"Gheorghe Asachi" Technical University of Iasi, Romania

ANALYSIS OF DISTRIBUTION OF OXYGEN TRANSFER RATE IN STIRRED BIOREACTORS FOR FUNGUS BROTHS
1. SUSPENSIONS OF *P. CHRYSOGENUM* FREE MYCELIA

Dan Caşcaval[1]*, Anca-Irina Galaction[2], Marius Turnea[2], Stefănica Cămăruţ[1]

[1] *"Gheorghe Asachi" Technical University of Iasi, Faculty of Chemical Engineering and Environmental Protection, Department of Organic and Biochemical Engineering, 71Mangeron Blvd., 700050, Iasi, Romania*
[2] *"Gr.T. Popa" University of Medicine and Pharmacy of Iasi, Faculty of Medical Bioengineering, Department of Medical Biotechnologies, 9-13 M. Kogalniceanu Street, 700454, Iasi, Romania*

Abstract

Unlike the *P. shermanii* and *S. cerevisiae* cultures, the study on the distribution of oxygen transfer in stirred bioreactor for *P. chrysogenum* free mycelia broths indicated that this process is controlled mainly by the high apparent viscosity of broths, and less by the presence of fungus biomass. For this reason, the influence of fungus accumulation on the reduction of $k_l a$ is attenuated compared with that obtained for bacterial or yeasts broths. The lower influence of fungus biomass is also suggested by the higher value of the ratio $(k_l a)_C/(k_l a)_0$ for *P. chrysogenum*, which was for about 1.25 times greater than that for *P. shermanii* broths, respectively for about 1.15 greater compared with that for *S. cerevisiae* cultures, at 36 g/L d.w. and 450 W/m^3. Similar to the previously studied systems, the analysis of $k_l a$ distribution indicated its heterogeneity on the bioreactor height, the oxygen transfer rate increasing from position 1 to 4. Contrary to the bacterial and yeasts cultures, the intensification of aeration promoted the initial reduction of $k_l a$, which reached a maximum level, followed by its increase, due to the flooding phenomenon.

Key words: $k_l a$, mass transfer coefficient, Penicillium chrysogenum, stirred bioreactor

---

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