



HYDROLYSIS OF STARCH WITH SOLUBLE AND IMMOBILIZED ALPHA-AMYLASE

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Enzyme-mediated hydrolysis of starch as a means for producing primary monosaccharide such as glucose, and further, if adequately processed, may be converted into bio-fuels, represents a better and almost environmentally harmless bio-catalytic process towards classical method, where aggressive and conspicuous reagents are used.

In the present work, hydrolysis of starch by immobilized and non-immobilized α -amylase was performed in batch stirred-tank reactor, in order to evaluate the suitability of systems, one containing the bound and the other the unbound form of the same enzyme. Immobilized and non-immobilized form of α -amylase from fungal origins was used as the biocatalyst. Furthermore, α -amylase was immobilized on PolyHIPE monoliths solid supports via covalent attachment. Immobilization efficiency of the carrier was tested afterwards. Primarily, the experiments were planned to elucidate the effect of several reaction parameters, such as enzyme concentration, temperature, stirrer speed and substrate concentration, in a carrier-free system. Enzyme concentration of 1% (v/v), temperature of 300.15 K, agitation speed of 800 rpm and substrate concentration of 6 mg(mL)^{-1} were predicted to be the optimum conditions for the reaction performance with non-immobilized α -amylase, resulting in a yield of about 97%, respectively.

The same reaction conditions were applied for the system, where the biocatalyst is covalently bound to the solid supports. On the basis of the results obtained with immobilized α -amylase, further experiments are being proposed in order to maximize the conversion yield and prolong the life-time of the immobilized biocatalyst.