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IMPACT OF NANOPARTICLES IN THE CULTIVATION MEDIUM ON THE VIABILITY AND STABILITY OF MICROMYCETES AFTER LYOPHILIZATION

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One of the factors influencing the viability of micromycetes after lyophilization and prolonged storage is the cultivation medium used before. Cultivation media are substrates that provide the nutrients and physico-chemical conditions necessary for the growth and multiplication of microorganisms. The nutritional needs of microorganisms for optimal growth and development are individual and this must be taken into account when preparing cultivation media. The main factors that ensure the vital activity, growth, and reproduction of microorganisms are nutrition, respiration and living conditions. Currently, nanoparticles (NP) are a means of stimulating the growth and biosynthetic processes of micromycetes of biotechnological interest. Research on the effect of NP on biological objects is necessary and current, because NP are obtained through nanotechnologies from modified materials at the atomic or molecular level. They have unique properties, with a different behavior from conventional materials. The action of NP on microorganisms, according to data from the literature, is different and depends on the microorganism studied, the quantity, size, and duration of the applied NP. NP can stimulate the growth and development of microorganisms, but also decrease or inhibit their growth. The aim of the research: to study the impact of supplemented NP in the culture medium on the viability and stability of micromycetes after lyophilization. In the study were taken 20 strains of micromycetes from the genera *Aspergillus* (5), *Penicillium* (10), *Trichoderma* (5). The strains were grown on Czapek medium - the control variant, and variants in which Czapek medium was supplemented with NP: Cu, Co, ZnO, Fe_2O_3, Fe_2ZnO_4, Fe_2CuO_4, in different concentrations. It was found that the action of NP studied, on the morpho-cultural peculiarities is individual, the best cultures grow and develop on Czapek medium supplemented with NP of Fe_2ZnO_4, Fe_2CuO_4, ZnO, in a concentration of 5 mg / l. NP Fe_2CuO_4, Fe_2ZnO_4, ZnO, supplemented in the micromycete cultivation medium before lyophilization, acted differently on their viability. In some cases, they stimulated, and in other cases they decreased the viability of the strains after lyophilization. Thus, the evaluation of the viability of the strains after 1 year of lyophilized storage, showed that the decrease of the viability of the strains in the variants with NP during storage is slower compared to the control variant. In most cultures, after 1 year of lyophilized storage, the viability in NP variants exceeded the control by 2-10%. It has also been established that NP Fe_2ZnO_4, Fe_2CuO_4, ZnO substituted in the culture medium before lyophilization has a positive effect on the biosynthetic properties of micromycetes. NP Fe_2ZnO_4 and ZnO act more beneficial on the biosynthetic properties, stimulating the antifungal activity against the tested phytopathogens from 2.2% to 21.4%, compared to the control.

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