ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

The aerosol appliance of preparation Nicosan.

Vasiliy Pavlovich Nikolaenko, Nadegda Arkadevna Ogeredova*, Alexander Nikolaevich Simonov, Elena Valentinovna Svetlakova, and Anatoliy Nikolaevich Kononov.

Stavropol State Agrarian University, Faculty of Veterinary Medicine, Zootekhnicheskiy lane 12, Stavropol 355017, Russia.

ABSTRACT

A new preparation Nicosan for poultry industry is developed. It belongs to the group of cationic surfactants. The material presents its aerosol usage for disinfection in hatchery during broiler farming. Normal concentration of the preparation is defined. Ecologically safe preparation Nicosan contributes to the increase of broilers hatchability to 3.5 - 4.0%.

Keywords: aerosol of preparation Nicosan, broilers, live weight, safety, concentration of the drug, disinfection, incubator, Escherichia coli, bactericidal action.

Corresponding author

ISSN: 0975-8585

INTRODUCTION

The main task of industrial poultry farming is to protect poultry health from infectious diseases and to obtain environmentally safe products. In this regard, specialists in poultry farms need to find the best way to grow it and timely carry out preventive measures [1, 2, 9, 13].Of particular importance is the sanitary culture of the industry[10, 14, 15, 16, 18]. At the same time, sanitizing facilities should not only be effective, but safe for service personnel, poultry and consumers of final products[3,4,5,6].

However, preparations containing aldehyde, glutaricdialdehyde and formaldehyde, are widely used as disinfectants in many poultry farms and poultry processing plants in the Russian Federation.

Their negative effects on humans, animals and poultry are obvious. Considering these circumstances, we developed a new generation preparation Nicosan. It consists of highly concentrated salts of four-substituted ammonium in a halide form, hydrogen peroxide and sodium bicarbonate. The preparation belongs to the group of cationic surfactants, does not contain toxic chlorine, aldehydes, phenol and other toxic substances, is environmentally safe for embryos, poultry and maintenance personnel. When shaken on the working surface, it forms a polymer film that serves as a barrier for microflora and provides a prolonged bactericidal action against gram-positive and gram-negative microorganisms. Nicosan has an obvious bactericidal effect against E. coli, Salmonella[11], Pseudomonas aeruginosa, streptococcal and mycoplasmalmicroflora [12], it shows activity against aspergillosispathogens [18] and candidamycosis [7, 8].

MATERIALS AND METHODS

The experiments were carried out in a hatchery at one of the poultry farms and in the farm enterprise of Stavropol Territory on broiler chickens of Cobb-500 cross. Initially, in the experimental and control groups there were 100 chickens at the age of 20-22 and 31-33 days. They were kept on a deep non-replaceable litter. APA aerosol generator was used for the treatment. A 0.2% aqueous solution of Nicosan was used at a rate of 2 ml per 1 m^3 of area and 30 min exposure once a day for 3 consecutive days. The control bird was treated with a 40% lactic acid solution at a rate of 20 ml per 1 m^3, according to the instructions. Bacterial contamination of the room air was determined before spraying the preparations, and then 1 hour after aerosol treatment. Next, four batches of hatching eggs were selected.

The first three batches of eggs were treated respectively with 0.1; 0.2 and 0.05% aqueous Nicosan solution, and the control lot six times with formaldehyde vapor (2 hours after the laying, after sorting in the stock, after sorting in the hatchery, 6 hours after the start of the incubation, before transferring the embryos to the hatchability, in the hatchers). After two to three hours after wet disinfection and aeration at room temperature, the trolleys with the incubation egg were placed in incubators pretreated with 0.2% Nicosan solution and with formaldehyde vapor, respectively.

After wet processing with Nicosan, a thin polymer protective film is formed on the surface of trays, internal walls of incubators, carts, and incubation eggs, which serves as an additional barrier for the causative agents of bacterial infection. Washings from the surface of the eggshell and the walls of the incubators to control the quality of the disinfection were taken before, and then 3 and 18 days after treatment. Bacteriological studies of incubation eggs and hatchery were carried out in accordance with the requirements of the "Regulations for disinfection and disinvasion of state veterinary supervision objects" (2002).

RESULTS AND DISCUSSION

Data on the bacteriological analysis of washings from the surface of the eggshell and the veterinary supervision objects of the hatchery are presented in Table 1.

Table 1: Data on bacterial eggs contamination and hatchery objects

Research term	Preparation Nicosan, %			Formaldehyde vapors (control)
	0,1	0,2	0,05	
	E.coliis stated			

ISSN: 0975-8585

Before processing eggs and objects	In 2 samples	In 1 sample	In 2 samples	In 1 sample
After disinfection: in 3 days	No infectious agent of a bacterial infection is stated			E. coli in 1 sample is marked
in 18 days	No infectious agent of a bacterial infection is stated			E. coli in 2 samples is marked
Hatchability of young poultry, %	83,0	83,4	83,5	79,5

After a single sanitation of hen hatching eggs and veterinary supervision objects with 0.1; 0.2 and 0.05-ml aqueous solution of Nicosan, E. coli was not detected, while in the control batches of eggs, Escherichiosis pathogens were stated throughout incubation.

Thus, broiler hatchability in the test lot compared to the control was 3.5 - 4.0% higher.
Bacterial contamination of air was taken into account by the method of microorganism's precipitation on Petri dishes, which were placed around the perimeter of the room at a height of 1 m (Table 2).

Table 2: The effect of Nicosan on the bacterial contamination of air in a room for poultry

Poultry age, days	Research term	The general microflora, thousand / m³		E. coli, thousand / m³	
		test	control	test	control
21 – 23	Before disinfection	71,7	80,5	41,2	65,8
	After disinfection	8,5*	45,2	12,1	39,7
32 – 34	Before disinfection	107,8	105,2	48,5	75,9
	After disinfection	15,5*	56,1	15,2*	41,7

Note * p<0,001 – the results are statistically significant compared to the control.

Nicosan in 0.2% concentration for air environment and equipment aerosol sanitation, contributed to a significant reduction in the amount of total microflora and E. coli, which ultimately positively influenced the overall clinical state of the poultry. They grew and developed in accordance with regulatory indicators, there were no deviations in clinical status. Moreover, the safety of broilers up to 37 days in the experimental group was 3% higher than in the control (Table 3).

Table 3: The effect of Nicosan after air aerosol sanitation on indicators of broiler chickens growing

Indicator	Group	
	test	control
Broilers set	100	100
Growth period, days	0 – 37	0 – 37
Body weight, g:1st day	38,0±0,1	38,0±0,1
37 days	2280±24,5*	2195±26,0*
Livability of broiler sin 37 days, %	97,0	94,0

Note *p<0,001 - the results are statistically significant in comparison with control

CONCLUSION

The economic effectiveness of Nicosan preparation lies in the price reduction of sanitation, increasing the safety of broilers and increasing body weight.

Ecologically safe preparation Nicosan for aerosol disinfection of air in premises in the presence of a bird will expand the arsenal of means that provide preventive action to infectious diseases in the herd. The hatchability of broilers increased to 3.5 - 4.0%. The obtained results make it possible to recommend the preparation to broiler poultry farming.

ISSN: 0975-8585

REFERENCES

[1] Patent «The method of sanitation of hatchery veterinary objects and incubation eggs» of 2010, Volume 23920005 RF.

[2] Patent «The disinfection method of zootechnical control objects of the hatchery and incubatory eggs, 2011, Volume 2426556 RF.

[3] Gamble, G.R., Berrang, M.E., Buhr, R.J., Hinton Jr, A., Bourassa, D.V., Johnston, J.J., Ingram, K.D., Adams, E.S., Feldner, P.W. 2017. Neutralization of bactericidal activity related to antimicrobial carry-over in broiler carcass rinse samples. Journal of Food Protection. 80(4):685-591.

[4] Glazer, A.N., and H. Nikaido, 2007. Microbial Biotechnology: Fundamentals of Applied Microbiology, Second Edition. Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, São Paulo: Cambridge University Press, pp: 576.

[5] Landrum M.A., Cox Jr N.A., Cosby D.E., Berrang M.E., Russell S.M. 2016. Treatment with a low pH processing aid to reduce campylobacter counts on broiler parts. Poultry Science. 96:1028-1031.

[6] Smith, J.E., 2009. Biotechnology, Fifth Edition. Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, São Paulo, Delhi: Cambridge University Press, pp: 280.

[7] Nikolaenko V.P., Shestakov I.N., Mikhaylova A.V. Washing and disinfection of chicken food eggs. Poultry farming. 2016; 11: 51 - 53.

[8] Nikolaenko V.P., Shestakov I.N., Mikhaylova A.V. Disinfection of hatching eggs and veterinary supervision objects of the hatchery. Poultry farming. 2016; 12:47 - 51.

[9] Ozheredova N.A., Svetlakova E.V., Verevkina M.N., Simonov A.N., Vasiliev N.V. The Influence of a Complex of Probiotic Cultures On Intensity of Development the Animals. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2016. T. 7. № 2. P. 1638-1642.

[10] Svetlakova E.V., Kononov A.N., Verevkina M.N., Ozheredova N.A., Simonov A.N. Rehydration mechanism of prokaryotic cells of the genus Salmonella by physiologically optimal diluent. Life Science Journal. 2014. T. 11. № 12s. C. 1008-1011.

[11] Trukhachev V.I., Kononov A.N., Ozheredova N.A., Simonov A.N., Svetlakova E.V. Effect Composition of Microbial Associations on Intensity Symptoms of Disease. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2016. T. 7. № 3. P. 2587-2591.

[12] Trukhachev V.I., Kononov A.N., Ozheredova N.A., Simonov A.N., Svetlakova E.V. The Mineral Composition of Ration Feeding by Sheep Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2016. T. 7. № 4. P. 435-438.

[13] Nikolaenko V. P., Tsapko A. P., Morozov V. Yu., Ozheredova N. A. Shestakov, I. N., Svetlakova, E. V., Simonov A. N., Chernikov A. N. The use of drug perbacsan for disinfection jf object of veterinary supervision. Stavropol, 2016.