IJBPAS, August, 2014, 3(8): 1926-1933

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

EFFECTS OF DIFFERENT LEVELS OF DIETARY VEGETABLE WASTAGES AND ENERGY ON OSTRICH CHICKENS GLUCOSE AND URIC ACID

TASIRNAFAS ME[1], SEIDAVI AR[2*] AND RASOULI B[1]

Department of Animal Science, Rasht Branch, Islamic Azad University, Rasht, Iran

[*]**Corresponding Authors E Mail: alirezaseidavi@iaurasht.ac.ir**

ABSTRACT

The aim of this study was to determine the effect of 4 different levels of vegetable wastage (0, 10, 20, and 30%) and 2 different levels of energy (2500, and 2700 kcal/kg) on some blood parameters in ostrich chickens. The experimental design was 8 treatments with 3 replicates per treatment. A total of 24 ninety-day-old male ostrich chicks of the blue and black neck African race strain were allotted to 24 groups. Vegetable wastages included *Petroselinum Crispum* (51.3%), *Lepidium Sativum* (15.0%), *Spinacaia oleracea* (15.0%), *Allium Ampeloprasum* (14.0%), *Trigonella Foenum-graecum* (2.5%), and *Ocimum basilicum* (2.2%). The proximate analysis of dried vegetable wastages was determined chemically (AOAC, 1990) and were as dry matter (86.0%), gross energy (2980 kcal/kg), metabolizable energy (2330 kcal/kg), crude protein (10.34%), digestible protein (8.16%), and crude fiber (10.0%). Vegetable wastages dried and used as an ingredient of experimental diets. From obtained results, it is showed that among studied treatments, the highest level of glucose belonged to 5th treatment (2700 kcal/kg dietary energy- 0% dietary wastages), and 3rd treatment (2500 kcal/kg dietary energy- 20% dietary wastages) remained at lower level than other treatments. Meanwhile statistical differences between studied treatments for this plasma constitute were not significant (P>0.05). Among studied treatments, the highest level of uric acid belonged to 2nd treatment (2500 kcal/kg dietary energy- 10% dietary wastages). Meanwhile statistical differences between studied treatments for this trait were not significant (P>0.05).

Keywords: Energy, Vegetable, Ostrich, Blood

INTRODUCTION

Ostrich is a useful animal and their products are used frequently by human. On the other hand, vegetable wastages produced by farmers and consumers and removed

without useful usage. Vegetable wastages are a pollution potential source for environment, if they are not used efficiently. Hence it is necessary investigate effect of ostrich feeding with these wastages as potential ingredient. Meanwhile, dietary energy levels have effect on ostrich blood parameters **[1, 2]**. Blood glucose and uric acid are major constitutes of plasma and have important role in biochemical cycles of cells. These two parameters are good index for investigation on nutrient metabolism in ostrich.

Little research exists evaluating hematology of commercial ostrich chicks fed diets differing in vegetable wastages and dietary energy. The aim of the presently reported study was to determine the effect of 4 different levels of vegetable wastage (0, 10, 20, and 30%) and 2 different levels of energy (2500, and 2700 kcal/kg) on some blood parameters in ostrich chickens.

MATERIAL AND METHODS

This research project was conducted during November 2013- January 2014 for 8 weeks (56 days) at an ostrich farm located in Guilan, Iran. The first three months of chicken's birthday were devoted to their adaptation and afterwards the main experiment was started and continued for eight weeks.

The experimental design was 8 treatments with 3 replicates per treatment. A total of 24 ninety-day-old male ostrich chicks of the blue and black neck African race strain were allotted to 24 groups. Environmental conditions were similar for all treatments. The treatments were as follows:

Treatment 1: diet included energy (2500 kcal/kg%) and vegetable wastage (0%)

Treatment 2: diet included energy (2500 kcal/kg%) and vegetable wastage (10%)

Treatment 3: diet included energy (2500 kcal/kg%) and vegetable wastage (20%)

Treatment 4: diet included energy (2500 kcal/kg%) and vegetable wastage (30%)

Treatment 5: diet included energy (2700 kcal/kg%) and vegetable wastage (0%)

Treatment 6: diet included energy (2700 kcal/kg%) and vegetable wastage (10%)

Treatment 7: diet included energy (2700 kcal/kg%) and vegetable wastage (20%)

Treatment 8: diet included energy (2700 kcal/kg%) and vegetable wastage (30%)

A basal diet covering all the nutritional requirements of ostrich chickens was prepared **(Table 1)**.

Vegetable wastages included *Petroselinum Crispum* (51.3%), *Lepidium Sativum* (15.0%), *Spinacaia oleracea* (15.0%), *Allium Ampeloprasum* (14.0%), *Trigonella Foenum-graecum* (2.5%), and *Ocimum basilicum* (2.2%). The proximate analysis of dried vegetable wastages was determined chemically **[3]** and were as dry matter (86.0%), gross energy (2980 kcal/kg), metabolizable energy (2330 kcal/kg), crude protein (10.34%), digestible protein (8.16%), and crude fiber (10.0%). Vegetable

wastages dried and used as an ingredient of experimental diets.

Ethics approval for the animal trials was obtained from the Animal Ethics Committee, Islamic Azad University, Rasht Branch, Rasht, Iran. A total of 24 ostrich chickens-blue and black African race (African Blucks) of three months of age (90th days of age) were selected. Ostrich chickens were housed individually in land cages. Each cage had a single space dry feeder and a bowl drinker. Temperature, humidity, lighting, health programs, and other management programs were supplied based on standard protocols and same for all treatments.

Composition of used dietary and nutrient composition of diets used in this study is shown in the **Table 1**. Diets were developed to be were iso-nitrogenous. All the ostrich chickens were fed *ad libitum* during 56 days (8 weeks). Drinking water was offered *ad libitum*. On day 56, blood samples (10 ml) were collected from the neck vein of three ostrich chickens randomly selected from each treatment. Blood plasma was isolated by centrifugation at 3000 rpm 20 min at 4ºC and aliquots were stored at -20 ºC for analysis. Aliquots were analysed for glucose and uric acid.

Data were analyzed by analysis of variance using a 4×2 factorial design with four vegetable wastage treatments (0, 10, 20, and 30% in diet) and two dietary energy treatments (2500 and 2700 kcal/kg in diet), using a two-way ANOVA procedure. Data were analyzed by SPSS **[4]** statistical software and GLM procedure was used. The means were compared by using DUNCAN test. The results were considered significantly different when $P<0.05$.

RESULTS AND DISCUSSION

Obtained results are summarized in **Figures 1-4** and **Table 2**. From obtained results, it is showed that amount of glucose in eight studied treatments were between 220.66-268.33 (mg/dl). Among studied treatments, the highest level of glucose belonged to 5th treatment (2700 kcal/kg dietary energy- 0% dietary wastages), and 3rd treatment (2500 kcal/kg dietary energy- 20% dietary wastages) remained at lower level than other treatments. Other treatments were between these treatments **(Table 2)**. Meanwhile statistical differences between studied treatments for this plasma constitute were not significant ($P>0.05$). From obtained results, it is showed that amount of uric acid in eight studied treatments were between 10.80-14.30 (mg/dl). Among studied treatments, the highest level of uric acid belonged to 2nd treatment (2500 kcal/kg dietary energy- 10% dietary wastages), and 7th treatment (2700 kcal/kg dietary energy- 20% dietary wastages) remained at lower level than other treatments. Other treatments

were between these treatments **(Table 2)**. Meanwhile statistical differences between studied treatments for this trait were not significant (P>0.05). From obtained results, it is showed that amount of glucose in two studied levels of dietary energy were between 236.00-255.66 (mg/dl) and the highest level of glucose belonged to 2700 kcal/kg dietary energy **(Figure 1)**. Meanwhile statistical differences between studied levels for this blood parameters were not significant (P>0.05). From obtained results, it is showed that amount of uric acid in two studied levels of dietary energy were between 12.07-13.10 (mg/dl) and the highest level of uric acid belonged to 2500 kcal/kg dietary energy **(Figure 2)**. Meanwhile statistical differences between studied levels for this blood parameters were not significant (P>0.05). From obtained results, it is showed that amount of glucose in four studied levels of dietary wastages were between, 237.16-253.83 (mg/dl) and the highest level of glucose belonged to 30% dietary wastages **(Figure 3)**. Meanwhile statistical differences between studied levels for this blood parameters were not significant (P>0.05). From obtained results, it is showed that amount of uric acid in four studied levels of dietary wastages were between 11.58-13.13 (mg/dl) and the highest level of glucose belonged to 10 and 30% dietary wastages **(Figure 4)**. Meanwhile statistical differences between studied levels for this blood parameters were not significant (P>0.05).

There is some report about the effect of dietary energy and protein level on the production of growing ostriches **[5]**. Cornetto *et al* **[6]** reported stocking density and dietary energy had positive effect on ostrich (*Struthio camelus*) performance. Recently, Glatz *et al* **[7]** reported assessment of high fibre dietary sources for grower and finisher ostriches. As conclusion, dietary energy can change some blood parameters and high fibre ingredient can used without adverse effects on blood parameters of ostrich.

ACKNOWLEDGMENTS

This work was based on the M. Sc. thesis of the first author. We gratefully acknowledge the support of Rasht Branch, Islamic Azad University, Rasht, Iran.

REFERENCES

[1] Withers PC, Energy, water, and solute balance of the ostrich *Struthio camelus*, Physiol. Zool., 12. 1983, 568-579.

[2] Swart D, Mackie RI, and Hayes JP, Influence of live mass, rate of passage and site of digestion on energy metabolism and fibre digestion in the ostrich (Struthio camelus var. domesticus), South Afr. J. Anim. Sci., 23, 1993, 1-9.

[3] Association of Official Analytical Chemists, Official Methods of Analysis of the Association of Official Analytical Chemists, 15th Ed., Helrich, K. (ed.), 1990.

[4] SPSS, SPSS Base 7.5 for Windows. SPSS, Chicago, IL, 1997.

[5] Brand TS, Nell CJ, and Van Schalkwyk SJ, The effect of dietary energy and protein level on the production of growing ostriches, South Afr. J. Anim. Sci., 30 (4), 2000, 15-16.

[6] Cornetto T, Angel R, and Estevez I, Influence of stocking density and dietary energy on ostrich (*Struthio camelus*) performance, Int. J. Poult. Sci., 2 (2), 2003, 102-106.

[7] Glatz PC, Ru YJ, Hastings MY, Black D, and Rayner B, On farm assessment of high fibre dietary sources for grower and finisher ostriches, Int. J. Poult. Sci., 2, 2003, 293-299.

Table 1: Feed Ingredients and Nutrient Analysis of Used Diets During the Experimental Period

Treatment / Ingredient (gr/kg)	1	2	3	4	5	6	7	8
Metabolizable energy (kcal/kg)	2500	2500	2500	2500	2700	2700	2700	2700
Vegetable wastages (%)	0.00	10.00	20.00	30.00	0.00	10.00	20.00	30.00
Vegetable wastages (%)	0.00	10.00	20.00	30.00	0.00	10.00	20.00	30.00
Corn	42.50	34.72	27.77	17.53	46.11	35.92	28.38	19.06
Soybean Meal	18.34	17.49	15.07	11.88	17.64	14.44	6.50	1.72
Barely	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Corn gluten meal	1.00	1.00	2.00	4.00	1.00	3.00	8.00	11.00
Alfalfa	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00
Soybean oil	0.83	1.36	1.54	2.76	1.90	3.10	3.22	4.06
Ca%22P%18	1.81	1.86	1.93	2.01	1.81	1.89	2.01	2.10
CaCO3	1.99	1.97	1.96	1.94	2.00	1.98	1.97	1.96
Mineral Mixture[1]	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Vitamin Mixture[2]	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
NaCl	0.33	0.33	0.34	0.34	0.33	0.33	0.34	0.34
DL-Methionine	0.00	0.01	0.04	0.06	0.00	0.00	0.00	0.01
Lysine-Hydro-Chloride	0.20	0.26	0.36	0.48	0.21	0.34	0.58	0.75
Zeolite	4.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	100	100	100	100	100	100	100	100
Price (Rial/kg)	14520	13850	13340	13150	14740	14490	14340	14130
Metabolizable energy (kcal/kg)	2500	2500	2500	2500	2700	2700	2700	2700
Crude protein	17.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00
Calcium (%)	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
Available phosphorus (%)	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Sodium (%)	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Crude fiber (%)	7.10	7.88	8.57	9.15	7.15	7.72	8.07	8.57
Lysine (%)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Met+Cys (%)	0.53	0.50	0.50	0.50	0.53	0.51	0.51	0.50

[1] Ca(IO3)2: 200.4 mg/kg; Se: 40 mg/kg; CuSO4: 3000 mg/kg; Fe2(SO4)3: 4000 mg/kg; ZnO: 14025667 mg/kg; MnO: 20000 mg/kg; NaCl: 54015 mg/kg; MgO: 2021 mg/kg; CoSO4: 80 mg/kg; S: 40095 mg/kg

[2] Vitamin A: 1800000 IU/kg; Vitamin B1: 300.86 mg/kg; Vitamin B2: 1400 mg/kg; Vitamin B3: 2000.18 mg/kg; Vitamin B5: 10000.745 mg/kg; Vitamin B6: 800.66 mg/kg; Vitamin B9: 300.2 mg/kg; Vitamin B12: 2 mg/kg; Vitamin K3: 400 mg/kg; Vitamin D3: 400000 IU/kg; Vitamin E: 4000 IU/kg; Vitamin H2: 4 mg/kg; Vitamin C: 4000.59 mg/kg; Coline chloride: 40200 mg/kg; Antioxidant: 1000 mg/kg

Table 2: Hematological Parameters Mean (±SEM) of Ostrich Chickens at Successive Weeks of Experiment Affected the two Different Levels of Dietary Energy and Four Different Levels of Dietary Vegetable Wastages[*]

Trait / Treatment	Glucose (mg/dl)	Uric Acid (mg/dl)
Energy (2500 kcal/kg)- Vegetable wastage (0%)	230.66[a]±15.80	12.33[a]±1.11
Energy (2500 kcal/kg)- Vegetable wastage (10%)	240.33[a]±15.80	14.30[a]±1.11
Energy (2500 kcal/kg)- Vegetable wastage (20%)	220.66[a]±15.80	12.36[a]±1.11
Energy (2500 kcal/kg)- Vegetable wastage (30%)	252.33[a]±15.80	13.43[a]±1.11
Energy (2700 kcal/kg)- Vegetable wastage (0%)	268.33[a]±15.80	12.70[a]±1.11
Energy (2700 kcal/kg)- Vegetable wastage (10%)	245.33[a]±15.80	11.96[a]±1.11
Energy (2700 kcal/kg)- Vegetable wastage (20%)	253.66[a]±15.80	10.80[a]±1.11
Energy (2700 kcal/kg)- Vegetable wastage (30%)	255.33[a]±15.80	12.83[a]±1.11

[*] Means (± standard error of means) within each column of dietary treatments with no common superscript differ significantly at P<0.05

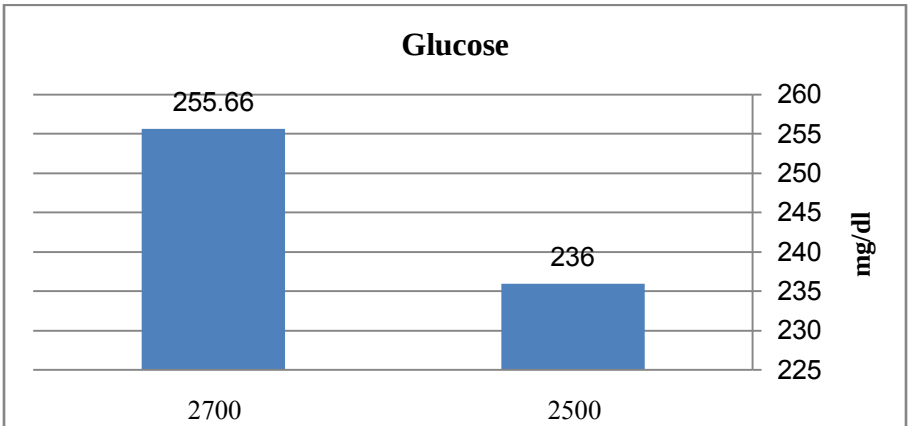

Figure 1: Effect of Dietary Energy Level on Blood Glucose

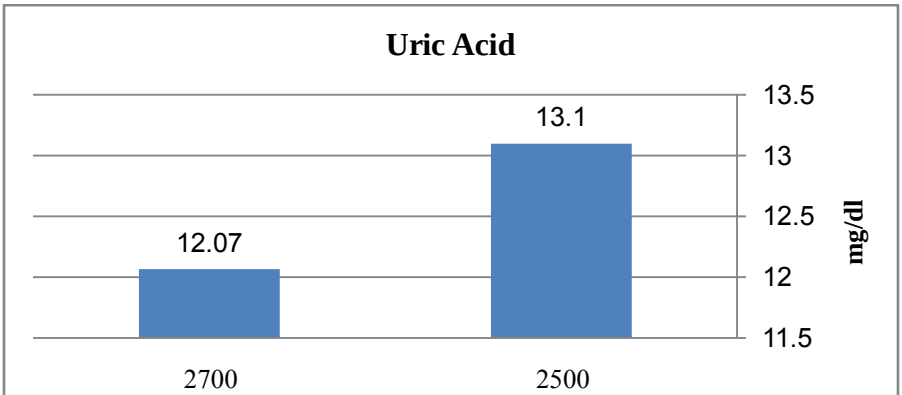

Figure 2: Effect of Dietary Energy Level on Blood Uric Acid

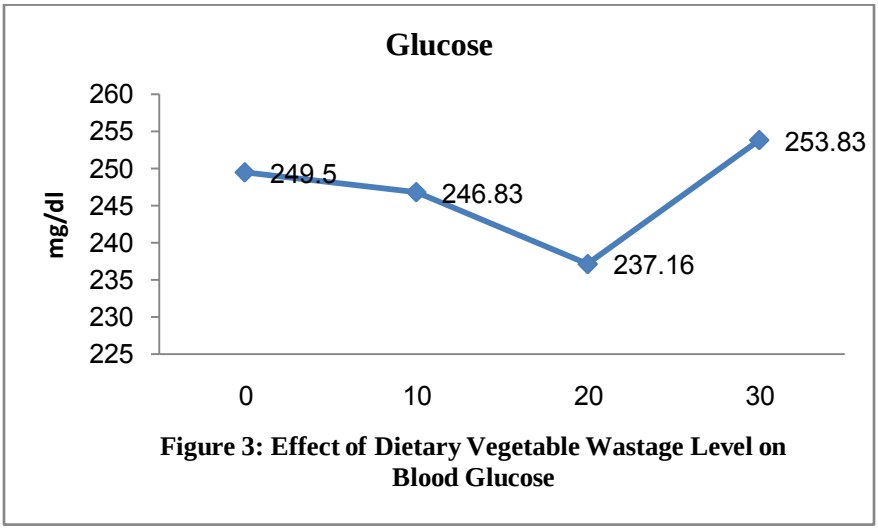

Figure 3: Effect of Dietary Vegetable Wastage Level on Blood Glucose

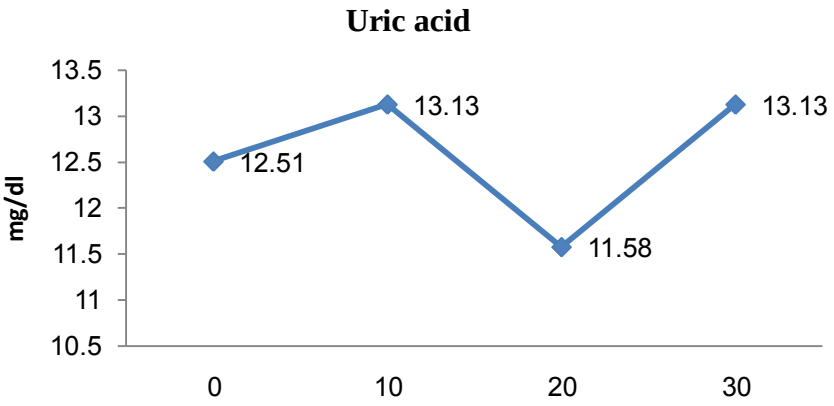

Figure 4: Effect of Dietary Vegetable Wastage Level on Blood Uric Acid