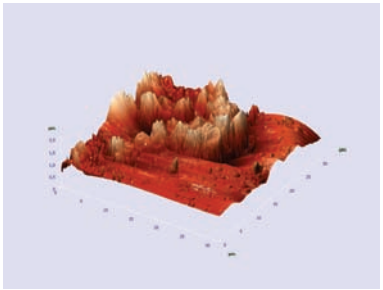
MECHANISM OF RECEIPT OF THE MAGNETICALLY OPERATED BIOSORBENT BY MULTIVORTICAL MAGNETOHYDRODYNAMIC MIXING

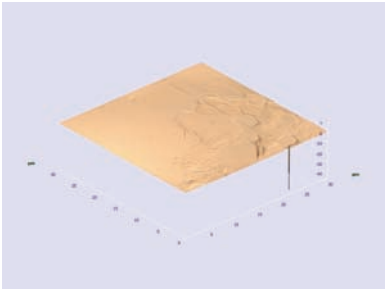
S.V. Gorobets, Y.V. Karpenko
National Technical University of Ukraine "Kiev Polytechnic Institute", Kiev, Ukraine
e-mail: pitbm@ukr.net

A process of biosorption for the cleaning of water solutions by the various cultures of microorganisms has a great interest [1]. In this work the biosorption of copper ions by the yeast culture S.Cerevisiae from water solutions was observed. The intensification of the biosorption process was got by using of the multivortical magnetically hydrodynamical mixing. For extraction of biosorbent in the speed mode with a help magnetic separator from a working environment, it must have magnetic properties. As is generally known the cells of microorganisms do not possess the high indexes of magnetic properties. And therefore it is necessary to create magnetically operated complexes on the basis of yeast cells. The yeast cell with the nanomagnetite [2] added to it can be magnetically operated complex. In this work the method of receipt of yeast cell-nanomagnetite complexes is suggested, and also the sorption capabilities of such complexes, got by different methods of mixing are compared.

The investigation of the surface of magnetically marked yeast S. Cerevisiae were investigated by methods of scanning probe microscopy for researching of the character of interaction between magnetic phase and yeast cells. Results, which were got by the method of atomic-power and magnetic-power microscopy on the scanning probe microscope of Solver PRO-M, rotined that nanomagnetite attached on yeast cell partly remains on its surface, and partly penetrates into a cell after using of magnetohydrodynamic mixing. As a result of magnetohydrodynamic mixing the nanomagnetite is immunodeficiency in the cell better than after the using of simple mechanical mixing. Thus the using of the magnetohydrodynamic mixing for receipt of the biosorbent improves his sorption ability.



Pic.1. Atomic-power microscopy



Pic.2. Magnetic-power microscopy

Reference

[1] Wang J., Chen C. Biosorption of heavy metals by Saccaromyces cerevisiae 1968. – Biotechnology Advances – Vol. 24, № 5 – pp. 427-451 (2006)

[2] Massart R. Preparation of aqueous magnetic liquids in alkaline and acidic media. – Magnetics, IEEE Trans. on. – Vol. 17, № 2 – pp. 247-248 (1981)