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**INVESTIGATION OF THE MECHANISMS OF ADSORPTION OF THE
COMPOSITION OF BIOSURFACTANT ON FIBERS**

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The concept of integrated study of colloid-chemical, physical indicators of efficiency of biological surface-active substances (biosurfactants) and application of a systematic approach to the analysis of chemical and technological processes of wet-cleaning of finished products is developed [1]. The molecular composition of the micelles X_1^m and the interaction parameter in mixed micelles β^m are determined. The regularities of the process of intermolecular interaction in solutions of ecosystems are established on the basis of the theory of regular solutions and the model of pseudo-phase separation. Binary compositions based on biosurfactants with synergistic effect in micelles formation, which may be influenced by a steric factor associated with the advantageous nature of packaging of biochemical molecules in mixed micelles, as well as the possibility of micelle formation of optimal composition are proposed [2]. The mechanism of adsorption of compositions of biosurfactants on fibers and the structure of adsorption layers on the basis of analysis of the chemical structure and spatial structure of biosurfactants [3]. The chemical structure of the surface of the fibers and their properties in aqueous solutions are described.

The adsorption of compositions of biosurfactants on the surface of textile materials in a solvent environment depends on many factors, the main of which are the properties of the surface of the fibers and the qualitative and quantitative characteristics of the components of the compositions [4].

The most important characteristics of the surface of the fiber that affect the adsorption processes of are:

- its chemical structure, which determines the hydrophilicity or hydrophobicity of the surface, the presence of polar groups, the electrokinetic potential of the surface in the solution, the ability to swell, etc;
- surface morphology characterized by smoothness or roughness, pore size and capillaries, presence of defects on the surface, thickness of the fiber, etc.

Compositions are characterized by the chemical nature of components, sizes and ratios of hydrophilic and hydrophobic parts in each biosurfactant the quantitative ratio of components in the mixture, the concentration of the mixture of biosurfactants in solution.

For this evaluation and analysis of the process of intermolecular interaction in solutions of biosurfactant the theory of regular solutions and a model of pseudophase separation were used [2, 4], according to which the molecular composition of the micelle X_1^m was determined (the mole fraction of component 1 – LAS-80 in the mixture with the second component – non-ionic biosurfactant

(Omero-16) and the interaction parameter in mixed micelles β^m). A numerical method of calculations using the Maple 14 program was used.

In this research, samples of cotton and polyester fabrics and their mixtures were treated with aqueous solutions of compositions of biosurfactant [2] with different ratios of components and with different concentrations of solutions. To study the properties of the tissues in the process of wet-cleaning with compositions of the biosurfactant, a composition with a mass fraction of 67 % Omero-16 and 33 % LAS-80

Consequently, studies and calculations based on the model of pseudophase separation have shown the synergistic effect of the mixture of biosurfactants in the molar LAS-80 fraction of more than 20 % and above, which is manifested in lowering the critical micelle concentration and surface tension of the solution in comparison with the corresponding values of the individual biosurfactant. The behavior of the biosurfactant mixture is determined by the behavior of a stronger biosurfactants environment, which displaces the less surface-active component of the mixture (LAS-80) from micelles and adsorption layers.

References

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