



IMPACT OF DIFFERENT LEVELS OF IRON SULPHATE SUPPLEMENTATION ON THE GROWTH OF CHICKS

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Abstract

An experiment was conducted to evaluate the effect of different levels of iron (40, 60,80, 100 mg) on bodyweight, weight gain, feed intake and feed conversion ratio of broiler chicks. There were four treatments and the control without supplementation . Performance of broiler chicks evaluated on the basis of body weight, gain in weight, feed intake and feed conversion ratio for five weeks. the results showed indicated that there was significant influence of treatments on the performance of broiler chicks based on body weight and gain weight and feed in take difference amount the fortified diets and the control .the highest mean body weight was T1(2380g) and highest mean gain weight was T1(2336g) and highest mean feed intake was T1(4600g) .the feed conversion ratio was no significant difference amount the fortified diets and the control. As the results showed indicated that there was no significant between treatments(T1,T2,T3,T4) .It was found that the supplementation of the diets with iron allowed a healthy, positive growth performance of the birds since there was no mortality. It could be considered as a good option to fortify broiler diets in order farmers to produce healthy broilers.

Keywords: Iron, Chicks, Bodyweight, Weight gain, Feed intake, FCR

1. Introduction

The Poultry chicken meat production plays a large part of food security in the face of the rapid increasing world population. It is critically important for this industry to continue to provide a great deal of a person's daily animal protein requirement. Growth of the broiler industry is characterized as robust but volatile (Annual Report, 2011). However, a major concern is the need to improve the quality of meat and self-sufficiency. Consequently, the use of dietary alternatives, such as iron, has been recommended to enhance performance of broiler chicks. It is well known that trace minerals in basal diets affects growth performance, immune responses, and meat quality (Yang et al, 2011). Iron can correct or prevent anaemia, in addition to being directly involved in haemoglobin functions (McNaughton and Day 1979). Iron deficiency anaemia is a common nutritional deficiency and Ferrous fortification of diets is necessary to alleviate this problem's deficiency of Fe may result from inadequate intake, for example, a high cereal diet low in animal protein or inadequate absorption, for example, gastrointestinal disturbances such as diarrhoea or intestinal disease, as well as from excessive loss of blood (Broiler



Nutrition, 2007). Therefore, an experiment was conducted to determine the effect of different levels iron on the growth performance of broilers chicks.

The Study Area Location

The study area is located in the lab of small animal in University of Azzaytuna –Tarhona-libya.

1.2. Climate

The study was between spring and summer the climate during study was dry and hot

2. Material and Methods

The one hundred fifty (150) day old broiler chicks of the same hatch were procured and reared in battery type cages. Each day old chick was weighed and distributed randomly among the 5 treatments. There were 30 chicks, referred to as 3 replications, per treatment. The production cycle was up to 5 weeks after hatching. Chicks were fed with self-prepared standard broiler starter ration from day 1 to day 21 (3weeks) and then standard broiler finisher ration from day 22 to day 35 (4th and 5th weeks). The two types of ration (starter and finisher) were supplemented with different levels of iron sulphate (FeSo₄) It was purchased ready (Table 1). The ration was fed *ad lib* to the birds. Data on body weight was recorded weekly to determine growth rate and weight gain of the chicks. To estimate the weekly feed consumption of the chicks, the weight of each feed bin was recorded weekly. The original weight of the bin was subtracted from the weight obtained each week to determine weight of feed consumed by the chicks. All broilers were offered with clean drinking water to be taken at all times.

Table (1) Treatments used in the experiment

Treatment	Level of supplements
T0	Control without Iron sulphate
T1	40 mg/Kg Iron sulphate
T2	60 mg/Kg Iron sulphate
T3	80 mg/Kg Iron sulphate
T4	100 mg/Kg Iron sulphate

3. Results and Discussion



The mean body weight of day old chicks (DOC) for treatments T0 to T4 was 42.67, 44.00, 46.00, 45.33, 48.00, , respectively.

3.1. body weight:

the mean body weight of five-week old chicks ranged from 2.00kg to 2.380 kg. The mean body weight (kg) of five-week old chicks for treatments T0 to T4 was 2.00, 2.38, 2.35, 2.37 and 2.34, respectively. There were significant differences ($p \leq 0.05$) among the treatments figure(1). The lowest mean body weight was 2.00 kg for treatment T0 and the highest was from T1 with 2.38 kg .



Figure (1) the mean body weight (kg) of five-week old chicks

3.2. Weight gain:

the average weight gain of five-week old chicks ranged from 1957.33 kg to 2.336 kg. The mean weight gain (kg) for each treatment from T0 to T4 was 1957.33, 2.336, 2.304, 2.324 and 2.292, respectively. There were significant differences ($p \leq 0.05$) among the treatments. The lowest mean weight gain was 1957.33 kg from T0 and the highest mean weight gain was 2.336 kg from T1.



Figure (2) the mean weight gain (kg) of five-week old chicks

3.3. feed intake:

The average feed intake of five-week old chicks ranged from 3.91 kg to 4.685 kg. The mean feed intake (kg) for each treatment from T0 to T4 was 3.91, 4.600, 4.580, 4.685 and 4.455, respectively. There were significant differences ($p \leq 0.05$) among the treatments. The lowest mean feed intake was 2.91 kg from T0, while the highest was 4.685 kg from T3 .

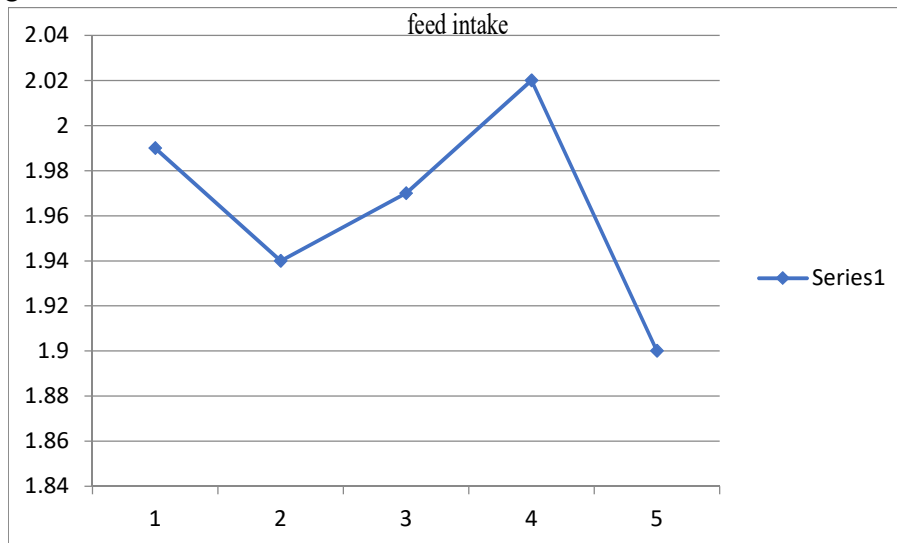


Figure (3) the mean feed intake (kg) of five-week old chicks



3.3. Feed conversion ratio:

The feed conversion ratio of five-week old chicks had a mean range from 1.90 to 2.02. The average feed conversion ratio for each treatment from T0 to T4 was 1.99, 1.94, 1.97, 2.02 and 1.9, respectively. There were significant differences ($p \leq 0.05$) among the treatments. The lowest mean feed conversion ratio was 1.90 from T3, while the highest was 2.02 from T3.

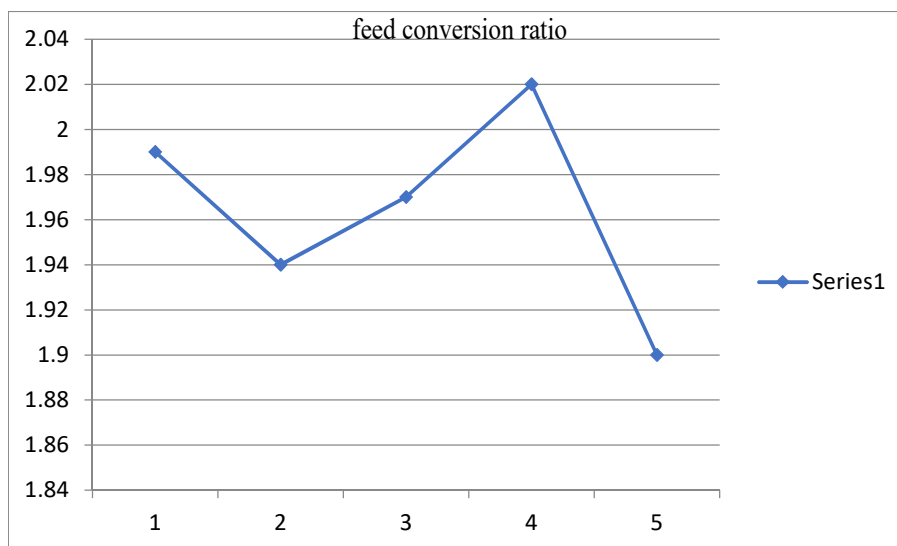


Figure (4) the mean feed conversion ratio of five-week old chicks

McNaughton and Day (1978) concluded that iron requirements for haematological and growth responses are critically essential in broiler diets, while Oguzet *al* (2006) found that iron sulphate supplementation had a significant effect on live body weights. However, Fairchild *et al* (2006) conducted trials to evaluate the effects of Fe concentration on broiler performance and found no differences in body weight, feed consumption, water consumption, mortality, or manure-soluble P in any of the trials.

Table (2) Mean value of different parameters in different treatments:

Items	Treatments				
	T0(Control)	T1 (40 mg/kg)	T2 (60 mg/kg)	T3 (80 mg/kg)	T4 (100 mg/kg)
Initial weight (g)	42.76±0.50	44±0.58	46±0.6	45±0.59	48±0.58
Final weight (g)	2000 ^c ±41	2380.00 ^{ab} ±22	2350.60 ^b ±15	2370 ^{ab} ±22	2342.80 ^b ±30.
Total weight gain (g)	1957.33 ^c ±45	2336 ^a ±24	2304 ^{ab} ±21	2324 ^a ±20	2290 ^b ±26.
Daily feed Intake (g)	3910 ^b ±48	4600 ^a ±26	4580 ^a ±39	4685 ^a ±26	4455 ^a ±48
FCR	1.95 ^a ±0.14	1.94 ^a ±0.15	1.97 ^a ±0.14	2.02 ^a ±0.16	1.90 ^a ±0.18

a, b,c Values in the same row with different superscripts differ significantly ($P \leq 0.05$)



Conclusion

In conclusion, the supplementation of the diets with iron allowed a healthy, positive growth performance of the birds, since there was no mortality. Ultimately, these trace elements could be considered as a good option to fortify broiler diets in order for farmers to produce healthy broilers with no or least mortality.

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تأثير إضافة نسب مختلفة من كبريتات الحديد كمكمل غذائي في دجاج اللحم

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الملخص

يواجه أجريت هذه الدراسة لمعرفة مدي تأثير إضافة نسب مختلفة من كبريتات الحديد (40,60,80,100) ملغرام /كجم علف كإضافات علفية على وزن الجسم ومعدل الزيادة الوزنية والكفاءة الغذائية في دجاج اللحم . حيث قسمت الطيور إلى أربع مجموعات إضافة إلى مجموعة الشاهد الخالية من كبريتات الحديد . حيث أظهرت النتائج وجود فروق معنوية بين المعاملات الأربعة مقارنة مع الشاهد حيث كانت أعلى وزن للجسم في المعاملة الأولى وهي (2380 كجم) وكذلك كانت أعلى معدل للزيادة في الوزن للطيور كانت في المجموعة الأولى (2336 كجم) وكذلك معدل استهلاك العلف للطيور كان في المجموعة الأولى (4600 كجم) بينما لم تكون هناك فروق معنوية في جميع المعاملات مقارنة بالشاهد. ومن خلال التحليل الإحصائي للبيانات أشارت النتائج لوجود تحسن واضح لأداء الطيور التي تم إضافة كبريتات الحديد للعليقة الخاصة بها مقارنة مع الطيور في مجموعة الشاهد لذلك ينصح بإضافة كبريتات الحديد للحصول على أداء أفضل في الصفات المدروسة.

الكلمات المفتاحية: كبريتات الحديد ، دجاج اللحم ، وزن الجسم ، الزيادة الوزنية ، استهلاك العلف ، الكفاءة الغذائية