Asian J. Exp. Sci., Vol. 26, No. 1, 2012; 49-52

Biochemical Analysis of Blood and Meat Samples of African Ostriches *(Struthio camelus)* from Ostrich Farms around Almaty, Kazakhstan

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ABSTRACT: The primary way to improve productivity of livestock animals is based in finding the just right combination of feeding and raising technique. In Kazakhstan, ostrich farming started in 2001, and today it is a lucrative and perspective business because of low content of fat and cholesterol in the meat without the health at risk. In the present investigation, an attempt has been made to standardize the components of diet in reference to some haematological parameters and fat and protein contents in red meat. The higher % of hemoglobin and erythrocyte counts were recorded, there is 1% increase in hemoglobin in male than female. Whereas, 0.12 % increase in erythrocyte counts were recorded in male than female. The cholesterol contents in meat of ostriches were 32 mg /100 g which is lowest in comparison to other birds and edible mammalian. Therefore, ostrich meat and also feathers, leather and ostrich products are highly valued and demandable items in the world market with good untapped potential.

Key words: African ostrich, Meat, Fat, Cholesterol.

Introduction

Ostriches are easy to grow and adaptable to various climatic conditions. The average weight is approximately 120-150 kg, the height is 3 m and can live on average 75 years. The ostriches can produce every year 20-40 eggs, the weight of the egg is roughly on an average 1500g. The meat of this flightless bird is healthy food with low cholesterol. Moreover, its taste great and is similar to beef. Meat quality and blood hematology in slaughter ostrich has been described by Wolmarans (2011).Ostrich diet normally consists of the same components that is given to cows or used in poultry. The diet contains granary products, alfalfa, fruits, vegetables and other berries (Orumbay & Tanatarov, 2010, 2011). Depending upon techniques of feeding and raising ostriches, 9-12 month old chick can weight 90 kg and produce roughly 30 kg of meat as suggested by Orumbayev & Tanatarov (2009). The aim of the present study was to determine meat and blood analysis values from ostriches bred around Almaty, Kazakhstan, and obtain data that will serve as a foundation for future research and scientific work related to improvement of ostriches' productivity. A special attention should be given to this article because experiments with ostrich meat and blood have never been conducted before on such scale at the ostrich farms around Almaty, the city in south-eastern Kazakhstan. This research is also valuable because it specifies values obtained from each male and female ostrich that was part of the slaughtered stock. Such data will help to generate statistics databank about ostriches and might prove useful in future.

Materials and Methods of Research

Experiment to determine values of ostrich blood and meat samples 1. Sampling and sample preparation

The blood and meat samples of five African ostriches (3 males and 2 females) have been taken for the experiments during the slaughter during the period of 2009 - 2010. Ostriches were given unlimited amount of water and food in accordance with natural extensive method of feed. After the age of 6 months, vitamin supplements were stopped. The bird were then kept at standard ratio of diet they were slaughtered. It's important to note that the results of analysis might vary if other ratios are used with different biochemical values (Table 1).

Refer to Table 1 for the composition and biochemical data of the ratio.

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Table 1 - Standard ratio for adult ostriches

Components	**Values, %**
Corn	30
Alfalfa hay	40
Barley	20
Wheat	10
1000g contains:	
Nutritional value, units	1.3
Energy, Megajoules	10.4
Dry matter, g	858
Crude protein, g	151
Protein, g	119
Crude fat, g	28.4
Carbohydrates, g	437
Ash, g	56
Raw fiber, g	136
Carotene, mg	18.2
Vitamin D, thousands IE	92.8
Vitamin ? , mg	145
Lyzine, g	4.03
Methyonine + cystine, g	2.87
Ca, g	11.6
P, g	2.8
Na, g	20.5
Fe, mg	123
Cu, mg	5.2
Mn, g	23.4
Co, mg	0.42
Zn, mg	16.5
I, mg	0.18

After the slaughtered bird's throat has been cut, 50 ml blood samples have been taken from each slaughtered unit. The samples were put into containers with coagulant, shaken and taken to the lab for analysis.

2. Sample analysis procedures

Hemoglobin in the blood has been determined by HS-3 hemometer, and number of erythrocytes has been determined in Goryaev's chamber. The amount of phosphorus and calcium in blood samples were determined by usual photoelectron calorimeter.

50 g of meat samples have been taken from hips of each unit, put into containers with anticoagulant, shaken and taken to the lab for analysis.

10 g of meat from each sample has been used for the humidity test being dried in the heat chamber for 24 hours less than 105º C temperatures.

10 g of meat from each sample has been used for ash determination by being incinerated in the incinerator oven under 550º C. Obtained ashes have been weighted on electronic scales with precision rate of 0.0001 g.

Results and Discussion

The results of laboratory analysis of ostrich meat and blood (Tables 2 & 3) show that males tend to have higher ratio of hemoglobin. The average 1.1 rise in hemoglobin has been notice. The erythrocytes counts were also slightly raised the rise in the % is 0.12. The increase of % in hemoglobin and erythrocytes is natural, because male ostriches are generally tougher than females; they fight with each other for dominance over the flock, and are less-likely to get injured in fights or other accidents like skidding in winter. The calcium and phosphorus analysis do not show much difference between males and females because these females have not reached their breeding age and have not received additional calcium supplements which is essential for laying eggs.

Generally, males have slightly higher ratio of proteins and fat in their meat because of their active role in ostrich flock (Table 2). Such activities require much energy; also, layer of fat at some point prevents males from receiving serious injuries while fighting with other males.

By comparing ostrich meat with meat of other livestock animals (Table 4) we conclude that ostrich meat is the most dietary and has the least amount of cholesterol than meat of other livestock animals (Tanataror *et al.,* 2002 and Bratzkyh *et al.,* 2004).

Table 2 Ostrich blood analysis data

Ostriches	Variables				
	Hemoglobin, %	**Erythrocytes, mln.**	**Ca, mg/dL-1**	**P, mg/dL-1**	**Ca: P**
1- male	84.1	18.7	28	19.2	1.5
2- male	91.0	20.2	28.3	20.4	1.4
3- male	88.7	19.2	29.1	22	1.3
4- female	82.3	17.9	28.3	19.6	1.4
5- female	85.6	16.8	29.4	22.1	1.3
Average summarized	**86.3**	**18.6**	**28.6**	**20.7**	**1.4**

Table 3 Ostrich meat analysis data

Ostriches	Variables, %				
	Humidity	**Dry matter**	**Protein**	**Fat**	**Ash**
1- male	81.3	23.1	24.1	1.36	0.87
2- male	80.6	23.5	22.4	1.58	0.90
3- male	78.0	23.9	23.6	1.42	0.84
4- female	79.5	23.2	21.7	1.33	1.10
5- female	81.1	23.1	22.3	1.26	0.93
Average summarized	**80.1**	**23.4**	**22.8**	**1.39**	**0.93**

Table 4 Comparison of various kinds of meat

Variables	Ostrich	Emu	Pork	Beef	Chicken	Deer
Water, %	75- 75.4	74.0	70.0	75.0	74.0	75.0
Fat, %	1.2	1.7- 2.4	25.0	5.0- 14.7	2.5	3.3
Proteins, %	21.7	20-24	18.0-28.0	18.0-22.0	23.5	20.6
Cholesterol (mg/100 gr)	32	54-58	75-85	60-80	60-70	60-65
Energy value (kCal/100 gr)	98	106- 109	290-320	140-160	120-125	112-120

Conclusions

In this experiment we have determined the ostrich blood and meat components. Of course it would be better to conduct such experiment on large scale with at least 10-20 birds in each group and give to each group specific ratio and premixes. But because of high cost of such experiment and limited space at the ostrich farms it will be very difficult to conduct such experiment in future. Therefore, we can use the obtained values to cooperate with other ostrich researchers and use them to develop biochemical norms of ostrich blood and meat.

Acknowledgements

We are grateful to the Kazakh National Agrarian University for funding these experiments. We also thank Gennady Ozheredov from the "Love Straus" ostrich farm for cooperation with experiments and samples.

References

Bratzkyh V., Sobol A., Nefedova V. (2004): Ostriches and quails. Breeding, maintenance, business. Phoenix, Rostov-na-Donu, pp 100-103.

Orumbayev A., Tanatarov A. (2009): The role of premixes in African ostriches' ratios in conditions of south-western Kazakhstan. Proc International Scientific-Practical Conference on "Innovative development of Kazakhstan's AIC: problems and ways of solutions" Almaty, Kazakhstan, November 6, 2009, pp. 287.

Orumbayev A., Tanatarov A. (2010): Study of ostrich chicks' winter ratios. Periodical Journal of Kazakh National Agrarian University "Research, Results", "Agrouniversity", Almaty, pp. 33-34.

Orumbayev A., Tanatarov A. (2011): Role of "Toxol" premix in African ostriches' diet in Central India. Periodical Journal of Kazakh National Agrarian University "Research, Results", "Agrouniversity", Almaty, pp. 35.

Tanatarov A., Chaikovsky E., etc. (2002): Breeding, Feeding and Maintaining African Ostriches in Conditions of Kazakhstan. "Nurprint", Almaty, pp: 39.

Wolmarans J.W. (2011): The effect of transport on live weight loss, meat quality and blood haematology in slaughter ostrich.PhD. Thesis, University of Stellenbosch.