

Study of influence of nano-composites on grow power of barm of bottom fermentation *Saccaromyces cerevisiae*

Aim To investigate the effect of nanocompos on the basis of Saponite ($\text{Si}_7.34 (\text{AlO}, 66\text{Mg}_6 \text{O}_{20} ((\text{OH})_4)$ productions of IMV CAS # 1319-41-1 (Nevada, USA) on viability and reductive activity of mitochondria of brewer's Yeasts of *Saccaromyces cerevisiae*, Methods of Microbiological, Laboratory, Statistical, Results, Nanocompos stimulate the development of *S. cerevisiae* and the activity of mitochondrial reductase in cages of yeasts. The cages in the culture of *S. cerevisiae* grows considerably. From the data of the MTT test, the most effect compared with control was found in the case of the use of nanocomposes of Saponite-H + and Nb-Sap-Eto for concentrations of 0.5 mg / ml, which stimulates the activity of mitochondrial reductase in the cages of yeasts.

Key words: nanocompos, yeasts, vitality, mitochondria, red tazna activity, saponites.

* A scientific leader is a doctor of biological sciences MF Starodub Nanotechnology is a relatively young area of science, which has entered our lives and is developing very intensively. Nanomaterials have received considerable attention due to the complex properties of them, in particular, having regard to the large specific surface area and high reactionary activity [3, 4]. With the rapid development of nanotechnologies, there were the nanomaterials of different forms and diameters that are used in the production of food and commodities [5, 9, 10].

From one side, the application of nanoparticles opens new possibilities in many directions of activity of man: the creation of super-power computers, high-strength materials, the development of high-efficiency anti-infectives. However, on the other hand, the hasty introduction of nanoparticles in the everyday vital functions of man, implicitly, can carry a threat to health. Therefore, a scientific search must be necessarily sent to the study of the influence of nanomaterials on biological objects of different levels of organization, in particular on the analysis of state subcellular, cellular, organ levels and the whole organism [1].

Aim of researches - to learn the direct impact of investigated nanopreparations in the hard state on the height and viability of cages of yeasts. *S. cerevisiae* is a eukaryotic microorganism. It is spherical, yellow-green yeasts that are commonly used in researches as "model organisms". The big advantage is that they are simultaneously and one-cell and by eukaryotic organisms. A far from genes and albumens of yeasts is the homologus of the organism of man. Deeper their study is a step towards the best understanding of the genome of man. Another benefit of yeasts is their hasty growth. On the optimal environments of doubling of the population of yeasts is present only 90 minutes [8], and their colonies, as a rule, are visible in 2-3 days after the transfer to a fresh environment.

Materials and methods of researches. In-process investigated the influence of a row of nanocomposes on the basis of Saponite ($\text{Si}_7.34 (\text{AlO}, 66\text{Mg}_6 \text{O}_{20} ((\text{OH})_4)$ production of IMV CAS # 1319-41-1 (Nevada, USA), namely: Saponite - H + ; Nb - Sap - Cl and Nb - Sap - EtO. Determined influence of the enumerated nanocompos on the level of viability and the reductase activity of mitochondria of brewer's yeasts of *S. cerevisiae*.

The microstructure of nanocompos was determined by means of a scanning electronic microscopy. Standards of Saponite - H + had a three-cornered form that represents the tetragonal structure of their structure. At the terms of dissolution, they agglomerated in the larger space formation, but remained porous, with the size of the pores of about 100 nm, which testifies to a large area of their active surface. Standards of Nb-Sap is an EtO of three-cornered form, a thickness of 20-30 nm. Nanocomposes of Nb-Sap-Cl had sizes of over 30 nm, but as well as previous, agglomerated with the formation of separate scales.

For the realization of the experiment, the culture of *S. cerevisiae* stamm Y-517 from the collection of the Institute of Microbiology and Virology named the D.K. Zabolotny She was grown on the environment of

YPD (of yeast extract - 1%, peptone-2, glucose / dextrose-2, agar-2.5%) for twenty-four hours at 28 ° C. The daily culture was transplanted at a concentration of 105 cells / ml in 25 ml of a medium of YPD with certain concentrations of nanomaterials: 0.5 mg / ml; 1.0; 1.5; 2 mg / ml and incubated over a 1 twenty-four hours. Then the yeasts are cultivated in twenty-four hours in small bottles for 50 ml. The amount of cages determined in the chamber of Goryaeva [2]. The amount of cages determined in the heterogeneous population of *S. cerevisiae* in the stationary phase of height.

After day's treatment, nanomaterials of 100 µl of culture of yeasts were incubated at 20 µl of MTT (3- (4,5-dimethylthiazolyl)-to the 2) -2,5-diphenyl-tetrazolium bromide) for concentrations of 5 mg / ml during 3,5 h at a temperature of 37 ° C in a small 96-hole plate-table. Researches conducted in three repetitions. After the incubation of cages, a culture medium was dissolved and crystals of formazan were dissolved in 150 µl of DMSO. Cages were incubated at presence of DMSO for 15 minutes in the conditions of darkness and measured indexes of absorbance (of OG) of formazan for wave-changing of 620 nm [7]

Results and their discussions. Set, that under the act of nanocompos, the amount of cages of *S. cerevisiae* significantly increases (rice .1). In the majority of cases, it was observed in the presence of nanocompo of Nb - Sap - EtO in a concentration of 2 mg / ml, when the amount of yeast cages was 4.17·10⁸ cells / ml, which corresponds to almost 5-fold for one occasion increase of their quantity comparatively with control. It can be explained by high oxidizing properties of nanopreparations on the basis of saponides [6]. Considering that they accelerate the process of disintegration of complex microelements to simple, and thus absorption and mastering of nutrients take place in yeasts with less power costs and faster and more efficient .

Rice. 1. Influence of nanocompos is on the basis of saponites on development of cages of *S. cerevisiae*

From data of MTT-тесту, the most expressed effect comparatively with control found out for the nanocompos of Saponite - H⁺ and Nb - Sap - EtO for the concentrations of 0,5 мг/мл and for Nb - Sap - Cl for the concentrations of 2 мг/мл (rice. 2). Under their influence the amount of cages exceeded a control level almost in 4 times. Absorbancy in case of the use of Saponite - H⁺ and Nb - Sap - EtO for the concentrations of 0,5 мг/мл presented 0,7845 and 0,7852 accordingly, and for Nb - Sap - Cl for the concentrations of 2 мг/мл - 0,8137. At the same time in case of increase of concentration of nanocompos an effect was some less, however however exceeded the value of control. Consider that it is related also to high oxidizing properties of these substances, that stimulates activity of mitochondrial reductase in the cages of yeasts.

Rice. 2. Influence of nanocompos is on the basis of saponites on biochemical properties of *S. cerevisiae*

Conclusions

At influence of nanocompos on the basis of saponites amount of cages in the culture of *S. cerevisiae* grows considerably. In a most degree it is observed under act of nanocompo of Nb - Sap - EtO for the concentrations of 2 mg/ml, when the amount of cages increased in 5 times comparatively with their level on control. From the data of the MTT test, the most commonly used form of nanocompos of Saponite - H⁺ and Nb - Sap - EtO for concentrations of 0.5 mg / ml, which stimulates mitochondrial reductase activity in the cages of yeasts.

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