PRODUCTIVITY AND CONTENT OF BIOLOGICALLY ACTIVE COMPOUNDS DURING *SPIRULINA PLATENSIS* CULTIVATION IN THE PRESENCE OF GOLD NANOPARTICLES (AUNPS)

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Gold nanoparticles (AuNPs) have wide applications in various nanotechnology fields, due to their unique properties and surface functionality. This multi-functionality of AuNPs provides a versatile platform for various nanobiological systems with respective oligonucleotides, antibodies, proteins. As a new concept, called "theranostics," AuNPs as multifunctionals may exhibit diagnostic and therapeutic functions that can be integrated into a single system, thereby facilitating the diagnosis, therapy and monitoring therapeutic responses.

It was studied biological effect of AuNPs on cyanobacterium *Spirulina platensis* growth and established the level of biomass accumulation. According to the obtained results, the effect of gold nanoparticles on spirulina growth was positive and this effect was provided by all doses added to culture medium. Thus, spirulina productivity in the presence of applied AuNPs doses increased by 18.75-34.3% compared to non-exposed biomass. Maximum biomass productivity increase by 32.29-34.3% compared to spirulina grown in the absence of nanoparticles, was recorded for AuNPs applied in dilutions of 1:1 (Au 1:1), 1:5 (Au 1:5) and 1:20 (Au 1:20).

Applying AuNPs did not lead to alteration of protein content in spirulina biomass. Although the protein content was lower by about 6-13% relative to the level of these biologically active compounds in spirulina biomass cultivated in the absence of AuNPs, we mention that the content of 64.65-69.75% was an appreciable one, framing in protein amounts characteristic of this culture.

The presence of AuNPs in spirulina cultivation medium did not essentially influence either the process of polysaccharide biosynthesis by this culture. The content of polysaccharides at all doses of gold nanoparticles registered values within the level of these functional compounds in biomass obtained by cultivating spirulina in the absence of AuNPs.

A more pronounced biological effect of AuNPs was set on the process of lipid biosynthesis by spirulina culture. Thus, lipid content increased in biomass. The highest level of lipidogenesis was determined for AuNPs in dilutions of 1:1, 1:5, 1:10 and 1:20, the increase in lipid amount constituting 24.33-28.22% relative to lipid level in non-exposed spirulina biomass.

Therefore, gold nanoparticles (AuNPs) are non-toxic for spirulina cultivation. These nanoparticles do not induce essential changes in protein and polysaccharide content of spirulina biomass. AuNPs stimulate strain growth by increasing the productivity by about 1.3 times and lipid content by about 1.25 times in biomass. Thus, AuNPs may be included in integrated schemes for the production of spirulina biomass - a source of nutraceutical compounds and these bionanoparticles.