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Industrial Poultry in Newcastle and Avian Influenza Highly Virulent Field Virus Risk of Case Effectiveness of Immunoprophylaxis

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Abstract: The article presents the results of studies on effective immunoprophylaxis of Newcastle and Influenza virus in industrialized poultry.

Keywords: Newcastle diseases, avian influenza, vaccine, immunoprophylaxis, virulent, virus, antibody, immunoglobulin, hemagglutination, infection, contagious, desinfection.

Relevance of the topic. Industrialized poultry farming in Uzbekistan began to develop in the 1960s. For 60 years, the prevention of Newcastle disease is one of the main immunoprophylactic measures. During these years, various vaccines and vaccination methods have been developed and are being put into production. Taking into account that the industrialized poultry industry in the world is rapidly developing year by year, there is information that immunoprophylactic measures against avian influenza are being carried out on a large scale in Asian countries in recent years. Therefore, in Uzbekistan for the last 4-5 years, in the industrialized poultry industry, the immunoprophylaxis of the avian influenza disease is being carried out. Thus, effective immunoprophylaxis against this disease is required.

Based on the observations in production, immunoprophylactic measures against bird flu and Newcastle disease are considered the main ones and are introduced to production in different ways.

It is known that the causative agent of avian influenza and Newcastle disease can be kept in wild and syntropic birds in a natural state, and dangerous situations are possible.

If we take into account that birds are kept in a high concentration in a limited area in industrialized poultry farming, due to the constant change in the number of birds in the farm, it is highly likely that the virulence of viruses will increase due to passage in birds. Thus, the causative agent of bird flu and Newcastle disease is always in a state of danger in the household. Avian influenza and Newkal's disease are pantropic infections, that is, they have the characteristic of developing in many tissues and systems of the body. Therefore, in some cases, immuno-preventive measures according to the general instructions may not give the desired result.

In industrialized poultry, immunity against influenza and Newcastle disease is constantly monitored by GATR and IFA serological tests. As a result of serological tests, the level of antibodies in the blood serum is determined. There are five classes of antibodies, that is, immunoglobulins (IgM, IgG, IgA, IgD, IgE), and mainly IgM, IgG, IgA antibodies make up the main amount.

Only a certain part of the antibody molecules, that is, with the active center, binds the antigenic determinant to itself. The valences of different classes of antibody molecules, that is, the active centers, differ. IgG and IgA are bivalent (have two active sites), IgM is polyvalent, can attach 5-10

antigen molecules, has 10 active centers (5 of which are distinguished by high antigen binding power). The order of formation of IgM and IgG class antibodies is as follows: IgM is formed as a primary immune response to most antigens, and IgG is formed as a secondary immune response. From the phylogenetic and ontogenetic point of view, the IgM system is earlier. IgM is mainly synthesized in the fetus and newborn body.

Immunoglobulin M class makes up 10% of total immunoglobulins in human blood serum, molecular mass is 900,000 daltons, sedimentation constant 19S. IgM immunoglobulins consist of five independent units, the end of which is a two-arm derivative, connected by a common fragment (ring). It binds to the homologous antigen with the derivatives of these five edges. IgM is also compared to spider webs. IgM responds to an antigenic impulse earlier than other immunoglobulins. IgM is also present in plasma.

Antibodies belonging to the immunoglobulin G class make up 70-85% of blood serum of animals and humans. IgG is also present in tissue fluids in addition to serum. Its molecular mass is 160,000 daltons, sedimentation constant 7S, monomer. IgG antibodies are active in the precipitation reaction, neutralization of toxins and viruses, but less active in cytolysis, slow attachment of complement. IgG is transferred from the mother to the fetus through the placenta.

There are two types of immunoglobulin A class: serum and secretory. The latter is formed in the mucous membranes (respiratory tract, gastrointestinal tract, urogenital organs) through lymphatic tissues. IgA differs from serum antibodies in that it retains the Sc glycoprotein component, which is present only in IgA binding, but also in free intestinal products and saliva. Serum immunoglobulin A is synthesized in peripheral lymph nodes, spleen, bone marrow. Its secretors are synthesized in the mucous membranes, pass into the blood through epithelial cells, and contain the secretory component of the IgA monomer molecule. IgA is important as local immunity in mucosal protection. Oral and aerosol immunization play a key role in the formation of immunity. IgA-dimer, its molecular mass is 385000, SC-component is 58000 daltons, it has the shape of a Greek letter.

Immunoglobulin D and E. IgD is poorly studied in animals, IgE is of great importance in allergic reactions.

Currently, in Uzbekistan, immunoprophylactic measures against avian influenza and Newcastle disease are carried out on the basis of general guidelines.

Research object and methods. Researches were carried out in the farm intended for raising 5000 broiler chickens, located in "Marifat" MFY, Samarkand city, Samarkand region.

The object of the study is broiler chickens and the parameters of immunoprophylaxis against Avian Influenza and Newcastle disease implemented in this farm.

Indicators of immune strength against Influenza and Newcastle disease in poultry were determined by Hemagglutination Inhibition Reaction (HATR) in the "Navobod Naslli Paranda" F/H laboratory.

Research results and their analysis. On August 2, 2023, 4,200 one-day-old broiler chicks were brought to our farm in order to conduct research on the effective immunoprophylaxis of broiler chicks raised in industrial poultry farming against avian influenza and Newcastle disease.

Blood serum was taken from every 20 chickens on days 1, 14, 21, and 42, and the level of immunity against Influenza and Newcastle disease was determined by Hemagglutination Inhibition Reaction (GATR) in the F/X laboratory of "Navobad Naslli Poultry" (Table 1).

Table-1 Against Newcastle disease of 1,14,21,42 days old broiler chicks indicators of immune strength

Ages of chicks (day)	The number of chicks on the titer of the hemagglutination inhibition reaction												
	1:2	1:4	1:8	1:16	1:32	1:64	1:128	1:256	1:512	1:1024	1:2048	1:4096	Log
1					2	4	5	3	3	3			6.0
14						2	3	5	5	4	1		8.45
21							3	6	2	6	3		9.0
42						1	1	6	5	5	2		8.9

Table-2 Indicators of immune power of 1,14,21,42-day-old broiler chicks against avian influenza

Ages of chicks (day)	The number of chicks on the titer of the hemagglutination inhibition reaction												
	1:2	1:4	1:8	1:2	1:4	1:64	1:2	1:4	1:512	1:2	1:4	1:4096	1:2
1				2	3	3	5	3	3	1			6.85
14						1	3	6	6	4			8.45
21							4	5	4	5	2		8.8
42						1	1	6	7	4	1		8.75

As a result of our research, the immune power of one-day-old chicks against Avian Influenza and Newcastle disease, i.e. passive immunity, was 6-7 log. Fourteen-day-old chicks were found to have a higher level of immunity than one-day-old chicks. Thus, we believe that the increase in immune power depends on the result of the synthesis of immunoglobulins after immunoprophylactic measures.

In Uzbekistan, great attention is paid to the immunoprophylaxis of Avian Influenza and Newcastle disease, and repeated vaccinations are carried out in the care of breeding hens.

In industrialized poultry farming, the number of poultry is rotated due to the large number of poultry and the constant intake of young birds and the slaughtering of older ones. Therefore, if there is a possibility of avian influenza and Newcastle disease field virus, the virulence of the virus on the farm may increase by continuous passage of the field virus. If this condition is observed, we may not get the desired result as a result of immune preventive measures and may lead the farm to an epizootic situation with high losses. Therefore, in this case, it is always required to provide high specific immune power in poultry.

We injected "KEMIN Mefluvac H9 ND-16 bivalent avian influenza H9N2 and Newcastle disease inactivated emulsified" vaccine into the skin of the back of mice on days 1 and 21, and on days 1 and 14, mice were injected with bivalent "boak NB La-Sota and IBC N-Aviv" 120 lyophilized mercury" were vaccinated.

Chicks were fed up to 46 days of age in compliance with all technological requirements, and on September 12-17, 2023, 97.5% were saved, and 41-46-day-old chicks with a live weight of 3-3.5 kg were delivered for meat.

Table-3 Conducted against infectious diseases of chickens immunoprophylactic measures

Age of chicks	Name of infectious disease	Vaccine Name	Execution method
1 day	Avian Influenza Newcastle Disease and Infectious Bronchitis Disease	Vaccine KEMIN Mefluvac H9 ND-16, Vaccine "Avivak NB La-Sota i IBK N-120 leofilizirovannaya jivaya"	Injection and spraying
2-6 days		Doxin (tylosin + doxycycline)	Drink with water
*** 2 times with an interval of 7 days depending on the antibody titer	Gambora disease	Vaccine "Avivak-IBB" vital dry strain "Winterfield 2512"	Drink with water
14 days	Newcastle Disease and Infectious Bronchitis	Vaccine "Avivak NB La-Sota i IBK N-120 lyophilizired and vital"	Eye drops
21 days	Avian influenza Newcastle disease	Vaccine KEMIN Mefluvac H9 ND-16,	Injection

Broiler chicks were given Doxin (tylosin and doxycycline) antibiotic for 5 days as a preventive measure with water from the age of two days.

Based on our research and observations, we believe that a high level of specific immune power will be ensured as a result of performing immunoprophylactic measures in the order shown in Table 3, that is, inactivated vaccine (Vaccine KEMIN Mefluvac H9 ND-16) at 1 and 21 days is an effective immunoprophylaxis.

It should be noted that 3 days after vaccination, pathological changes in the upper respiratory organs were observed under the influence of La Sota live vaccine, but the antibiotic Doxin (tylosin + doxycycline) given prophylactically ensures that secondary infections do not develop.

Conclusions:

1. Effective immunoprophylaxis can be done by injecting an inactivated (inactivated) vaccine 2 or 3 times every 28 days until the epizootic situation in the surrounding area moderates the risk of highly virulent field virus of the causative agent of Influenza and Newcastle disease in the care of breeding hens in industrial poultry farming.
2. Depending on the epizootic situation, this immunoprophylactic measure can be repeated.
3. In industrial poultry farming, if broiler chickens are required to be fed for 43-45 days, in the case of high virulence field virus, the causative agent of avian influenza and Newcastle disease, until the epizootic condition in the surrounding area stabilizes, broiler chickens are injected twice every 21 days with an inactivated (inactivated) vaccine. effective immunoprophylaxis is possible.
4. Taking into account the pantropic infectivity of avian influenza and Newcastle disease, it is difficult to make effective immunoprophylaxis at the expense of general antibodies (mainly IgG) at the risk of highly virulent field virus, the causative agents of these diseases.
5. Taking into account the pantropic infectivity of avian flu and Newcastle disease, in industrialized poultry farming, when the causative agents of these diseases are at risk of highly virulent field viruses, humoral immunity at high concentrations can be effectively immunoprophylaxis at the expense of IgM antibodies and IgA antibodies.
6. Although the injection of repeated inactivated (inactive) vaccine is contrary to the general instructions, by implementing this immuno-prophylactic measure, it is possible to ensure a high concentration of humoral IgM antibodies for a certain period of time.

7. Immunoglobulin M (IgM) is large, pentomer (has five arms), has the property of neutralizing ten viral antigens, while Immunoglobulin A (IgA) antibodies provide local immunity in the mucous layers of epithelial tissue.
8. Having both local and humoral immunity is an effective immunoprophylaxis in case of highly virulent field virus in industrialized poultry farming.

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