



“Gheorghe Asachi” Technical University of Iasi, Romania



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## DISTRIBUTION OF MIXING INTENSITY OF OXYGEN-VECTOR DISPERSIONS IN AERATED SIMULATED BROTHS FOR STIRRED BIOREACTORS

Elena Folescu

*“Gheorghe Asachi” Technical University of Iasi, Faculty of Chemical Engineering and Environmental Protection,  
Department of Chemical and Biochemical Engineering, 73 Prof. Dr. Doc. Dimitrie Mangeron Street, 700050 Iasi, Romania  
e-mail: efolescu@yahoo.com*

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### Abstract

The circulation of aerated broths inside a stirred bioreactor is more complex than in the case of anaerated medium, due to the cumulated pneumatic and mechanical agitation. Therefore, it is very important to analyze the distribution of mixing in such systems. Furthermore, the addition of an oxygen-vector, in our case n-dodecane, complicates more the hydrodynamics of these types of fermentation broths. The addition of hydrocarbons determine an enhancement of mixing intensity, especially for higher viscosities and for higher volumetric fraction of n-dodecane compared to aerated simulated fermentation broths which doesn't contain oxygen-vectors. This is due to the assimilation of small “droplets” of hydrocarbons as rigid sphere which can determine an increase in medium turbulence, with positive effect on medium circulation.

Analyzing the mixing distribution for n-dodecane dispersions in aerated simulated fermentation broths in a stirred bioreactor with a double impeller indicated an inhomogeneous distribution of mixing intensity into the medium, although, for certain conditions (for example at 450 rpm and 420 L h<sup>-1</sup> for low viscosity broth), a relatively homogenous medium can be achieved. The value of the flow rate which corresponds to the maximum of the mixing time was between 150 - 300 l/h, depending on the rotation speed of the stirrer, the volumetrical fraction of the n-dodecane and on the pH electrode position.

*Key words:* mixing distribution, mixing time, oxygen-vector, stirred bioreactor

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