The use of Immunostimulants for the animal diseases prevention

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Abstract. Biostimulant - splenivit helps to increase the natural resistance of the body of young farm animals and reduce morbidity. To study splenivitis, groups of sows (60 heads each) were formed. The animals of the first experimental group were injected with tissue antigen, twice 20 and 10 days before farrowing, in doses of 3 and 5 ml. The animals of the second experimental group, simultaneously with tissue antigen, were injected with splenivit at a dose of 5 ml, three times, with an interval of 10 days. And also, to 122 fattening piglets - weaners: the 1st experimental group (31 piglets) was injected with splenivit intramuscularly 1 ml 3 times with an interval of 7-10 days. The 2nd group of pigs (29 heads) was injected with a non-specific gamma globulin according to the same scheme; in the 3rd group of pigs (62 heads) the above preparations were not used. Clinical observation of all piglets was carried out for 1.5 months, starting from the day of the formation of groups for fattening. For prophylactic purposes, newborn calves with gastroenteritis in the experimental group (13 heads) were injected subcutaneously with a biostimulator - splenivit, 1.0-1.5 ml, from 2-3 days of age, three times, with an interval of 7 days, in the control (7 heads) this drug did not apply. Also, the effectiveness of the stimulant - splenivit was studied on fattening calves. Experimental group (206 heads), control group (104 heads). Splenivit for the prevention of gastrointestinal diseases in animals, increases the natural resistance of the body, helps to reduce the incidence of young animals, improving growth and development and ensuring their maximum safety. To increase immunological protection, prevent gastrointestinal diseases, safety and productivity of animals, it is advisable and effective to use a biostimulator - splenivit.

1. Introduction
Reducing the resistance of farm animals causes significant damage to the economy of the production of livestock products on an industrial basis. It consists of a deterioration in health, a decrease in the productivity of all types and age groups of farm animals, a decrease in fertility and a deterioration in product quality. In this regard, the use of immunomodulators in the development and implementation of preventive and therapeutic measures is justified.

Immunomodulators are drugs that restore, when used in therapeutic doses, effective immune protection [16]. They do not cure disease by themselves but stimulate the immune system's response to the action of a pathogenic agent. The action of immunomodulators lasts a long time and is not limited to the period of illness [14]. Immunomodulators are used as part of complex treatment, in parallel with the appointment of antibiotics, antiviral, antifungal and other drugs [19].
A therapeutic strategy based on modulation of the immune response has a number of advantages over traditional antimicrobial treatment, without directly affecting the pathogen, immunomodulators do not cause the development of multidrug resistance among microbes. Due to this, their use can become a possible solution to the problem of the rapid spread of antimicrobial resistance [9, 12].

The area of use of immunomodulators in veterinary medicine is constantly expanding since the immunodeficiency states of the animal body have become almost an integral part of the life of animals. In recent years, a significant amount of research has been devoted to studying the effect of pharmacological agents on the state of the immune system. In the practice of animal husbandry, various methods of immunostimulation are known: with the help of feed means, medicines, biologically active and other substances [4]. Currently, the use of immunomodulators in agriculture is a very urgent problem.

Diseases of calves cannot be explained only by inadequate and unsatisfactory feeding of both cows during pregnancy and dryness, and the calves themselves. It is known that new-born calves are characterized by immaturity of the immune system. Immunodeficiency in new-borns is manifested primarily by the almost complete absence of antibody synthesis in the first days of life [6]. Therefore, the development of immunostimulants in order to increase the resistance of the animal organism deserves special attention.

To increase the immune status of young farm animals, the following drugs were tested: PS-6 and PS-7, which have a complex immunostimulating, antibacterial and antiviral effect. It has been proven that they promote more intensive growth and development of calves, prevention of intestinal and respiratory diseases, activation of cellular and humoral factors of nonspecific resistance of the body, in addition, their use is cost effective [17].

The use of immunostimulants ribav, oletim and chitosan against the background of etiotropic treatment contributed to the normalization of the immune system function in calves with bronchopneumonia. Improvement of immunological parameters occurred against the background of normalization of clinical signs of bronchopulmonary pathology [23, 13].

After the introduction of immunotropic drugs galavet, sodium nucleinate, myelopid, the blood parameters of the experimental animals deviated from those of the control calves. The use of myelopid increased the number of erythrocytes and haemoglobin, respectively. The haemoglobin level increased from intramuscular administration of sodium nucleinate by 10.0%. The measures taken, especially with the use of immunomodulators, contributed to the optimization of the number of leukocytes [3].

Immunostimulants are also used in pig production.

For the treatment and prevention of gastrointestinal and respiratory diseases, increase of nonspecific resistance, safety and productivity of piglets, thymus preparations [11], immunostimulant dostim [21], dodeconium [15], water-salt extract of lymphoid tissue of young animals [2] are used. The research results indicate the positive effect of the studied drug vestin, an immunostimulant of nucleic nature, on the growth rate, development and safety of piglets in postnatal ontogenesis, and indicate a more perfect mechanism of natural adaptation in experimental animals [7,8,15]. A positive effect on the organism of piglets of quaterin, fumaric acid, phenibut, and eleutherococcus extract has been established [5]. Sufficient experience has been accumulated on the use of immunomodulators in various pathologies of pigs and to enhance the body's immune response during vaccinations, such as levamisole, dibazol, etymizole, vitamins A, B, B12, E, C, trace elements, enzymes, probiotics [1,10,22].

The effectiveness of vaccinations can be increased with the help of immunocorrective agents with immunostimulating activity. Positive results were obtained with the use of methyluracil and dibazol in the immunization of pigs against pasteurellosis [7] and paliguacil in the vaccination against Aujeszky's disease [18].

Clinical practice of recent years convincingly shows that preventive work to reduce morbidity should be carried out taking into account the physiological state of animals using substances that increase the natural resistance of animals, correcting the state of the immune system [16,21].
Therefore, the use of immunostimulants, the action of which is aimed at increasing the resistance of the animal organism and specific stimulation, deserve special attention [24,25,26].

2. Purpose of research
The use of a biostimulator - splenivit, developed by the researchers of the branch, for the prevention of gastrointestinal diseases in young animals.

3. Materials and methods
On the basis of the research veterinary station currently called the Vologda branch of the V.I. Ya. R. Kovalenko was developed and patented a biostimulator - splenivit (AS for invention No. 1695869 according to MKI A 23K 1/100).

To study the effect of the biostimulant preparation - splenivit, groups of sows (60 heads each) were formed. The animals of the first experimental group were injected with tissue antigen, twice 20 and 10 days before farrowing, in doses of 3 and 5 ml. In the production of tissue antigen, the “Technology for the manufacture of inactivated tissue vaccines against viral transmissible gastroenteritis of piglets” (FGBNU VIEV named after Ya. R. Kovalenko), “Temporary instructions for the manufacture and control of tissue formol vaccine against viral enteritis of new-born piglets” Belorussian NIEV were used. The animals of the second experimental group, simultaneously with tissue antigen, were injected with splenivit at a dose of 5 ml, three times, with an interval of 10 days. One group (60 heads) was the control. And also on 122 heads of fattening piglets - weaners: the 1st experimental group (31 piglets) was injected with splenivit intramuscularly 1 ml 3 times with an interval of 7-10 days; the 2nd group of pigs (29 heads) was injected with a non-specific gamma globulin according to the same scheme; in the 3rd group of pigs (62 heads) the above preparations were not used. Clinical observation of all piglets was carried out for 1.5 months, starting from the day of the formation of groups for fattening.

For prophylactic purposes, new-born calves with gastroenteritis in the experimental group (13 heads) were injected subcutaneously with a biostimulant - splenivit, 1.0-1.5 ml, from 2-3 days of age, three times, with an interval of 7 days, in the control (7 heads) this drug did not apply. Also, the effectiveness of the stimulant - splenivit was studied on fattening calves. Experimental group (206 heads), control group (104 heads). The calves were clinically observed, their morbidity and mortality were taken into account.

4. Research results
To increase the nonspecific resistance of the body of calves in the farms of the Vologda region, a stimulant drug, splenivit, was tested.

Splenivas influenced some of the indicators of the natural resistance of new-born calves. In the experimental group, their hemoglobin content increased by 7.8%, the bactericidal activity of blood serum by 8.8%, and the number of leukocytes by 12.2%. Phagocytic index of neutrophils by 47.1, phagocytic capacity by 82.1%. The differences are statistically significant. The share of the influence of splenivitis in the general complex of reasons causing a change in the total number of leukocytes, their phagocytic capacity, and the bactericidal activity of the blood was, respectively, 40.0; 38.0; 37.0; (P> 0.95-0.99). The incidence of calves in the experimental group was 16.9% lower than in the control group, their disease was milder, and recovery came 1-2 days earlier.

The introduction of splenivite to fattening calves led to an increase in the level of neutrophils by 19.3%, the phagocytic capacity of neutrophils and the bactericidal activity of blood serum by 33.6% and 39.5%, respectively, in comparison with animals of the control group. In the experimental group, the calves fell ill on average three days later, the duration of the illness was 5.9 days shorter than in the control, the incidence decreased by 13.9%. In addition, in the control group, 60% of the animals showed relapses of the disease, while in the experimental group there were none. Splenivit contributed to an increase in average daily weight gain. The weight gain was 86+ 26 grams with fluctuations from 46 to 134 grams. The greatest increase was obtained in calves 4 - 5 months - 184
grams.

The impact on the body of the combined use of a biostimulator and tissue antigen was assessed by the indices of nonspecific resistance of sows and piglets born from them.

It was noted that in sows of the control group on the 2nd day after farrowing, the level of erythrocytes was reduced by 45.0%. The amount of albumin is reduced by 33.0%, and beta-globulins are increased by 29.0%, relative to the norm. The ratio of leukocytes / neutrophils in the leukocyte formula is 0.95, the assessment of group immunological reactivity showed that the number of animals under stress was 100.0%. The introduction of tissue antigen to animals of the first group was accompanied by an increase in the level of albumin by 11.0%. The level of beta globulins corresponded to the physiological norm. The bactericidal activity of blood serum increased by 10.5% relative to the control group. The differences are statistically significant (P> 0.95).

In the second experimental group, the use of tissue antigen in combination with splenivitis led to a significant increase (P> 0.99), gamma globulins by 17.0%, albumin by 15.0%, an increase in the bactericidal activity of blood serum by 18.0%, an increase in the level of erythrocytes by 2.3 times compared to the control group. Phagocytic capacity of neutrophils in the control group exceeded the physiological norm by 2.2 times, and in both experimental groups this indicator corresponded to the physiological norm. The number of animals under stress decreased by 50.0%.

A positive effect from the introduction of tissue antigen with splenivitis was also noted in newborn pigs. So the level of gamma globulins in piglets of the first and second experimental groups was higher than the values in the control group by 20.0% and 29.0%, respectively (P> 0.99). Phagocytic capacity of neutrophils in the control group exceeded the physiological norm by 2 times, in the first experimental group it was increased by 16.0%, in the second experimental group it corresponded to the physiological norm. Assessment of group immunological resistance showed that the introduction of splenivitis reduced the number of animals under stress 4.1 times relative to the control group and 2.3 times compared to the first experimental group.

The use of splenivit was accompanied by a 50.0% reduction in the number of stressed sows. And also, biostimulant - splenivitis in pregnant sows contributed to a decrease in stillborn piglets by 6.6%, and the yield of piglets by 2.1 piglets from each sow.

The effectiveness of the splenivit biostimulant was studied on fattening piglets. It turned out that its application to piglets increases their resistance to gastrointestinal diseases. In the experimental group for 1.5 months, not a single disease arose, and also contributed to an increase in average daily weight gain by 20.0-50.0 grams, and a decrease in piglet mortality by 13.8%.

5. Conclusion

Thus, a biostimulant - splenivit for the prevention of gastrointestinal diseases in animals, increases the natural resistance of the body, helps to reduce the incidence of young animals, improving growth and development and ensuring their maximum safety. To increase immunological protection, prevent gastrointestinal diseases, safety and productivity of animals, it is advisable and effective to use a biostimulator - splenivit.

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