CZU: 579.8:546.4

THE IMPACT OF ZnO AND Cu NANOPARTICLES SUPPLEMENTED IN THE REHYDRATION MEDIUM ON LYOPHILIZED MICROMYCETES

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Rehydration of lyophilized microorganisms is an important step in the recovery of strains from the state of anabiosis. There is a wide range of lyophilized strain regeneration media, which demonstrate various results. It has been shown experimentally that viability increases if the rehydration solution with the protective medium is selected correctly. When recovering cells after lyophilization, the duration and temperature of rehydration are important. Complex rehydration media play an important role in repairing damaged cells by providing additional nutrients and essential cell components. The rehydration process includes three simultaneous processes: absorbing water into the dry material, swelling and restoring the soluble materials in the cell. The extent of rehydration depends on the degree of damage to the cell structure and the chemical changes caused by dehydration.

At present, nanoparticles (NPs) are widely used in biotechnology and microbiology, with the help of which the biosynthetic processes of microorganisms used as producers of bioactive substances can be regulated. NPs, due to their very small size, are able to penetrate the body's microstructure, accumulate on the cell surface or penetrate the cell wall, thus altering the functioning of biological systems. Publications in recent years demonstrate the effect of NPs on the viability, development and biosynthetic processes in microorganisms. With the help of NPs introduced into the culture medium of microorganisms, their morphological features can be modified and biosynthetic processes can be stimulated, thus obtaining the expected microbial product of a higher quantity and quality.

The aim of the research was to study the impact of Cu and ZnO NPs supplemented in the rehydration medium on lyophilized micromycetes.

Twenty micromycete strains, representatives of the genera: *Aspergillus*, *Penicillium*, and *Trichoderma*. The strains were lyophilized in the defatted milk + 7% glucose protection medium. Rehydration of strains was performed with distilled H_2O - control variant and 2 NP variants (NP): H_2O + NP Cu; H_2O + NP ZnO. At the first stage, the optimal concentration of NP in the rehydration medium was selected. 3 concentrations (mg / l) were tested: 0.005; 0.001; 0.01.

The viability and stability of micromycete strains, after lyophilization, rehydrated with media supplemented with NP of Cu or ZnO in a concentration of 0.001 mg / l were evaluated. It was shown that in the variant with NP, the viability of the strains exceeds the control variant by 1-4%, and the antifungal activity of the strains of the genus *Penicillium* and *Trichoderma* significantly exceeds the control. In the variant with NP ZnO there was a decrease by 2-11% compared to the control.

Changes in the morpho-cultural properties of micromycete strains in the NP variants compared to the control variant were not detected.

***Acknowledgments*:** The research was funded out within the project 20.80009.7007.09 (ANCD).

Keywords: lyophilized micromycetes, rehydration medium, state of anabiosis, nanoparticles (NPs), culture medium of microorganisms.