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Performance Test of the Drug "Enterocol"

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Abstract

The results of the performance test have demonstrated that the drug "Enterocol" significantly reduces the morbidity of newborn lambs, improves their overall health, and ensures 98-100% safety of young animals in comparison with 26-32% loss of control animals. The obtained results suggest high curative and preventive effectiveness and safety of the drug "Enterocol". This drug can eliminate intestinal infections, increase yield, improve the epizootic situation in enterprises and significantly reduce food poisoning in humans. Having observed the curative and preventive effectiveness of "Enterocol", veterinary specialists of the mentioned regions have moved to the systematic use of this drug to prevent gastrointestinal diseases of newborn lambs. The efficient probiotic product "Enterocol" was proposed for veterinary practice. It possesses etiotropic and pathogenetic effects and is intended for prophylaxis and therapy of intestinal infections in lambs.

Keywords: Enterocol, probiotics, pathogenicity, Escherichia, microbiocenosis, bacteriocinogenic properties, infection.

INTRODUCTION

Acute gastrointestinal diseases of young animals are widely spread in Kazakhstan. According to statistical data, they occupy the first place among currently registered diseases of newborn animals in the country [1-3].

The main method against these diseases is the treatment of sick animals with antibiotics, sulfanilamide and nitrofuran preparations. However, the use of antibacterial agents often leads to the loss of normal microflora, the disruption of gastrointestinal microbiocenosis, the emergence of microorganisms with resistance to medicines and a decrease in the quality of products. In this regard, the creation of environmentally friendly microbial drugs with preventive efficiency is very important [4-7].

Practical experience shows that the prevention and treatment of gastrointestinal diseases of young animals requires substitution therapy aimed at restoring intestinal biocenosis through regulatory administration of living bacteria – normal intestinal microflora, i.e. probiotics [8-10].

In this regard, the development of new probiotic strains of Escherichia selected from healthy young farm animals with bacteriocinogenic properties is a very important and relevant task.

MATERIALS AND METHODS

This study was carried out in the laboratory of anti-bacteriological biotechnology, Biological safety department of KazNAU. Performance tests of the drug "Enterocol" from the strain E. coli 64 against gastrointestinal diseases of the lambs were performed in Aqtobe ("Anisan" enterprise), Kyzylorda ("Turtan-Ata" enterprise), Jambyl ("Kalyc-Trans-1" LLC) regions. "Enterocol" was tested on 860 newborn lambs.

EXPERIMENTAL RESULTS

Basing on the accounting documents of the Almaty, Jambyl and Kyzylorda regional veterinary laboratories, as well as our own research and observational data, it has been determined that the nosological profile of the infectious pathology of sheep at these farms includes cases of gastrointestinal diseases of the newborn lambs.

In order to investigate this pathology, we have conducted studies to define the role of opportunistic microorganisms in the diseases of sheep. We have also found several epizootological features: the dynamics of livestock morbidity, the seasonality of decease manifestations, the age barrier; the main causes, factors, ways of emergence and spreading of diseases.

The study of the distribution and incidence of intestinal infections in lambs at the regional farms has demonstrated that this pathology is very common and causes damage to pastures in the region mostly due to entero-infection pathogens, particularly escherichia, salmonella and other bacteria. The average incidence is within 30-40%, while it is only 10.5% and 13.5% according to official statistics.

Our research has shown that colibacillosis and salmonellosis tend to seasonality. The seasonality of manifestations of epizootic process is the element of short-term epizootic forecasting.

The results of our research indicate that these diseases occurred from February to May, which is apparently connected with a complex of contributing conditions (time of mass lambing, feeding level, adverse weather conditions, favourable conditions for the spreading of pathogens, etc.). These diseases were not recorded from July to January in all regions.

The results of the performance test of the drug "Enterocol" on laboratory models and on newborn lambs served as a basis for further tests directly in the working conditions.

Table 1 – Effect of the drug "Enterocol"

Enterprise	Animal Species	Animal group	Number of animals	Died		Left	
				Heads	%	heads	%
Anisan	Lambs	Experimental	240	6	2	234	98
		Control	50	14	28	36	72
Turtan-Ata	Lambs	Experimental	290	3	1	287	99
		Control	50	16	32	34	68
Kalyc-Trans	Lambs	Experimental	180	-	-	180	100
		Control	50	13	26	37	74

For this purpose, a process procedure for manufacturing of the drug "Enterocol" from the strain E. coli 64 was developed at the laboratory of anti-bacteriological biotechnology. Normative and technical documentation (specifications, a temporary instruction on drug manufacturing, and a temporary instruction on the drug usage) has been reviewed and approved by the scientific advisory council of SRIAA KazNAU.

An experimental series for testing under working conditions was manufactured. "Enterocol" was validated with the preventive purpose in Aqtobe ("Anisan" enterprise), Kyzylorda ("Turtan-Ata" enterprise), Jambyl ("Kalyc-Trans-1" LLC) regions with a high incidence of gastrointestinal deceases caused by pathogenic bacteria of intestinal group.

The drug was tested on 860 newborn lambs. The drug "Enterocol" was administered once before the first feeding, not later than 30 minutes after the birth, in a dose of 10^{10} CFU (20 ml). The results of performance tests are presented in Table 1.

Experimental animals were clinically observed: the duration of illness, recovery, and livestock livability were taken into account.

Production testing have shown that "Enterocol" significantly reduces the incidence of newborn lambs, improves their overall health, and ensures 98-100% safety of young animals at 26-32% loss of control animals. The administration of the drug with drinking water does not require much labor and costs.

RESULTS AND DISCUSSION

The obtained results indicate high curative and preventive effectiveness and safety of the drug "Enterocol".

The economic efficiency of "Enterocol" amounts to 18 tenge per head.

According to the results of the conducted studies, we received a patent for the invention of "Biopreparation "Enterocol", its manufacturing method, and the way of preventing the intestinal infections in young animals and birds (No. 25918).

Regulatory technical documentation (TC, temporary instruction on drug manufacturing and control, temporary instruction) for the drug "Enterocol" has been developed and approved by Scientific Research Institute of Animalogy Problems KazNAU.

CONCLUSION

As a result of the conducted studies, an effective probiotic drug "Enterocol" has been introduced to veterinary practice. It possesses etiotropic and pathogenetic effects and is intended for prophylaxis and therapy of intestinal infections in lambs.

The regulatory technical documentation on the manufacturing and control of the probiotic drug "Enterocol" has been developed. The patent for the invention of "Biopreparation "Enterocol", its manufacturing method, and the way of preventing the intestinal infections in young animals and birds (No. 25918) has been recieved from the Office for Intellectual Property of the Republic of Kazakhstan.

REFERENCES

[1] Bondarenko, V.M., & Shabanova, N.A. (2007). Infektsii, vyzyvaemye enterogemorragicheskimi esherikhiyami [Infection Caused by Enterohemorrhagic Escherichia coli]. *Veterinarnaya patologiya, 4*, 22.

[2] Biyashev, K., Tulemisova, Zh., Biyashev, B., & Sarybayeva, D. (2013). Prophilaxy of Gastro-Intestinal Diseases of young animals. *Journal of Animal and Veterinary Advances, 12*(22), 1645-1650.

[3] Bomba, A., Nemcová, R., Strojný, L., & Mudroňová, D. (2014). Probiotics for Farm Animals. In S. Lahtinen, A.C. Ouwehand, A. Salminen, & A. Wright (Eds.), *Lactic Acid Bacteria – Microbiological and Functional Aspects* (4th ed., pp. 634-659). CRC Press, Taylor & Francis Group.

[4] Ringdal, G., Lystad, M., & Hektoen, L. (2011). *Sauekontrollen. A˚rsmelding 2011*. Oslo: Animalia.

[5] Talan, D.A., Morgan, G. J., Newdow, M., Ong, S., Mower, W.R., Nakase, J.Y., Pinner, R.W., & Slutsker, L. (2001). Etiology of Bloody Diarrhea among Patients Presenting to United States Emergency Departments: Prevalence of Escherichia coli O157:H7 and Other Enteropathogens. *Clinical Infectious Diseases, 32*(4), 573-580.

[6] Subbotin, V.V., Sidorov, M.A. (2004). Osnovnye elementy profilaktiki zheludochno-kishechnoi patologii novorozhdennykh zhivotnykh [The Main Elements of Prevention of Gastrointestinal Pathology in Newborn Animals]. *Veterinariya, 1*, 1-6.

[7] Biyashev, K.B., Biyashev, B.K., Makbuz, A.J., & Kirkimbaeva, J.S. (2012). Opredelenie prodolzhitelnosti persistentsii bakteritsinprodutsiruyushchikh shtammov v kishechnike yagnyat [Determination of Persistence of Bacteriocin Producing Strains in Intestine of Lambs]. *Vestnik selskokhozyaistvennoi nauki Kazakhstana, 7*, 55-57.

[8] Zhao, T., Tkalcic, S., Harmon, B.G., Doyle, M.P., Brown, C.A., & Zhao, P. (2014). Fecal Shedding of Enterohemorrhagic E. coli in Weaned Calves Following Treatment with Probiotic E. Coli. *Journal of Food Protection, 66*(7), 1184-1189.

[9] Voronin, E.S. Devrishov, D.A., Esepenok, V.A., Sidorov, M.A., Fedorov, Yu.N., & Yurov, K.P. (2008). *Infektsionnye bolezni zhivotnykh rannego postnatalnogo perioda* [Infectious Diseases of Animals in Early Postnatal Period]. Moscow: Agrovet. (p. 240).

[10] Sherman, P.M., Ossa, J.C., Johnson-Henry, K. (2009). Unraveling Mechanisms of Action of Probiotics. *Nutrition in Clinical Practice, 24*, 104.