

Hematological Indicators of Blood in Rabbits Affected by Psoroptic Mange

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Annotation: This article highlights the changes in hematological parameters of blood in rabbits affected by psoroptic mange (a parasitic disease caused by *Psoroptes cuniculi*). According to the research results, a decrease in erythrocyte count, hemoglobin concentration, and hematocrit levels was observed in diseased rabbits. Leukocytosis was detected in the leukocytic profile, characterized by an increase in eosinophils and neutrophils and a decrease in lymphocytes. These alterations are closely associated with parasitic invasion, inflammatory processes, and intoxication in the rabbit's body. Thus, it is substantiated that in the diagnosis of psoroptic mange, hematological examinations are of great importance alongside clinical signs.

Keywords: rabbit, psoroptic mange, *Psoroptes cuniculi*, hematological indicators, leukocytosis, anemia.

Relevance of the Topic

Globally, including in our republic, adverse changes in the ecological environment have led to a significant increase in the incidence of parasitic diseases in rabbits. The main reasons for this include the lack of systematic veterinary services, non-compliance with zoohygienic rules, and insufficient preventive measures against parasitic infestations.

At present, ensuring food security is a pressing task, and increasing the efficiency of the rabbit-

breeding sector holds particular importance. Addressing this challenge requires the prevention and effective treatment of rabbit diseases. In recent years, ectoparasitic and other diseases of rabbits in our republic have been insufficiently studied by researchers.

Literature Review

Rabbit breeding is an important branch of animal husbandry, providing the population with rapidly produced, dietetic meat of high nutritional value, as well as raw materials for industry. Rabbit meat is highly digestible and rich in protein [4; pp. 273–279].

According to many researchers, significant hematological changes occur in rabbits with psoroptic mange, including a decrease in erythrocytes and hemoglobin, an accelerated erythrocyte sedimentation rate (ESR), and a sharp increase in leukocyte count [1; pp. 135–138].

Morphological and biochemical analyses of blood from rabbits with psoroptic mange have shown changes in erythrocytes, hemoglobin, ESR, leukocyte profiles, total protein, glucose, magnesium, calcium, and phosphorus levels, which are of theoretical importance [2; pp. 72–126].

It has also been reported that the body weight of infected rabbits is 20–30% lower compared to healthy ones [3; pp. 26–27].

Based on the literature and our own findings, this study investigates the hematological changes occurring in rabbits affected by psoroptic mange, both before and after treatment with acaricidal drugs.

Research Objective

To determine changes in major hematological parameters (erythrocytes, hemoglobin, leukocytes, lymphocytes, eosinophils, etc.) in rabbits affected by psoroptic mange, and to compare them with the values of healthy rabbits.

Research Object

The research was conducted on rabbits of different ages kept at the “Dargom Agro Velikan” rabbit farm in Pstdargom district, the “Oq Muskat” farm in Oqdaryo district, and the “Buriboy Mustayev Zamin Nur” farm in Bulungur district of Samarkand region, as well as on rabbits maintained by households.

Research Methods

In the study, clinical, general, and specific laboratory methods were employed.

Research Results

During the course of the study, morphological and biochemical changes in the blood of rabbits affected by psoroptosis were analyzed. The scientific experiments were conducted on the basis of analogues and divided into four groups, with three rabbits in each group. Prior to the start of the research, the clinical parameters of the rabbits—including body temperature, pulse rate, and respiratory rate—were examined.

The biochemical and morphological changes in the blood of rabbits with psoroptosis were tested at the “Bulungur Shifo” private diagnostic clinic in Bulungur district. During the disease, a decrease in erythrocyte count and hemoglobin level was observed. In addition, leukocytosis was detected in the organisms of infected rabbits (*Table 1*).

- In Group 1, the rabbits were administered Ivermectin at a dosage of 1 ml per 50 kg body weight, injected subcutaneously once every 7 days, for a total of two treatments.
- In Group 2, rabbits were treated with 20% benzyl benzoate emulsion and ointment, applied simultaneously to the affected area once every other day for a period of 15 days.

- In Group 3, rabbits received a 1:1 mixture of sulfur powder and cottonseed oil, applied topically to the affected area once every two days.
- Group 4 rabbits were left untreated and served as the control group.

In all experimental groups, both general and specific examinations were carried out regularly. Rabbits in the experimental groups demonstrated almost identical clinical signs, including drooping ears, elevated pulse rate exceeding 200 beats per minute, increased respiratory rate, loss of appetite, and decreased body weight.

Before treatment began, blood samples were taken from rabbits in all groups, and after treatment, blood samples were again collected and compared with the initial results (*Table 2*).

Hematological examination results of rabbits affected by psoroptosis (before treatment)

(*Table 1*)

Indicators	Unit of meas.t	Normal range	Group 1 (experimental)			Group 2 (experimental)			Group 3 (experimental)			Group 4 (control)		
			1	2	3	1	2	3	1	2	3	1	2	3
Hemoglobin	g/%	10-17	10,6	10,3	10,1	10,2	10,4	10,8	10,5	10,1	10,3	10,1	10,3	10,2
ESR	mm/h	2-10	7	8	8	7	8	7	7	8	7	8	7	7
Erythrocytes	million/m ³	5-10	5,7	5,6	5,5	5,8	5,6	5,7	5,4	5,2	5,1	5,5	5,1	5,8
Leukocytes	1000/mm ³	5-12 1000	13,4	13,7	13,9	13,1	13,5	13,0	13,6	13,4	13,8	13,9	13,8	13,1
Basophils	%	0-1	0	0	0	0	0	0	0	0	0	0	0	0
Eosinophils	%	1-5	6,0	6,5	6,8	6,2	6,8	6,0	6,1	6,4	6,2	6,5	6,2	6,2
Neutrophils :	%	0-5	1,2	1,3	1,5	1,3	1,4	1,2	1,2	1,1	1,2	1,3	1,2	1,3
Band neutrophils	%	0-5	4,4	4,6	4,7	4,5	4,7	4,2	5,0	5,1	5,3	4,7	4,3	4,5
Segmented neutrophils	%	30-65	32	34	35	34	33	32	36,3	36,0	36,1	35	35,1	34
Lymphocyt	%	20-45	49	47	46	48	47	49	43,7	44,0	43,5	43,7	43,5	46
Monocytes	%	1-4	5,4	5,1	5,2	5,0	5,1	5,2	7,7	7,3	7,7	5,2	5,1	5,0
Total protein	g/L	55-75	60	58	57	60	59	61	56	55	57	57	57	60
Albumin	g/L	25-40	41	40	39	42	41	43	30	31	29	39	39	41
Globulin α	g/L	7-15	17	18	18	18	18	17	5,5	5,2	5,8	18	17	18
Globulin β	g/L	5-12	22	21	22	21	22	21	11,3	11,5	11,1	16,1	15,4	16,7

Analyzing Table 1, it was observed that in rabbits affected by psoroptosis but not treated, the morphological and biochemical analysis of blood samples revealed that hemoglobin levels, erythrocyte sedimentation rate (ESR), and erythrocyte counts were slightly below the normal range. Conversely, leukocytes and eosinophils were slightly elevated, while neutrophils, including band and segmented forms, showed partial alterations. In addition, the number of lymphocytes and monocytes was found to be higher compared to normal values.

Regarding the biochemical parameters of the blood, total protein, as well as α -, β -, and γ -globulins, were elevated compared to the normal range. These findings suggest that the increase in both morphological and biochemical blood parameters indicates the activation of protective mechanisms of the organism against pathological processes and inflammation.

Hematological examination results of rabbits affected by psoroptosis (after treatment)

(Table 2)

Indicators	Unit of meas.t	Normal range	Group 1 (experimental)			Group 2 (experimental)			Group 3 (experimental)			Group 4 (control)		
			1	2	3	1	2	3	1	2	3	1	2	3
Hemoglobin	g/%	10-17	11,8	11,5	11,6	12,6	12,2	13	10,4	10,3	10,3	9,6	10,3	9,2
ESR	mm/h	2-10	5,4	5	5	3	4	3	12	13	15	26	22	26
Erythrocytes	million/mm ³	5-10	6,1	6,0	6,2	6,8	6,5	6,9	5,2	5,3	5,1	4,7	5,3	4,6
Leukocytes	1000/mm ³	5-12 1000	11,2	11,5	11,3	9,8	10,1	9,2	10,8	10,1	9,9	15,6	13,9	16,1
Basophils	%	0-1	0	0	0	0	0	0	0,5	0,7	0,6	2,3	1,8	2,5
Eosinophils	%	1-5	3,2	3,4	3,1	3,5	4,0	3,8	4	5	4,5	10,8	11,2	12,6
Neutrophils	%	0-5	0,9	1,0	0,8	0,9	0	0	1	1	1	7,2	5,9	7,8
Band neutrophils	%	0-5	3,2	3,5	3,1	2,5	2,0	2,3	4	5	5	6,7	7,5	6,9
Segmented neutrophils	%	30-65	40	38	39	27	26	28	55	58	57	50,1	52,7	54,3
Lymphocyt	%	20-45	47	49	48	61	62	60	28	27	26	19,0	18,3	17,1
Monocytes	%	1-4	4,7	4,6	5,0	6	6	6	8	7	7	4,9	4,6	4,8
Total protein	g/L	55-75	65	67	66	69	70	68	60	62	61	83,2	80,4	84,0
Albumin	g/L	25-40	45	44	46	52	50	53	33,0	34	32	24,7	25,0	23,6
Globulin α	g/L	7-15	16	17	15	13	14	13	6,0	6,2	6,1	18,4	17,0	18,8
Globulin β	g/L	5-12	20	20	21	18	19	18	12	12,3	12,1	16,1	15,4	16,7
Globulin γ	g/L	8-20	19	19	18	17	17	16	29	30	29	24,0	23,0	24,9

Analyzing the data presented in Table 2, rabbits affected by psoroptosis were divided into four groups, of which three groups were treated with the preparations mentioned above. The fourth group was left untreated and served as the control group. In the treated groups (Groups 1, 2, and 3), the morphological and biochemical blood parameters were observed to approach normal values. This indicates that inflammatory and other pathological processes in the organism showed positive changes, demonstrating the high effectiveness of the applied treatments.

In contrast, in the untreated control group, morphological and biochemical blood parameters remained either below or above the normal range, confirming the persistence of pathological alterations in the absence of therapy.

Conclusion.

The results of the study revealed that in rabbits affected by psoroptosis, treatment with Ivermectin and 20% benzyl benzoate emulsion and ointment led to the normalization of blood parameters by the end of therapy. This effect was particularly more pronounced in rabbits treated with 20% benzyl benzoate, where the recovery process occurred more rapidly. In contrast, in the control group, blood parameters significantly deviated from the normal range, indicating the persistence of pathological changes in untreated animals.

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