

USE OF CHITIN AND CHITOSAN DERIVATIVES IN THE SPHERE OF PHARMACY

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Abstract: *And the article provides review materials on the use of environmentally friendly chitosan biopolymer and its water-soluble derivatives in the field of pharmacology for the production of various drugs.*

Key words: *chitosan, spectrophotometer, fungicide, filamentous fungi, culture medium.*

Chitosan is a natural polymer of the 21st century. The unique properties of chitin and chitosan attract the attention of a large number of specialists in various specialties. The role of polymers in our life is generally recognized, and it is difficult to list all the areas of their application in everyday life, industrial production, science, medicine, and culture. If until the 20th century people used polymers of natural origin - starch, cellulose (wood, cotton, flax), natural polyamides (silk), natural polymer resins based on isoprene - rubber, gutta-percha, then the development of organic synthesis chemistry in the 20th century led to the emergence of various fields of human activity of a huge variety of polymers of synthetic origin - plastics, synthetic fibers, etc. The technological breakthrough that has taken place has not only radically changed our lives, but also created a lot of problems related to protecting human health and protecting the environment.

Therefore, the great interest of science and industry in the search and use of polymers of natural origin, such as chitin and chitosan, is natural. These polymers have a number of interesting properties, high biological activity and compatibility with human, animal and plant tissues, do not pollute the environment, since they are completely destroyed by microbial enzymes, and can be widely used in environmental protection measures.

The production of chitosan is based on the cleavage reaction of the acetyl group from the structural unit of chitin-N-acetyl-D-glucosamine or the deacetylation reaction. The trans arrangement of the substituents (acetamide and hydroxyl groups) at C2 and C3 in the elementary unit of the chitin macromolecule determines the significant hydrolytic stability of the acetamide groups, including under alkaline hydrolysis conditions.

Chitin and chitosan are similar in structure to cellulose, one of the main fiber-forming natural polymers. It is natural, therefore, that, like cellulose, these polymers and their derivatives have fiber- and film-forming properties [9]. Due to biocompatibility with human tissues of low toxicity, the ability to enhance regenerative processes during wound healing, biodegradability, such materials are of particular interest to medicine. In the treatment of purulent and burn wounds,

enzymes have become widely used, the efficiency of which can be increased by including them in the structure of fibers and sponges. Polymers such as chitin, chitosan, carboxymethylchitin, due to a wide range of functional groups, provide the possibility of forming bonds of various strengths between the carrier polymer and the enzyme, which creates the prerequisites for regulating the activity and stability of the enzyme, the rate of its diffusion into the wound. In medicine, for the treatment and prevention of thrombosis, a natural blood anticoagulant is used - heparin, which by its chemical structure is a mixed polysaccharide. Its closest structural analogue, chitosan sulfate, also has an anticoagulant activity that increases with an increase in the degree of sulfation. The possibility of realizing a synergistic effect (increasing the activity of heparin with the addition of chitosan sulfate) makes this compound promising for the creation of anticoagulant and antisclerotic drugs.

The unique spectrum of biological activity of chitosan includes a number of functions, including:

- normalization of triglyceride fractions
- normalization of cholesterol and bile acids in the body
- binding of cellular fat
- normalization of the digestive tract
- decrease in uric acid concentration
- acceleration of healing of wounds and ulcers
- analgesic effect
- interaction with biologically active calcium
- stabilization of blood pressure
- antimicrobial and fungicidal action

Many of these properties have already found their application in medicine.

The hemostatic properties of chitosan allow you to quickly thicken the blood, and also reduce pain by blocking nerve endings. At present, the US and British armed forces are successfully using chitosan dressings on the battlefield. In plastic surgery, chitosan is used in skin grafting. It promotes the fastest healing of wounds and reduces scarring after plastic surgery.

Chitosan fibers are used as surgical threads, they are absorbed in the body and do not have an allergic effect.

In pharmaceutical production, chitosan is used as a filler in tablets. For example, it is used as a carrier in controlled release drugs. The prebiotic properties of chitosan allow better absorption of the active substances of the drug.

Chitosan is used to lower cholesterol levels, it also helps fight anemia and improves physical strength, appetite and sleep in people with kidney failure. According to experts from the State Scientific Center for Biophysics, chitosan remains the most effective anti-radiation agent to this day. Numerous studies have proven its antitumor properties.

In combination with other biologically active substances (citric and ascorbic acids, vitamins E, K, A), chitosan increases the immune status of a person.

Chewing gums and mouthwashes containing chitosan can reduce the number of bacteria in the mouth that cause cavities. There are studies showing the effectiveness of treating periodontitis with chitosan ascorbate.

Habitual food products in combination with chitosan oligosaccharides become functional. There are such effects as restoration of joints, hepatoprotection, atherosclerotic effect, correction of blood pressure, increased immunity, improved functioning of the gastrointestinal tract, improved absorption of nutrients, and a decrease in visceral fat.

Now, when after many years of neglecting dietary fiber, many have realized the need for healthy nutrition and longevity, interest in chitosan is increasing like an avalanche.

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