

Scientific Vacuum in the Fight Against Antibiotic Resistance of Bacteria in Agriculture

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The emergence of antibiotic-resistant bacteria in agriculture poses two problems. The first problem is the limitation of the use of antibiotics for veterinary needs. The second problem is that, now, the safety of pig, livestock and poultry products must be considered in the context of the presence of antibiotic resistance genes in food.

Attempts to minimize the risks of human infection with antibiotic-resistant bacteria, undertaken by officials, look somewhat ill-considered and, possibly, aggravate the existing situation.

What actions have been taken to limit antibiotic resistance now?

Eliminate or limit the use of feed antibiotics. It is not at all obvious that even the development of resistance to feed antibiotics that are not used in medicine, for example avilomycin, flavophospholipol, can somehow hinder the use of other antibiotics that are used in medicine. It is possible that cross-antibiotic resistance can be realized, this cannot be ruled out. Nevertheless, a decrease in the consumption of feed antibiotics that are not used in medicine is usually offset by an increase in the use of antibacterial agents that are used in medicine. In such a situation, the risk of bacteria resistant to medical antibiotics entering the human body increases.

The adverse consequences of such a decision should include an increase in the risks of developing bacterial infections, while limiting their prophylaxis with antibiotics. In such a situation, the risk of more active use of antibiotics by people already infected with pathogens of bacterial infections through food may also increase.

It follows from the above that the use of feed antibiotics that are not used in medicine should be considered as a favorable factor in minimizing the use of therapeutic antibiotics. The restriction of the use of feed antibiotics in the EU countries is caused by completely different reasons that are not relevant for the Russian Federation.

For example, according to our data, enromycin, in the long term, showed a more effective effect on reducing the infection of poultry with Salmonella than almost all therapeutic antibiotics.... Flavophospholipol preparations were safer and more effective in preventing clostridiosis caused by *C. perfringens* (including dangerous for humans), while the use of some therapeutic antibiotics, on the contrary, provoked both an increase in the concentration of Clostridia in the liver and the general level of infection in poultry. As a result, the risks of human infection with salmonella and clostridia have increased, but they are already resistant not to feed antibiotics, but to medical ones.

Reducing the range of antibiotics used in veterinary medicine. At first glance, this is an absolutely correct solution to reduce the risk of bacteria appearing in foods that are resistant to appropriate antibiotics. Here we come to another problem - if there are fewer antibiotic groups in the doctor's arsenal, then the risk of repeated use of the same antibiotics will increase. Attempts to combat antibiotic-resistant

bacteria will be reduced to an increase in the dosage of antibiotics used, and a lengthening of treatment courses. As a result, we get a manifold increased risk of developing antibiotic resistance, albeit to a limited range of antibiotics.

Summing up, it is worth noting: some measures of regulation of agricultural production in the direction of minimizing the risks of infection of people with antibiotic-resistant microorganisms, from a scientific point of view, should lead to a diametrically opposite result. In some cases, at least, mathematical modeling of the evolutionary processes leading to the development of antibiotic resistance in animals and humans is needed before introducing some restrictions on the use of antibiotics. Replacing antibiotics with alternative means of fighting bacteria sometimes looks downright unsafe. For example, there is absolutely no certainty that the widespread use of organic acids will not increase the pathogenicity of bacteria for humans, which will acquire resistance to them, and at the same time to some protective reactions of the human body. The widespread replacement of antibiotics with antibacterial drugs from plants does not mean that these drugs are non-toxic. For example, the same substance was used by us for the mutagenesis of bacteria and by our colleagues for the prevention of bacterial infections in agriculture. At the very least, this looks unsafe, ecologically.

Conclusion

Prevention of risks of infection of people with antibiotic-resistant bacteria, through food, sun.

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