



Effect of Bee Pollen as Supplementation Diet on Broiler Growth Performance

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Abstract

The current study was carried out with broiler hybrid Ross308 in the poultry farm of University of East Kordofan, Sudan. This study was conducted for the purpose of determining the effects of adding bee pollens at different rates to broiler fed ration on growth performance. A total of 90 day-old chicks were used in the study and they were randomly divided into three treatment groups such as control group and treatment groups (T1 and T2). There were no additives in the ration that was prepared for the control group broilers; and bee pollen was added to the rations of the other groups as 400 mg/kg (T1) and 800 mg/kg (T2). The values of live body weight were higher in the treatment T1 compared to other groups. On the other hand, the carcass weight, breast weight and thigh were higher in the treatment groups compared to control. The findings of the study also indicated that the carcass yield was higher in the treatment groups compared to the control group. There were found significant differences ($P \leq 0.05$) among control group and treatment groups in terms of thigh weight, liver weight and heart weight. From the present study, it has been concluded that the bee pollen has a positive effect on broiler growth performance.

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Broyler Yemine Polen Katılmasının Büyüme Performansı Üzerindeki Etkisi

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Özet

Mevcut çalışma, Sudan'daki East Kordofan Üniversitesi'nin kanatlı çiftliğinde broilerhibrit Ross308 ile gerçekleştirildi. Bu çalışma, etlik piliç yem rasyonlarına farklı oranlarda arı poleni ilavesinin büyüme performansına etkilerini belirlemek amacıyla yapılmıştır. Çalışmada toplam 90 günlük civciv kullanılmış olup, civcivler rastgele kontrol grubu ve uygulama grubu (T1 ve T2) olmak üzere üç uygulama grubuna ayrılmıştır. Kontrol grubu piliçler için hazırlanan rasyonda katkı maddesi kullanılmamış; diğer grupların rasyonlarına ise 400 mg/kg (T1) ve 800 mg/kg (T2) olarak arı poleni ilave edilmiştir. T1 uygulamasında canlı ağırlık değerleri diğer gruplara göre daha yüksek çıkmıştır. Öte yandan, uygulama gruplarında karkas ağırlığı, göğüs ağırlığı ve but ağırlığı kontrol grubuna göre daha yüksek bulunmuştur. Çalışmanın bulguları ayrıca uygulama gruplarında karkas veriminin kontrol grubuna göre daha yüksek olduğunu göstermiştir. Uyluk ağırlığı, karaciğer ağırlığı ve kalp ağırlığı açısından kontrol grubu ve tedavi grupları arasında önemli farklılıklar ($P \leq 0.05$) bulunmuştur. Bu çalışma ile arı polenin etlik piliç büyüme performansı üzerinde olumlu bir etkiye sahip olduğu sonucuna varılmıştır.

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Introduction

The poultry industry started more than 60 years ago, in the world the poultry meat production has expanded a lot due to the consumer's desire for protein [1]. Broiler chickens are bred specifically for meat production Because of its usual juicy meat, low fat content and short production period [2]. In the coming year, poultry production trend will remain relatively positive in relation to other meat [3]. For decades, some antibiotics have been used In broiler chicken feed for disease control, prevention and treatment and enhance performance and feeding efficacy [4,5]. The production of broiler chicken meat has witnessed tremendous growth in global consumption and commercial profit. Low production costs and rapid economic progress are pivotal to its expansion [6]. The Ross 308 hybrid broiler is a vigorous, fast-growing, and feed-efficient broiler with a good yield of meat and other domestic poultry available broiler in limited quantities including ducks, geese, guinea fowl and quail [7]. Pollen is a new type of the feed additive with a variety of nutritional and biologically activities. It enhances the immunity of poultry, promotes the growth of animals, protects the health and improves the meat quality and safety of products [8]. Pollen is a new type of the feed additive with a variety of nutritional and biologically activities. It enhances the immunity of poultry, promotes the growth of animals, protects the health and improves the meat quality and safety of products [8]. Over the past several years, the use of natural products has been encouraged as alternatives to substitute antibiotics to improve the performance and immune system of the animal life. Bee pollen is one of the respected candidates in natural products. Bee pollen is a conglomerate of pollen grains of monoflora or multiflora, which are collected by bee workers and mixed with nectar and secreted from the hypopharyngeal glands as β -glucosidase enzymes [9] Bee pollen is used as a dietary supplement because it is known to be a rich source of the carbohydrates, proteins, fats, vitamins and minerals [10,11]. Bee products, such as bee pollen, offer a potential alternative to feed antibiotics currently used in poultry fed diet. Bee pollen is a new type of supplemental additive with a variety of the nutritional and biologically active properties. It may improve poultry immunity, promote animal growth performance, protect the health and improve the quality and safety of animal products [8]. The present experiment was aimed to study the effect of bee pollen as an alternative feed additive on broiler growth performance.

Material and Methods

The experiment has been done in the poultry farm of University of East Kordofan in south kordofan state - Sudan. The mean annual temperatures between 26°C and 32°C, in the summer the temperature it reaches to 43°C. The GPS coordinates of South Kordofan State, Sudan. *Latitude: 11.2667 Longitude: 30.833*.

A total of 90 unsexed one day old (Cob 500) broiler chicks achieved from a local commercial hatchery and they were randomly divided into three experimental diet groups, the first group was control (C) which have fed by basal feed mixture diets without antibiotics and feed additives after first week to experimental groups they were added bee pollen in dose to groups (T1 400 mg/kg and T2 800 mg/kg) into the broiler feed mixture. Each group was fed by same starter complete feed mixture (CFM) from 1st day to 21st day of their age, and from the 22nd to 42nd day the birds were fed by a grower complete feed mixture (CFM) (Table 1.). The chicks of each replicate were housed in a pen (1 square meter) in an open-sided deep litter house. The birds were kept under strict hygienic conditions and confined throughout the experimental period, the temperature was controlled during the fattening period and it was 33 °C at the first day and every week was reduced about 2°C. The lighting during the feeding period was continuous. Each cage was equipped with feed dispenser and water intake was ensured *ad libitum* through a self feed-pump. The birds were randomly selected, weighed to get their initial body weight without any significant difference, and then allotted to three (3) treatment groups (C, T1, and T2) (n=30) which were divided three replicates' according to a completely randomized design (CRD) for 42 days.

Table 1 broiler complete feed mixture

Ingredient (%)	Starter (1 to 21 days)	Grower (22 to 42 days)
Wheat	35.00	35.00
Maize	35.00	40.00
Soybean meal (48 % N)	21.30	18.70
Fish meal (71 % N)	3.80	2.00
Dried blood	1.25	1.25
Ground limestone	1.00	1.05
Monocalcium phosphate	1.00	0.70
Fodder salt	0.10	0.15
Sodium bicarbonate	0.15	0.20
Lysine	0.05	0.07
Methionine	0.15	0.22
Palm kernel oil Bergafat	0.70	0.16
Premix Euromix BR 0,5 %	0.50	0.50
Nutrient composition (g.kg ⁻¹)		
Crude protein	210.76	190.42
Fibre	30.19	29.93
Ash	24.24	19.94
Ca	8.16	7.28
P	6.76	5.71
Mg	1.41	1.36
Linoleic acid	13.51	14.19
ME _N (MJ.kg ⁻¹), calculated	12.02	12.03

Active substance: Salinomycin sodium; 4 active substances per kg of the premix: vit. A 2,500,000 IU; vita. E 50,000 mg; vitamin D3 800,000 IU; niacin 12,000 mg; *d-pantothenic* acid 3,000 mg; riboflavin 1,800

Statistical analysis

The findings of the treatment were statistically analyzed by using the statistic program Statgraphics Plus version 5.1 (AV Trading Umex, Dresden, Germany). For the determination of the significant differences ($P \leq 0.05$) between treatment group analysis of the variance (arithmetic mean, standard deviation) was used.

Results and Discussion

The study has been studying the effect of bee pollen on broiler growth performance, such as live body weight, carcass weight, breast weight, thigh weight and other broiler part, there were found that the live body weight was higher slightly in the treatment group compared to control group, And there found significant differences in thigh weight, liver weight, and hart weight between the treatment groups (table 2). Anyway, our findings were agreed with [12]. Who were used bee pollen in the amount (0.1%). Similarly the study confirmed [13, 14]. Who were found, that the live body weight was higher compared to control after adding (1.5%) of the bee pollen in broiler diet. . On the other [15]. Confirmed our findings, who were tested added bee pollen in different concentrates (T1-100 g, T2-200 g, T3-300 g) into rabbits diets and found that the live body weight was increased. Also [16] and [17] have added bee pollen as a supplemental dietary horses nutrition, their study found the horse weight was improved and food intake was increased. [18]. used only the pollen and water in the diet of the rats during 12 weeks at the end of the treatment the rats survived healthy, their weight increased, the absorption of iron, calcium and phosphorus utilization were increased and the efficiency of hemoglobin regeneration was improved [19] support our study who was daily fed rats by bee pollen in amount 10 or 20 g. kg⁻¹ during whole experiment. It was found that the live body weight and content of total proteins, hemoglobin, serum iron and albumins were higher in the experimental group than in the control group. Moreover, [20] found that the different doses of bee pollens (2.5 g, 5 g and 10 g. kg⁻¹) of body weight as a

nutritional supplement for pregnant rats had a harmful effect to mothers and also to fetus life. Pollen extracts in study of [21] inhibited or counteracted the elevation of aminotransferases, alkaline phosphatase activity, lipids and carbohydrate metabolism disturbances in the liver of rats and prolonged their life after organic poison administration [22 and 23] reported positive effects of bee pollen on rats liver, brain and gene expressions, which are important in the apoptosis pathways and chemotaxis.

Table 2. the effect of bee pollen on broiler growth performance (g)			
Inductor (g)	Groups (Mean ±S.D)		
	Control	T1. (BP 400 mg/kg)	T2. (BP 800 mg/ kg)
Live body weight	2273.9±108.8	2276.5±98.9	2349.8±102.7
Carcass weight	1589.3±84.6	1598.4±80.6	1649.3±77.4
Breast weight	257.8±31.5	255.4±20.6	279.5±26.1
Thigh weight	220.6±15.8 ^a	236.3±15.4 ^b	236.0±16.2 ^{ab}
Liver weight	50.30±7.29 ^b	42.99±7.23 ^a	42.50±5.93 ^a
Gizzard weight	34.48±6.11	31.52±4.12	32.64±5.76
Heart weight	0.51±0.32 ^a	0.69±0.31 ^{ab}	0.92±0.36 ^b
Neck weight	80.06±8.46	87.08±12.54	78.46±13.81
Abdom. fat weight	37.15±9.01	34.96±5.44	37.76±7.20
Carcass yield %	77.59±3.36	78.91±1.43	77.09±1.38

T1, T2: experimental groups; ^{a,b} means with different superscripts different significantly; (P≤0.05) significant, BP: bee pollen

Conclusion

From the findings, they were concluded that the bee pollen as supplement diet has been increased broiler growth performance such as broiler breast and thigh. Also the pollen has been decreasing the broiler secondary parts such as gizzard weight, heart weight, neck weight and abdominal fat weight.

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