

Conference Paper

Productivity of Ostriches Fed with Felucen P-2 Feed Supplement

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ORCID:Yulia O. Korotkikh: <http://orcid.org/0000-0002-2937-7341>**Abstract**

This article presents the results of a study that examined the effect of Felucen P-2 feed supplement on the growth and development, blood parameters and quality of meat of black African ostriches. The experiment was conducted on two groups of ostriches: the first group received the main diet and the second group received Felucen P-2 added to the main diet. It was found that Felucen P-2 was an effective feed supplement which increased the rate of growth and development of young ostriches. For example, at the age of 90 days, ostriches of the first group had a live weight of 19.15 kg, and of the second group - 20.35 kg; at the age of 120 days, the birds of the first group had a live weight of 29.10 kg and of the second group - 32.05 kg; at the age of 150 days, the birds of the first group had a live weight of 40.35 kg and of the second group - 44.95 kg. In addition, from the age of 120 days, the significant live weight gain was observed. During this period, average daily gains were 332-453 g. The insignificant superiority of ostriches of the second group over the first one by the biological value and meat quality was determined. The ash content in ostriches of the second group was 1.1%, and in the first group it was 0.9%; the moisture content was 75.3 and 77.1, respectively; the protein content was 20.9% and 19.1%, respectively; and the fat content was 2.7% and 2.9%, respectively. In general, meat products had high quality and dietary indicators.

Keywords: ostriches, Felucen P-2, daily average gain, meat.

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1. Introduction

Recently, breeding of ostriches has become very popular all over the world. This is due to their high adaptive plasticity, unpretentiousness to the keeping and feeding conditions, as well as a high level of meat productivity and quality of meat products [1-3]. Rostov region has some experience in breeding these birds.

For normal life and reproduction, ostriches need a full-fledged and varied diet. The feed should contain protein, fat, carbohydrates, vitamins and minerals, consumed for energy generation, growth of new cells and tissues [4, 5].

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A complete diet will ensure a more complete use of nutrients and increase productivity of ostrich meat, the optimal ratio of weight gain and survival rate [6, 7]. One of such feed supplements is Felucen P-2.

The research aim is to study economic and biological characteristics and productivity of black African ostriches when using Felucen P-2.

2. Methods and Equipment

The studies were carried out in Don State Agrarian University in Rostov Regional Veterinary Laboratory, at the ostrich farm located in Aksay district of Rostov Region.

For feeding ostriches, diets corresponding to different age periods were used. We studied the growth and development rates of young black African ostrich under various diets.

For the experiment, two groups of chicks were formed. The first group - (I) - received the main diet, the second one - (II) - Felucen P-2 main diet + feed supplement at a dose of 2 grams per 1 kg of bird weight per day.

The accounting period covered the start, growth, and finish periods (the experiment began when the birds were 60 days old, and ended upon reaching the age of 360 days).

TABLE 1: Experimental scheme

Groups	Number of birds	Diet
I - control	5	Main diet
II - experimental	5	Main diet + Felucen P-2

TABLE 2: Accounting period

Period	Age, days
Start	60 – 120
Growth	121 – 210
Finish	211 – 360

The groups consisted of chicks of the same age, live weight, origin, without defects in the exterior and constitution.

Blood was taken from the strains at the beginning and mid-finishing periods to determine hematological parameters. From the hematological parameters, the amount of hemoglobin, white blood cells and red blood cells was determined. Hematological studies were performed using a Mindray hemolytic analyzer.

At the end of the experiment, in order to determine the morphological composition of the carcass and physicochemical parameters of muscle tissues, 5 ostriches aged 360 days old were slaughtered.

To determine the physico-chemical parameters of muscle tissues, samples were taken, carcasses of ostriches of the control and experimental groups were taken from the hind limbs according to GOST 51944-2002. In the muscles, pH, the protein, fat, ash, and water contents were determined [8]. In the crushed muscle tissues, the chemical composition was determined using standard laboratory methods.

3. Results

Productivity of young ostriches was estimated by their live weight and average daily gain, which were calculated by weighing ostriches once a month.

Growth and development are main indicators of the health status and productivity. These data are presented in Table 3.

TABLE 3: The growth dynamics for the black African ostrich

Period	Age, days	Group			
		I		II	
		Average live weight, kg	Average daily gain, g	Average live weight, kg	Average daily gain, g
Start	60	10.2±0.31	-	10.6±0.39	-
	90	19.15±0.16	298±2.3	20.35±0.24	325±3.0
	120	29.10±0.29	332±3.1	32.05±0.33*	390±3.5
Growth.	150	40.35±0.45	375±1.9	44.95±0.55*	430±2.5
	180	52.25±0.11	397±2.7	58.15±0.20*	440±2.2
	210	64.05±0.34	393±4.1	70.75±0.40**	453±3.9
Finish.	240	74.65±0.22	353±3.8	83.05±0.35**	410±4.0
	270	82.80±0.40	272±2.9	93.65±0.50**	353±2.5
	300	89.55±0.36	225±4.3	102.30±0.38**	288±3.7
	330	96.19±0.21	221±5.1	109.95±0.27**	255±5.4
	360	102.45±0.50	209±3.2	115.65±0.55**	190±3.4

Note: * - P < 0.05; ** - P < 0.01.

The numerical values presented in the Table indicate that the average daily live weight gain in the control and experimental groups increased with an increasing age. At the same time, the growth-stimulating effect of a feed additive was observed. In the starting and growth periods, in the second sub-experimental group receiving Felucen P-2, the average daily weight gain was higher.

In addition, it should be noted that at the age of five months, we recorded a significant increase in the average daily live weight gain. Moreover, high growth energy was observed up to the age of 8 months. During this period, the average daily live weight gain was 332-453g.

In the finishing period, the live weight of ostriches in both groups corresponded to the breeding standard. At the same time, ostriches of the second group exceeded the ones in the control group by this indicator.

3.1. Hematological indicators of ostriches

A hematological blood test is one of the most important diagnostic methods, reflecting the reaction of the blood-forming organs [9 - 11].

In the starting period, at the beginning of the growth and mid-finishing periods, blood samples were taken to determine the hematological parameters. A comprehensive blood test allows you to evaluate the general physiological condition of animals.

The blood taken for analysis was investigated in the Rostov Regional Veterinary Laboratory (Table 4).

TABLE 4: Blood counts of black African ostrich

Indicators	M.u.	Period				
		start	Growth (g)		finish (g.)	
			I	II	I	II
Red blood cells	$\times 10^{12}/l$	1.7±0.10	2.1±0.03	2.5±0.07*	2.5±0.05	2.8±0.04*
Hemoglobin	g/l	113±0.2	121.5±0.35	138±0.1**	139±0.3	147±0.4**
White blood cells	$\times 10^9/l$	19±0.8	22±0.07	24±0.03*	26±0.02	28±0.06*

Note: * - P < 0.05; ** - P < 0.01.

At the beginning of the experiment, in comparison with the end of the experiment, a smaller number of red blood cells and white blood cells was recorded in the blood.

The amount of hemoglobin was within the physiological norm. However, the use of Felucen P-2 in the diet of birds maintained the previous trends in blood counts - the amount of hemoglobin in ostriches of the experimental group was significantly higher than in the control one.

The data obtained might indicate an improvement in the oxygen supply of the organism and an increased intensity of metabolic processes in ostriches that received Felucen P-2.

3.2. Physical and chemical studies of ostrich meat

The study of interior features involved the determination of the physicochemical parameters of the muscle tissue.

By the chemical composition, ostrich meat is better than meat of other farm animals. It contains a significant amount of protein, fat, which makes it valuable in dietary and therapeutic nutrition. Ostrich meat contains protein, fat, minerals and vitamins [12-15].

The main physical and chemical parameters of muscle tissue that characterize its biological value include: water content, dry and organic matter (ash, fat, protein), and pH.

The data in Table 5 characterize the meat quality and indicate the superiority of ostriches of the experimental group over the control ones by the main parameters.

Indicators characterizing the amount of fat and protein in the muscle tissue of ostriches are crucial. The mass fraction of fat is 2.7-2.9%, and protein - 19.1-20.9%. According to literary sources, these are low indicators, using to consider ostrich meat as dietary.

TABLE 5: Physico-chemical characteristics of ostrich meat

Indicators	Group	
	I	II
Ash, %	0.9±0.2	1.1±0.1
Moisture, %	77.1±0.5	75.3±0.8
Protein, %	19.1±0.95	20.9±0.89
Fat, %	2.9± 0.3	2.7±0.5
pH	5.9± 0.05	5.8± 0.02

By the amount of ash and the pH level, no significant differences between the groups were found. However, the highest ash content was observed in meat obtained from the experimental group.

3.3. The content of certain vitamins and minerals in ostrich meat

According to the laboratory studies, the content of vitamin A in muscle tissue in the second group was 0.14 mg / kg (P <0.05) more. Vitamin A is required for normal growth and reproduction, as well as to increase the body's resistance to pathogens. Vitamin A takes part in the synthesis of a visual pigment and stimulates the growth of young ostriches.

A similar pattern was observed in the content of vitamin E: in ostriches of the second group, this indicator was higher by 0.8 mg/kg. Vitamin E is required to increase the fertility of birds, as it takes part in the maturation of follicles. In addition, vitamin E has properties of an antioxidant, it contributes to the absorption and preservation of vitamin A and carotene in the body of ostriches.

The study of water-soluble B vitamins showed that ostriches receiving Felucen P-2 exceeded the first group by the content of vitamin B1 by 0.14 mg / kg, B2 - by 0.11 mg / kg. Vitamin B1 plays an important role in metabolism, it is part of enzymes involved in the regulation of the nervous system, cardiac activity, carbohydrate metabolism. Vitamin B2 increases productivity, contributes to the correct development of the limbs.

Of the minerals, calcium and iron are of great importance. Mineral substances entering the human body with meat are absorbed in the best way. Iron is absorbed by the body by 30%, while iron contained in other products - by 10%.

Analyzing the content of calcium and iron t, it can be noted that in ostriches of the second group this indicator is higher. For example, in ostriches of the first group, its content is 0.48 mg/kg, of the second group - 0.82 mg / kg.

Thus, the use of Felucen P-2 ensures the normal growth and development of the bird, increases resistance to infections and stress. It is required for bone formation and egg shell formation. It prevents embryonic mortality.

4. Discussion

Studies on Felucen P-2 used o in the diet of ostriches indicate that it is an effective feed supplement which increases the growth and development of ostriches. When using Felucene P-2, we recorded an increase in the average daily live weight gain in young ostriches of the experimental group.

5. Conclusion

1. Felucen P-2 is an effective feed supplement increasing the growth and development of ostriches.

2. The use of Felucene P-2 in the diet of ostriches helps to increase the growth energy and average daily live weight gain. Throughout the entire growth period, the average daily gain in group 1 was 307.5 g, in group 2 - 353.4 g.

3. The maximum growth energy of ostriches is observed at the age of 5-8 months. During this period, the average daily gain was in the range of 375-453g.

4. The use of Felucen P-2 increases the level of red blood cells and white blood cells. In the starting period, the number of leukocytes is $19 \times 10^9/l$; in the growth period, in group 1 it is $22 \times 10^9/l$, in group 2 it is $24 \times 10^9/l$; in the finish period, in group 1, it is $26 \times 10^9/l$, in group 2, it is $28 \times 10^9/l$. In the starting period, the number of red blood cells is $1.7 \times 10^{12}/l$; in the growth period, in group 1 - $2.1 \times 10^{12}/l$, in group 2 - $2.5 \times 10^{12} / l$; in the finishing period, in group 1 - $2.5 \times 10^{12}/l$, in group 2 - $2.8 \times 10^{12}/l$.

Conflict of Interest

The authors have no conflict of interest to declare.

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