is confirmed by the micrographs showing the retained viability of the growing vegetative cells due to the protective role of the carrier.

Key words: Immobilization, Fungi, Scanning Electron Microscopy