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Original Research

Predicting of some productive traits of the meat broilers Ross 308 depending on the level of potassium in the blood

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ABSTRACT:

The study was conducted in the poultry field of the department of animal production, College of Agriculture, University of Baghdad in Abu Ghraib (20 km west of Baghdad) for the period from 15.10.2017 to 27.11.2017, in order to measure the level of potassium in the blood of 100 birds from Ross 308 meat breeds and its relation to production performance through the adoption of correlation coefficient and regression or by dividing the birds according to the levels of potassium in the blood to three categories (low below 8 and medium 8-10 higher than 40 mmol/l) and level potassium in the blood and two periods (14 days and 35 days of the age of birds) and the impact of some of the qualities of productivity. The results of the present study showed a significant difference in the level of potassium in blood and measured at the age of 14 days on average body weight and weight increase, as well as a significant difference in some dimensions of the body according to the level of potassium in the blood at 14 days for the categories of potassium low, medium and high. And a negative correlation in the level of potassium in the blood at the age of 14 days with body weight and rate of weight increase, positive correlation in the level of potassium in the blood at the age of 14 days and measured dimensions of the body.

Keywords:

Potassium, Decline, Body weight, Body dimensions, Broiler.

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INTRODUCTION

The poultry industry is one of the most successful industries in the world and agricultural production increases 2 % during the year while the ratio is the increase 8% of poultry production (Mehta and Nambiar, 2015). There is an increase in the demand for white meat products as this is accompanied by reduced body immunity and increased chances of various diseases (Jatau *et al*., 2014). There is a need for birds mineral element to achieve rapid growth and increased production and the lack of these elements or some causes a deterioration in the health of birds, which is reflected in the performance (Jatau *et al*., 2014). For this reason, research and studies have tended to find solutions to these problems to improve the growth of the meat breeds, increase the live weight, improve food conversion factor and improve the ability of the birds to be immunized through the use of certain dietary supplements (Swiatkiewicz *et al*., 2014). Some food additives, especially mineral elements, promote and protect tissues from damage because they are antioxidants (Ibrahim, 2013).

The mineral elements, including potassium play a role in reproduction, immunity and other vital processes (Yatoo *et al*., 2013). Studies have shown that potassium is a key element of humans and is used as an addition to poultry diets. It is a rare element that plays a major role in the metabolism of minerals, a metal found in foods. It is also an electrolytic solution that manages electrical pulses throughout the body. Produced naturally from the body. Potassium is essential for the functioning of the kidneys while low body levels result in irregular contractions and abnormal electrical form. This element is required to work in the outer membranes of the muscle cells of the heart. These channels are open to respond to voltage changes and are responsible for ending the potential of work and contractions during the rebuilding of bonds hyperglycemia causes low electrical conduction and often leads to heart palpitations and disruption of the rhythm. Potassium has been identified as essential nutrients in feeding different animals, including domestic birds. Potassium is essential for the life of small animals that may fail to grow and die within a few days when the diet is very deficient in potassium. There is a strong evidence that this ingredient lowers blood pressure, whether consumed primarily in foods such as potassium bicarbonate or as a dietary supplement. The form of potassium chloride or other potassium salt (NRC, 2005; He and MacGregor, 2008; Molero, 2007).

The heat stress increases the secretion of potassium through urine, which leads to a decrease in plasma potassium (K). This results in an increase in bicarbonate, which is eliminated by urine which pulls other ions such as Na^+, Ca^+, Mg^+, K^+. These results in an imbalance of the pH of the blood (Lin, 2006). The objective of the present study is to measure the level of potassium in the blood of a sample of the Rose meat broiler and recorded the production performance, as well as the study of the correlation of the potassium level with the different qualities and the regression of each potency or potency level of the potassium at the age of 14 and 35 day and dividing the sample into three groups according to the level of potassium (low - medium - high) to study their effects in the production traits for the purposes of selection.

MATERIALS AND METHODS

This experiment was conducted in the poultry field at the department of animal production in the College of Agriculture, University of Baghdad for the period of 15/10/2017 to 27/11/2017, 450 chicken frisk of belonging to the breed Ross 308 was used for the experimentation. They were immunized and given all vaccines during the duration of breeding and continued to 35 days. The birds were housed in a hall according to the system of closed education 'as the birds were numbered as metal wing numbers and take the

Table 1. Percentages of the ingredients used in the study and their chemical composition

S. No	Feed composition	Starter 1 - 10 day	Grower 11 - 24 day	Finisher 24 - 35 day
1	Yellow maize rods	10.1	12	16.5
2	Stuffed wheat	50	50	50
3	Soybean Meal 48 %	30	26	21.4
4	Proteins Center 1)	5	5	5
5	Sunflower oil	2.9	5.2	5.3
6	Limestone	0.9	0.9	0.9
7	Calcium diphosphate DCP	0.7	0.5	0.5
8	Food salt	0.2	0.2	0.2
9	A mixture of vitamins and minerals (2)	0.2	0.2	0.2
	Calculated chemical analysis (3)			
10	Raw protein (%)	23	21.25	19.4
11	Representative energy calculated (kcal / kg feed)	3003	3153	3200
12	Lysine (%)	1.26	1.1	1.0
13	Methionine (%)	0.48	0.45	0.43
14	Cysteine (%)	0.36	0.34	0.31
15	Methionine + Cysteine (%)	0.85	0.796	0.75
16	Argene (%)	1.28	1.15	1
17	Calcium (%)	0.85	0.80	0.78
18	Phosphorus (%)	0.43	0.4	0.4

(1) Proteins Type Center BROCON - 5 SPECIAL W . Each kg contains: 40 % Crude protein, 5 % Fat, 2.2 % Fibers, 4.2 % Calcium , 4.68 % Phosphorus, 3.85 % Lysine , 3.7 % Methionine, 4.12 % Methionine + cysteine , 2.5 % Sodium, 2107 Kilogram of energy / kg of energy represented, 20000 IU vitamin A , 40000 IU vitamin D3 , 500 Vitamin mg E , 30 Vitamin mg K3 , 15 Vitamin mg B1 , 140 Vitamin mg B2 , 20 Vitamin mg B6 , 10 Folic acid amalgam,100 Micro-gratin biotin, 1 Iron oxide, 100 Copper amalgam, 1.2 Manganese mg, 800 Zinc amalgam, 15 Amalgam, 2 Selenium mg, 6 Cobalt amalgam, 900 Oxidizing amalgam BHT).
(2) A mixture of vitamins and minerals. Each kg contains: vitamin A (500 IU), international unit D3 (600), amalgam E (10) , amalgam K3 (2) , amalgam B1 (2), amalgam B2 (2), amalgam B6 (2), Microgram B12 (5), amalgam C (10), Mg niacin (15), Micro-folic acid (500).
(3) According to the chemical analysis of the ellipsoid according to NRC (2005)

measurements of the body individually with the provision of temperatures (32-34 %) in the first week of age, which was reduced by 2°C per week until it reached a normal atmospheric temperature suitable for chicken growth (18-21°C) and the hall were ventilated using fans to pull the air and the hall is equipped for continuous lighting 23 h/day. The water was freely available, and the birds were fed with the food (s) as shown in the Table 1. The experiment was carried out according to the complete random design CRD and the averages were compared using Duncan test (Duncan, 1955).

RESULTS AND DISCUSSION

The results of the current study Table 2 showed that the level of potassium in the blood and the measurement at the age of 14 days was not significant on the body weight rate at the age of 2 and 3 weeks, but the differences were significant ($P<0.05$). At the age of 28 days, with the lowest body weight (1245.62±28.23 g) in the blood of the meat broiler with a potassium level below 8 mm/l, with the lowest body weight in the third week (1196.35±20.61 g) with the level of a potassium 8 -10 mmol/l. The mean body weight at the end of the fifth week was 1658.48±48.89, 1538.45±29.69 and 1541.95±33.46 g for meat breeds with potassium levels

Table 2. Effect of potassium level in blood at 14 days on average body weight weekly

S. No	Potassium level (mmol/l)	Weekly bodyweight rate ± standard error (g)			
		Second week	Third week	Fourth week	Fifth week
1	Less than 8	411.81 ± 8.77	763.14 ± 15.16	1245.62 ± 28.23[a]	1658.48 ± 48.89[a]
2	8-10	39.7.23 ± 5.60	737.83 ± 12.23	1196.35 ± 20.61[b]	1538.45 ± 29.69[b]
3	More than 10	411.21 ± 9.36	782.32 ± 24.98	1232.00 ± 54.07[ab]	1541.95 ± 33.46[b]
4	Moral level	NS	NS	*	*

* (P<0.05), ** (P<0.01), NS : Not significant.
The averages with different letters within the same column vary significantly between them.

of less than eight, and for class 8-10 with more than 10 mmol/l respectively and the differences were significant (P<0.05). And in favor of the sample of meat breeds in the lowest category in the level of potassium in the blood balanced in the second and third categories .

These results, especially with age, showed that the eggs that achieved the highest body weight have a low level of potassium in the blood and may be indicative of some important roles of potassium in the metabolic processes, which reflects negatively on the level of blood as well as the possibility of high blood pressure in Birds are overweight due to loss of potassium in the urine.

Table 3 showed the direction of results of the effect of potassium levels in the blood on the rate of increase was similar to what it is the results of the rates of body weight referred to in the Table (2-4) as the differences were not significant at the second and third week, as well as the fourth week, while the differences were significant (P<0.05). As of the end of the fifth week, as well as the total increase in weight, the mean weight increase was 412.86±28.69 and 1618.05±38.68 g at the end of the fifth week and the total weight increase and the low potassium level (less than 8 mm/l), which is a sign of some important roles of potassium in the metabolic processes, that is reflected negatively on the level of blood, as well as the possibility of high blood pressure in birds weight as a result of the loss of potassium in the blood, in addition to the potassium participates. In many metabolic processes, neurosurgery, contraction and excretion of muscles are also involved in cell volume regulation (Their, 1986).

Table 4 shows the effect of potassium level in the blood at 14 days on measured body dimensions, length of body, length of the sheath, body circumference, chest circumference, leg length and thigh circumference at 21 days on looking at the calculation between the rates according to the level of potassium these results are contrary to what they have reached (Ragaa and

Table 3 . The effect of the level of potassium in the blood at the age of 14 days on average weekly increase of gravimetric

S. No	Potassium level (mmol / L)	Weekly mean increase rate ± Standard error (g)				
		Second week	Third week	Fourth week	Fifth week	Total weight increase
1	Less than 8	249.28±8.43	351.33±12.98	482.47±29.24	412.86±28.69[a]	16.18.05±38.68[a]
2	8-10	241.43±4.55	340.60±10.11	458.52±12.04	342.10±15.81[ab]	1498.45±29.59[b]
3	More than 10	23.21±9.21	371.11±21.16	44.33.68±38.33	309.94±32.95[b]	1501.26±43.53[b]
4	Moral level	NS	NS	NS	*	*

* (P<0.05), ** (P<0.01), NS : Not significant.
The averages with different letters within the same column vary significantly between them.

Table 4 . The effect of potassium level in the blood at the age of 14 days on the dimensions of the body at the age of 21 days

S. No	Potassium level (mmol / l)	Mean ± standard error (cm)					
		Body length	Length of the shear bone	Body circumference	Chest circumference	Leg length	Thigh circumference
1	Less than 8	40.00 ± 0.25	12.24 ± 0.21	30.76 ± 0.24	16.05 ± 0.17	22.86 ± 0.20	11.61 ± 0.25
2	8-10	39.97 ± 0.14	12.02 ± 0.12	30.5 ± 0.16	16.02 ± 0.12	22.83 ± 0.10	11.75 ± 0.13
3	More than 10	39.58 ± 0.34	11.89 ± 0.21	31.21 ± 0.34	16.32 ± 0.20	22.68 ± 0.35	12.16 ± 0.27
4	Moral level	NS	NS	NS	NS	NS	NS

*(P<0.05), **(P<0.01), NS : Not significant.

Korany, 2016). They found that there was a significant increase (P<0.05) in proportion to the weight of the chest and thigh.

Results given Table 5 showed that the length of the body dimensions, the length of the sternum, the perimeter of the body, chest circumference and thigh circumference at 28 days were not significantly affected by different levels of potassium in the blood of broiler chickens aged 14 days, while the contrast was significantly (P<0.05) affected. In the length of the leg, with a rate of 22.57±0.22 and 22.15±0.17 cm at the level of potassium less than 8 and 8-10 mm/l, respectively, while lower when the level of potassium in the blood is more than 10 mm/l and by 20.79±0.44 mm/l. This is contrary to (Tohru *et al.*, 2011) who stated that the addition of 1% dietary supplements KDF leading to a significant increase in the muscles of the chest and muscle thighs, feet and wings.

Table 6 shows that the length of the body and the length of the shear length at the age of 35 days for the sample of the broilers were not significantly affected by the level of potassium in the blood at the age of 14 days, while the differences were significant (P<0.05) (43.48±0.22 cm) when the potassium level was less than 8 mmol/l. The lowest rate (41.52±0.74 cm) for the birds with the potassium level was more than 10 mmol/l. Medium-level birds with the potassium level (8 -10 mm/l) was found between the two (42.25±0.14 cm). There was a significant variation (P<0.05) in the vicinity of the chest at 35 days difference the potassium level in the blood at the age of 14 days, and the circumference of the chest 22.14±0.17 and 22.06±0.09 cm when the potassium level is less than 8 and 8-10 mm/l while the lower chest circumference rate in the case of high potassium level in the blood of more than 10 mm/l and the average was 21.47±0.36 cm. While the differences were not significant for the leg length of the chicks at the age

Table 5 . The effect of potassium level in the blood at the age of 14 days on the dimensions of the body at the age of 28 days

S. No	Potassium level (mmol / L)	Mean ± standard error (cm)					
		Body length	Length of the shear bone	Body circumference	Chest circumference	Leg length	Thigh circumference
1	Less than 8	45.00 ± 0.60	13.52 ± 0.19	35.71 ± 0.54	20.85 ± 0.23	22.57 ± 0.22[a]	15.52 ± 0.23
2	8-10	43.68 ± 1.23	13.28 ± 0.13	35.30 ± 0.33	20.40 ± 0.14	22.15 ± 0.17[a]	15.61 ± 0.16
3	More than 10	45.05 ± 0.75	13.10 ± 0.23	35.78 ± 0.66	20.16 ± 0.41	20.79 ± 0.44[b]	15.31 ± 0.35
4	Moral level	NS	NS	NS	NS	*	NS

*(P<0.05), NS : Not significant.
The averages with different letters within the same column vary significantly between them

Table 6 . Effect of potassium level in blood at age 14 days on body dimensions at 35 days

Potassium level (mm / l)	Mean ± standard error (cm)					
	Body length	Length of the shear bone	Body circumference	Chest circumference	Leg length	Thigh circumference
Less than 8	49.81 ± 0.16	15.47 ± 0.19	43.48 ± 0.22[a]	22.14 ± 0.17[a]	23.90 ± 0.24	16.09 ± 0.11[a]
8-10	49.73 ± 0.09	15.30 ± 0.09	42.25 ± 0.14a[b]	22.06 ± 0.09[a]	23.73 ± 0.15	16.08 ± 0.09[a]
More than 10	49.05 ± 0.75	15.05 ± 0.29	41.52 ± 0.74[b]	21.47 ± 0.36[b]	23.58 ± 0.42	15.63 ± 0.30[b]
Moral level	NS	NS	*	*	NS	*

*(P<0.05), NS : Not significant.
The averages with different letters within the same column vary significantly between them.

of 35 days according to the level of potassium in the blood at the age of 14 days, the differences were significant (P<0.05). In the vicinity of the thigh, where the maximum rate at the level of potassium was less than 8 mmol/L (16.09±0.11 cm) or at the level of potassium 8-10 mmol/l (16.08±0.09 cm), while the rate was lower in the potassium level is more than 10 mmol/L and is 15.63±0.30 cm. The effects of some dimensions of the body, especially the circumference of the body, chest and thigh of the chicks at the age of 35 days may be attributed to the difference in the level of potassium in the blood at the age of 14 days, and the high dimensions at the level of low potassium and then average as found in this study.

CONCLUSION

We conclude from the results of this experiment the level of potassium in the meat broiler sample Ross 308 was within the normal range for this trait in different types of chicken, and that the differences are highly significant in the distribution of Ultra Cape genetic ratios obtained. A gal house here was within the middle class, and it turned out that the level of potassium in the blood at the age of 14 days had a significant effect on the rate of the body weight and the rate of increase in the weight at the age of 4 and 5 weeks, reflecting the importance of this relationship to predict the growth or productive performance .

In addition to the level of potassium, in the blood at the age of 14 days it has a significant effect on most of the body dimensions that it couldn't important metrics for a number of subsequent attributes of productivity, especially the weight and the rate of weight gain.

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