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THE IMPACT OF ELIMINATING ENVIRONMENTAL FACTORS, CREATING OPTIMAL ZOOHYGIENIC PARAMETERS, PROVIDING NUTRITIOUS FEEDING, AND IMPLEMENTING PREVENTIVE MEASURES AGAINST DISEASES ON THE VETERINARY-SANITARY QUALITY OF RABBIT MEAT

Abzoyit Turdiev, Khudaynazar Yunusov,
Bakhtiyar Bakirov, Utkirbek Rakhmonov,
"Samarkand State University of Veterinary Medicine,
Livestock and Biotechnologies, Samarkand, Uzbekistan

Annatation. The article presents the results of an experiment aimed at determining the impact of a set of measures aimed at eliminating the impact of environmental factors on rabbits, creating favorable zoohygienic parameters, providing them with nutritious food, and preventing their diseases on the veterinary and sanitary quality of rabbit meat. Tadqiqotlarda chora-tadbirlar majmuyini qo'llash so'yilgan quyon gavdasining yaxshi qonsizlanishi, parenximatoz a'zolarning hammasining iste'mol uchun yaroqli bo'lishi, go'sht tarkibidagi oqsil (20,1%) va kul (1,0%) viqdorining oshishi, suv (58,0%) va xolesterin (22,2mg%) miqdorlarining kamayishi, yog' miqdorining optimal (18,5%) darajada bo'lishi aniqlangan.

Key words. Rabbit. Ecological, zoohygienic and nutritional factors. Veterinary sanitary quality of rabbit meat.

Relevance of the Topic. In our Republic, large-scale reforms are being carried out to develop rabbit breeding, which is one of the important branches of animal husbandry. In particular, significant progress has been made in increasing the number of pedigree rabbits, enhancing their productivity and fertility, as well as developing innovative methods aimed at improving their resistance to diseases. In the Strategy of Actions for Further Development of the Republic of Uzbekistan, the tasks of "further strengthening the country's food security and expanding the production of environmentally friendly products" have been identified. In this regard, external ecological factors, unfavorable zoohygienic conditions, and inadequate feeding are considered the main obstacles. Under the influence of such negative factors, the productivity, fertility, and disease resistance of rabbits decrease; the quality of meat, skin, and fur products obtained from them deteriorates; and the rise in morbidity leads to a sharp decline in their population within a short period, which ultimately causes significant economic losses to farms. Therefore, the development of comprehensive measures to protect rabbits from external ecological factors, unfavorable zoohygienic conditions, and inadequate feeding is one of the most urgent issues today.

Degree of Investigation of the Problem. The influence of environmental factors on the organism of rabbits and the problems of metabolic disorders in rabbits have been thoroughly studied by a number of foreign scholars, including P.D. Gorizontov (1981), K.P. Danilov (1984), V.S. Alexandrova (1985), A.G. Vasilieva (1989), N.A. Balaksirev (2000), S.N. Alexandrov (2005), S.P. Zhukov (2005), M.V. Dorosh (2007), I.F. Draganov (2008), N.A. Cheremenina (2010), A. Shevchenko and L. Shevchenko (2011), Yu.A. Kalugin (2012), T.A.

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Ruleva (2016), E.V. Mironova (2017), A.V. Vostroilov, E.E. Kurchaeva, V.L. Pasenko (2018), N.A. Balakirev (2024), P.H. Dijk (1997), S.N. Hermida, M. Gonzalez, M. Miranda (2006), E.O. Ewuola (2010), G. Xiccato, A. Trocino (2010), and J. Henning (2015). From domestic scholars, U.H. Ballasov, Sh.K. Mamatiminov (2016), D.G‘. Hayitov (2019), and U.T. Qashiyev (2024) have also conducted extensive research in this field.

However, literature data indicate that under the specific climatic conditions of the Republic of Uzbekistan, in-depth research has not been sufficiently carried out to evaluate the impact of adverse ecological factors on rabbits’ organisms from clinical, physiological, biochemical, immunological, and veterinary-sanitary perspectives, as well as to develop comprehensive preventive measures against their consequences.

Research Objective. The aim of the study is to evaluate the effects of ecological, microclimatic, and feeding conditions on the organism of rabbits under the specific natural and climatic conditions of the Republic of Uzbekistan from clinical, physiological, biochemical, immunological, and veterinary-sanitary perspectives, and to develop comprehensive preventive measures to mitigate their consequences.

Research Objectives

- To evaluate the effects of ecological factors (ambient temperature and air pollution) on the rabbit organism under the conditionally adequate natural-climatic environment of Samarkand region, the technogenically extreme conditions of Navoi region, and the highly extreme conditions of the Republic of Karakalpakstan, using clinical, physiological, biochemical, and immunological criteria.
- To assess the impact of microclimatic conditions on rabbits in the conditionally adequate natural-climatic environment of the Samarkand region, with respect to clinical, physiological, biochemical, and immunological parameters.
- To determine the effects of nutritional factors on rabbits by examining clinical, physiological, biochemical, immunological, productive, and reproductive indicators.
- To identify diseases arising in rabbits as a result of unfavorable ecological, microclimatic, and nutritional conditions, and to substantiate methods for their prevention as well as approaches for conducting veterinary and sanitary examination of rabbit meat and meat products.
- To develop and introduce practical recommendations for improving productivity, fertility, and resistance indicators of rabbits, and for preventing diseases through the protection of rabbits from adverse ecological influences, the establishment of optimal microclimatic parameters for rabbitries, the creation of new feed types for rabbits of different ages and physiological stages, and the application of innovative feed additives such as probiotics and vitamin-mineral supplements.
- **Research Objects and Methods** The scientific studies were conducted during 2011–2025 within the framework of the MEGA PROJECT established under Samarkand State Veterinary Medicine, Animal Husbandry and Biotechnologies University (SamDVMCHBU). The experiments were carried out in the vivarium of the Faculty of “Veterinary Prophylaxis and Treatment,” at the Department of “Animal Nutrition Technology and Zoohygiene,” and in the “Hematology” laboratory of the Department of “Internal Non-Communicable Diseases.” In addition, field studies were conducted at the “Eshniyoz Bobo Livestock Farm” in Pastdargom district of Samarkand region, the “Ilhon Rajabov” rabbit-breeding farm in Karmana district of Navoi region, and the “Khojayli Gosht-Davkor” LLC rabbit farm in the Republic of Karakalpakstan.

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- Throughout the experiments, the number of animals, the principle of analogy, and the methodological rules of scientific research were strictly observed.

Research Results. The experimental conditions aimed at developing a set of comprehensive measures to mitigate the effects of ecological factors on rabbits, establish optimal zoohygienic parameters, ensure balanced nutrition, and prevent diseases are presented in **Table 1**.

1-jadval. **Qoyonlarga ekologik omillar ta'sirini bartaraf etish, qulay zoogigiyenik parametrlarni vujudga keltirish, ularni to'yimli oziqlantirish hamda kasalliklarining oldini olishga qaratilgan kompleks chora-tadbirlar ishlab chiqishga qaratilgan tajriba shartlari.**

Groups		Experimental Conditions
Control group		The nutritional adequacy of the diet was ensured under the following controlled conditions: ambient temperature of 20 °C, room temperature ranging from 5–15 °C, relative humidity of 65–75%, air velocity of 0.1–0.3 m/s, carbon dioxide (CO_2) concentration of 0.09–0.11%, and nitrate (NO_3) concentration of 0.05–0.010 mg/L in the room air. Under these conditions, hydroponic greens were incorporated into the diet at a level of 15% of its nutritional value (control variant – CV).
Experimental group	I	"In addition to the control variant (NV), the animals were given 1 g of monocalcium phosphate (MCP) per day together with the feed."
	II	"In addition to NV and MCP, Multivit Minerals+ was administered."
	III	"In addition to NV, MCP, and Multivit Minerals, the probiotic Innoprovet was added to the drinking water at a rate of 1 ml per 1 liter."

Upon completion of the experimental trials, 25 rabbits (5 from each group) were subjected to control slaughter. Following exsanguination, carcasses and internal organs were immediately examined through veterinary-sanitary inspection. The carcasses and organs (lungs, heart, liver, spleen, intestines, skeletal muscles – for cysticercosis) underwent organoleptic evaluation. In cases where abnormalities were suspected, tissue or organ samples were subjected to laboratory bacteriological examination for the detection of pasteurellosis, pseudotuberculosis, necrobacteriosis, tuberculosis, tularemia, myxomatosis, streptococcal septicemia, staphylococcosis (infectious mastitis), spirochetosis, fascioliasis, cysticercosis, coccidiosis, listeriosis, Aujeszky's disease, and cachexia (Table 2).

As shown in Table 2, poor exsanguination of carcasses in the control group was observed in 20% of cases. The edibility rates of internal organs were determined as follows: lungs – 80%, liver – 60%, spleen – 80%, and kidneys – 100%. The proportion of unfit organs, affected by pasteurellosis, streptococcal infection, staphylococcal infection, fascioliasis, and cachexia, was 25% on average. Additionally, the chemical composition of rabbit meat was established as: protein – 17.7%, fat – 16.0%, moisture – 60.2%, ash – 0.88%, and cholesterol – 24.5 mg%.

Table 2. Results of Veterinary-Sanitary Examination of Rabbit Meat in the Experiment

T/r	Parameters	Groups				
		Control group	Experimental group			
			I	**II**	**III**	**IV**
1	"Inspected carcass, piece(s)"	5	5	5	5	5
2	"Exsanguination: good"	4/80	4/80	4/80	5/100	5/100
	"Exsanguination: poor"	1/20	1/20	1/20	-	-

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3	"Examined organs (fit/unfit): – lungs"	4/1	4/1	5/0	5/0	5/0
	Liver	3/2	4/1	4/1	5/0	4/1
	Spleen	4/1	4/1	5/0	5/0	5/0
	Kidneys	5/0	5/0	5/0	5/0	5/0
4	"Bacteriological examination results of unfit organs: – Pasteurellosis"	1/25%	1/33,3%			
	- "Streptococcal infection"	-	-	-	-	-
	- "Staphylococcal infection"	1/25%	1/33,3%			
	- "Fascioliasis"	1/25%	1/33,3%	1/100%		1/100%
	"Cachexia"	1/25%				
5	"Meat composition: – protein, %	17,7	19,3	19,5	20,1	19,9
	Fat, %	16,0	17,4	17,5	18,5	18,7
	Moisture, %	60,2	59,0	58,2	58,0	58,0
	Ash, %	0,88	0,92	0,96	1,0	1,0
6	Cholesterol, mg%	24,5	24,1	23,0	22,2	22,5

According to the indicators of veterinary-sanitary examination, the most favorable results were observed in the rabbits of the third experimental group. In this group, no cases of poor carcass exsanguination were recorded. The edibility rate of all internal organs was uniformly 100%, and no unfit organs were identified.

The chemical composition of the meat was as follows: protein – 20.1%, fat – 18.5%, moisture – 58.0%, ash – 1.0%, and cholesterol – 22.2 mg%.

In general, ensuring dietary balance by supplementing the ration with hydroponic greens at the level of 15% of the total nutritional value had a positive effect on the quality of rabbit meat. This beneficial influence was characterized by good exsanguination, full edibility of all organs, the highest levels of protein and ash content among all experimental variants, the lowest moisture and cholesterol content, and an optimal fat level.

Conclusion

Ensuring dietary adequacy under controlled conditions (ambient temperature – 20 °C, room temperature – 5–15 °C, relative humidity – 65–75%, air velocity – 0.1–0.3 m/s, CO_2 concentration – 0.09–0.11%, and NH_3 concentration – 0.05–0.010 mg/L) and supplementing the ration with 15% hydroponic greens, as well as the inclusion of monocalcium phosphate (MCP), Novo-marks, Multivit + minerals, and the Innoprovet probiotic in prescribed amounts, formed the basis of the comprehensive program "Measures to Prevent the Decline of Productivity and Fertility and to Combat Diseases in Rabbits."

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