

## **Nanobiocomposites on the Basis of Arabinogalactan *Larix sibirica* for Biomedical Purposes**

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The generation of nanosized particles with participation of natural polymers has resulted in the formation of nanocomposites, a new type of compounds. The unique various properties of these compounds depend on their particles' sizes. Besides, nanobiocomposites can show typical synergism of properties both as natural stabilizing matrix and as materials of central nucleus.

We have developed a new general method for the synthesis of nanosized materials (oxides of iron, cobalt, copper, nickel as well as metals - gold, palladium, platinum) on the basis of unique stabilizing polymer matrix that is an available natural polysaccharide of Siberian larch arabinogalactan (*Larix sibirica*). The content of metal in the resultant nanocomposite samples can vary within the range of 0,1 - 21,0% depending on the conditions of preparation and metal ion used. X-ray diffraction analysis of nanoparticles has proved that the average size of crystallites of metallic and metaloxide phases was 10-25 nm. The method of electronic microscopy was applied to find that nanocomposite particles were microspheroids of 1700-2500 nm in size. We have also revealed that a microspheroid's nucleus consists of a great number of crystals covered with arabinogalactan.

Synthesized nanocomposites possess high biological activity. Ferroarabinogalactan exerted also anti-anemic action, which is conditioned by the bound iron contained in its structure. The investigations have proved that parenteral introduction of ferroarabinogalactan to animals (white rats) resulted in the normalization of quantitative and qualitative indices of erythrocyte system as well as in the recovery of iron depot in organism. In addition, the unique method for the synthesis allowed to ferroarabinogalactan to preserve not only its membranotropic activity, but also immunomodulating properties.

It has been found that argentoarabinogalactan possessed high anti-microbe activity with respect to gram-negative enterobacteria such as *Escherichia coli*, *Salmonella typhimurium*, *Candida albicans*, *Bacillus subtilis*, *Staphylococcus aureus*. The derivatives containing from 1 up to 21% of silver can be used as bactericidal additives to lacquer coatings in medicine.

Thus, the modern method for the preparation of nanosized composites on the basis of available natural polysaccharide arabinogalactan makes it possible to synthesize the materials having unusual set of controlled properties. At present these materials are in a great demand in medicine and biology when they are applied for the development of controlled compositional materials as well as for the preparation of new drugs.