



DISTRIBUTION OF OXYGEN TRANSFER RATE IN STIRRED BIOREACTORS WITH SIMULATED BROTHS

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Abstract

The study on distribution of oxygen transfer rate for a stirred bioreactor and simulated broths was carried out for four positions inside the broth and indicated the significant variation of k_La on the bioreactor height. For all considered positions, k_La initially increased to a maximum value with mixing intensification, decreasing then, as the result of the modification of mixing mechanism in presence of air bubbles. The increase of broth viscosity led to the significantly reducing of oxygen transfer rate, to the emphasizing of differences between the four positions and to the increasing of specific power consumption needed for reaching the maximum k_La . The magnitude of these effects is diminished by intensifying the aeration. For positions 1 and 4, the increase of the aeration rate initially induced the strong increase of k_La , followed by its slight increase or decrease. The influence of aeration for the positions 2 and 3 was continuous positive. The minimum of oxygen transfer rate was localized in the region corresponding to position 3 of the oxygen electrode.

Keywords: stirred bioreactor, mass transfer, mass transfer coefficient, k_La , superficial velocity, specific power input.

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