

## AREAS OF APPLICATION OF NANOTECHNOLOGIES IN ANIMAL HUSBANDRY

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Competitiveness of agricultural production is possible only with the rapid introduction of innovative technologies. This applies both to the intensification of production processes and to the improvement of its quality and safety, in particular the reduction of negative effects on the environment. Human health directly depends on the quality of food consumed, so today, given that the environment is polluted by industrial and household waste, experts are seriously concerned about the safety of meat, milk, eggs and fish. Nanotechnologies - methods of nanoparticle management, as a result of which new methods of processing, manufacturing, state change, properties, shape of raw materials, materials or semi-finished products are developed.

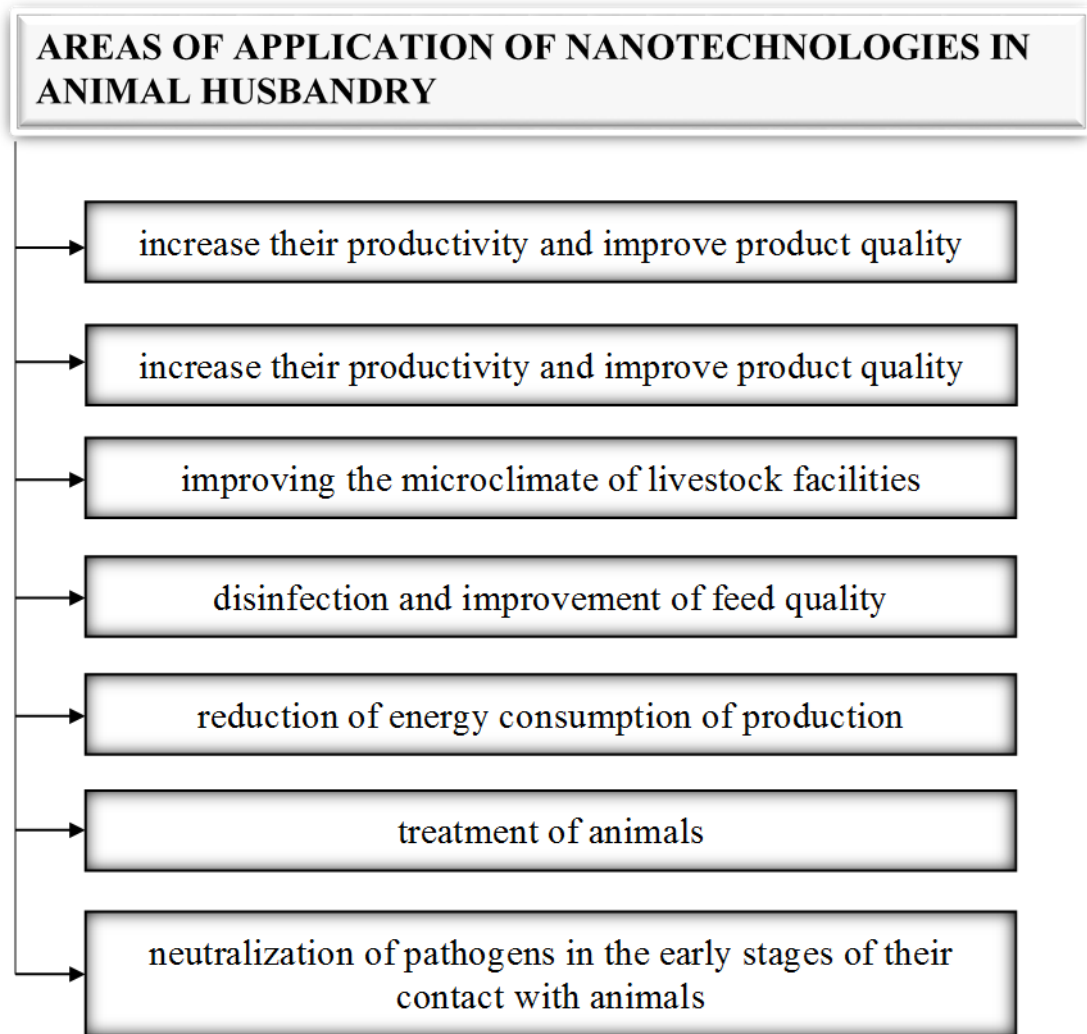
The analysis of the developed nanotechnological processes and nano-materials showed that the main areas of their application in agro-industrial complex are biotechnological engineering, production and processing of agricultural products, agricultural engineering, technical service [1-3].

Areas of application of nanotechnology in animal husbandry related to the breeding of highly productive animal breeds are presented in Fig. 1.

The French company OLMIX is a world leader in the use of nanotechnology and natural nanoproducts in agriculture. From a wide range of works carried out by the company it is necessary to note research on creation of the organomineral complex which gained popularity under the Amadeite © trademark. This is a unique nanomaterial - intercalated clay, the adsorption capacity of which exceeds all existing analogues. Based on Amadeite © created unique drugs designed to clean feed from mycotoxins, bacterial toxins and pathogens, as well as to improve the process of biocatalysis in the digestive system of animals [2,3].

Currently, the deficiency of carotene in feed reaches 60 percent. Therefore, it is necessary to establish the production of complete feeds and balancing additives and premixes. Modern enterprises produce compound feeds, premixes and BVMK, which are not inferior to foreign counterparts. Tests have shown that the use of nanoproducts increases profitability in poultry and livestock. Develop methods for using nanoadditives to reduce the introduction of doses of tranquilizers and hormones. VITAL ULTRA

premises with the addition of a special natural material, bentonite. Based on terpenoids and nanostructured silicates can improve product quality, increase growth, reduce morbidity, reduce growing time, feed costs.



**Fig. 1. – Areas of application of nanotechnology in animal husbandry related to the breeding of highly productive animal breeds**

The nanoadditive does not have toxic properties, does not have a negative effect on the blood and organs of animals. Russian scientists use in practice environmentally friendly nanotechnology of electro-preservation of silage with electro-activated preservative. It is used instead of expensive organic acids, which require strict safety rules. This new nanotechnology increases feed preservation by up to 95%.

Biological nanodevices that can be implanted in animals allow you to automate processes and transmit the necessary data in real time. Modern biological nanochips help to diagnose somatic and infectious diseases, in particular the species identification of pathogens of especially dangerous infections and toxins. Prevention and treatment of diseases of calves with a symptom complex of diarrhea in the newborn and lactation periods.

At present, for a large group of nanomaterials based on metals Ag, Cu, Co, Mn, Mg, Zn, Mo, Fe, the technical conditions have been obtained and their production has been established.

Iron nanoparticles are included in premixes to increase the viability of birds, birds and fish and their productivity.

In the light of recent discoveries in nanotechnology, the biological role of silicon in living organisms and its compounds, silatrans, has been studied. Silatrans have a physiological effect on living organisms at all stages of evolutionary development from microorganisms to humans.

Obtained materials with silver nanoparticles having antibacterial properties. They are used in veterinary medicine to control staphylococci and other bacteria, are used as chlorine-free disinfectants, in dressings. Silver nanoparticles are successfully used in filters, milking machines and other parts of the dairy industry equipment to inhibit the processes of fermentation and fermentation of milk. The technology of production of fodder sugar "Slastik" by deep processing of grain fodder is developed. The resulting product allows you to balance the diets of cows for easily digestible carbohydrates.

With the expansion of the construction of pig farms by 110,500,000 heads, the presence of ammonia and carbon dioxide in the air is especially dangerous for young animals, reaching the maximum permissible concentration of MPC (0.02 milligrams / l) in the summer. Electrochemical purification of polluted air without release into the environment is carried out by passing it through a nanodisperse solution of water with slaked lime.

Nanoelectrotechnology in technological processes of poultry farming with the use of high frequency electromagnetic radiation allows to carry out:

- ultraviolet irradiation of hatching eggs and young birds for the purpose of their disinfection from pathogenic microorganisms and stimulation of perinatal (during incubation) development of young birds. Studies have shown that hatchability of chickens increases to 94, and their preservation - up to 99%;

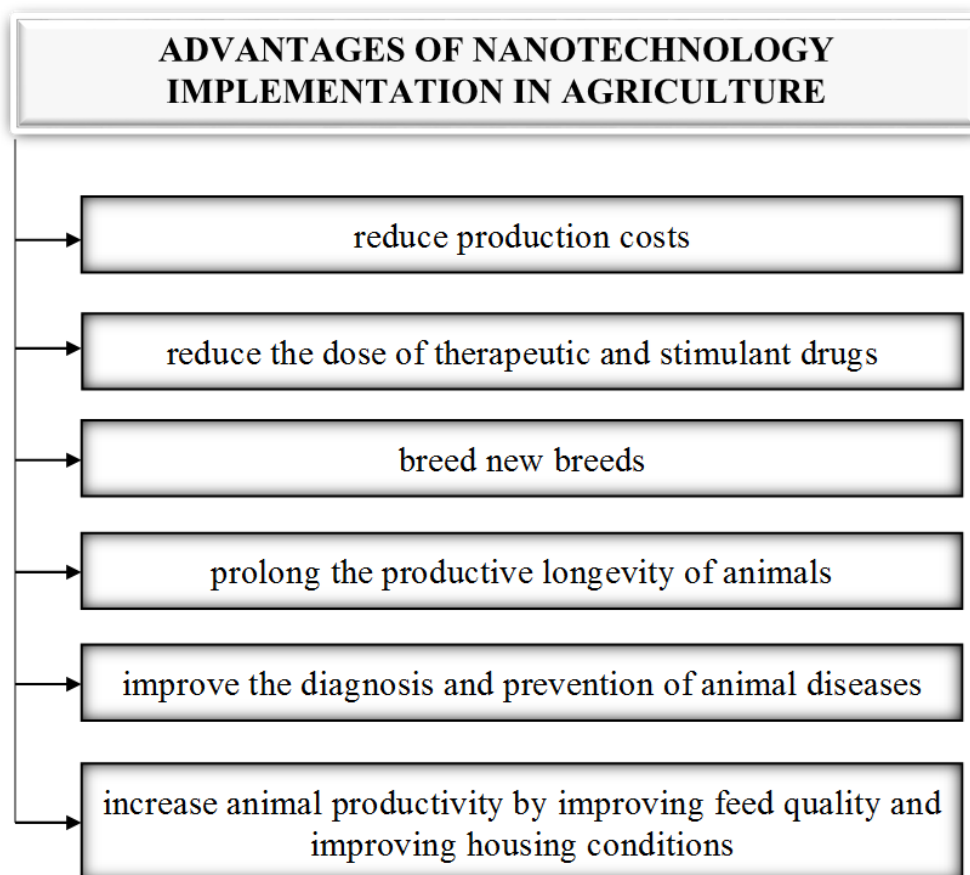
- division of young birds on the floor.

An illustration of the prospects for the introduction of nanoelectrotechnology in the practice of agricultural production can be tests of the installation of OZUF (ozone-ultraviolet irradiators), which were conducted in a poultry house for growing repair young stock in the Moscow region.

During the production testing, the effectiveness of the regime and technology of air disinfection by UVFO irradiators was confirmed, as well as the positive effect of bactericidal UVA on the microclimate and bacterial composition of air, which proves the feasibility of using such irradiators in chickens.

The development of nanotechnology contributes to the emergence of a new direction in animal husbandry, the so-called molecular animal husbandry. In Tatarstan, work has begun on genotyping and molecular diagnosis of hereditary animal diseases for breeding highly productive breeds of cattle and pigs. Today, DNA technology is actively used to detect genes associated with economic traits, resistance to stress, infectious diseases, as well as genes carrying recessive mutations - genetic abnormalities.

Each innovation has its own path of development, its own chain of formation. At present, it is difficult to assess the benefits of the introduction of nanotechnology in agriculture, but it is safe to say that this introduction will provide the following results (Fig. 2).



**Fig. 1. – Benefits from the introduction of nanotechnology in agriculture**

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