



BIOREACTORS WITH STIRRED BED OF IMMOBILIZED CELLS 1. STUDIES ON MIXING EFFICIENCY

Anca-Irina Galaction¹, Anca-Marcela Lupășteanu², Dan Cașcaval^{2*}

¹ University of Medicine and Pharmacy "Gr.T. Popa" of Iasi, Faculty of Medical Bioengineering, Dept. of Medical Biotechnologies, M. Kogalniceanu 9-13, 700454, Iasi, Romania,
email: anca.galaction@bioinginerie.ro

² Technical University "Gh. Asachi" of Iasi, Faculty of Chemical Engineering, Dept. of Organic and Biochemical Engineering, D. Mangeron 71, 700050, Romania, email: dancasca@ch.tuiasi.ro

Abstract

The models describing the flow or the heat and mass transfer in stirred bioreactors can be easily adapted for the continuous phase from the stirred bed bioreactors. But, for the immobilized biocatalyst phase, new models have to be established. Therefore, in this paper the influences of the main factors on mixing for a bioreactor with stirred bed of *S. cerevisiae* immobilized cells in alginate have been analyzed. The mixing efficiency continuously increases with rotation speed acceleration for the distances between the stirrers of 1.5d and 2d, the lowest mixing intensity being invariably recorded for 2d. The variation of mixing time obtained by placing the impellers at a distance of 0.5d and d was sinusoidal and more evident for the closest positions of the stirrers. In all studied cases, the mixing time increases for about 3.5 - 4 times with the increase of the volumetric fraction of biocatalyst from 7 to 40%. The most efficient mixing has been obtained for biocatalyst particles with 4.6 mm diameter.

Key words: bioreactor, immobilized cells, yeasts, mixing, mixing time.

* Author to whom all correspondence should be addressed: dancasca@ch.tuiasi.ro