

KINETICS OF THE MASS TRANSFER OF OXYGEN FROM AIR BUBBLES IN THE PROCESSES OF YEAST BIOSYNTHESIS

G. Ivanitsky, A. Obodovich, V. Sidorenko

For the growth of aerobic microorganisms, which, inter alia, feed or bakery yeast requires dissolved molecular oxygen. For oxygen saturation of the culture medium appropriate to apply deep aeration and submit a fermenter in the form of fine air bubbles that, if possible, evenly distributed in the volume of culture fluid. Oxygen from air bubbles absorbed liquid, and then transferred to the cells of microorganisms. Aeration efficiency plays a crucial role in increasing the output of yeast and improving their quality.

Oxygen transfer from the gas phase to the cells of microorganisms occurs in two stages. In the first phase oxygen passes from the air bubbles into the bulk liquid; the second - absorbed oxygen passes from the liquid in the cells due to the concentration gradient and actions turbulent fluctuations. It is known that the rate of transfer of oxygen to the cells is limited primarily intensive processes that occur in the first stage.

The most rational way to speed up the process of absorption of oxygen is to increase the volume factor of the impact of weight. By reducing the amount of air bubbles and increasing the size of the bulk gas content air dispersed in the culture fluid can significantly increase surface contact phases and thus intensify the process of oxygen transfer to the liquid.

The purpose of research - analytical determination depending on the quantities of surface and volumetric ratios of the impact of weight, specific contact surface and bulk phase gas content the size of air bubbles, and study the effect of these parameters on kinetic processes submerged aerobic microorganisms ..

Depending obtained that describe the mass transfer rate of oxygen absorption process. On the basis of the results Calculations specific absorption rate liquid oxygen liquid, or weight of oxygen absorbed from bubbles per unit time per unit

volume of culture fluid. The rate of absorption was determined based on the average diameter of the bubbles.

Established that with increasing diameter bubbles surface of the impact of weight rate increases and the volume ratio of the impact of weight significantly reduced. This is a sharp increase surface contact phases with decreasing the size of the bubbles in the culture medium at a constant value gas content.

Conclusions

The basic provisions for the theoretical analysis of the conditions necessary oxygen supply cultures of aerobic microorganisms. Applied traditional assumptions about the mass transfer of oxygen from gas to liquid phase, in which the main parameter is the volume ratio of the impact of weight, which depends on the gas content in the culture fluid under different conditions of aeration and mixing. As a result of the studies concluded that fundamental direction for the use of aeration for growing microorganisms is to provide an increase in surface area contact phases by reducing the size of the bubbles pop.