

Original Research

Effect of adding different levels of Oleobiotec to the diet on production performance of broiler

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ABSTRACT:

This study was conducted in the poultry field, Department of Animal Production, College of Agriculture, Al-Qasim Green University for the period from 12 February to 18 March 2016 to evaluate the production performance of broiler fed to diets containing various levels of Oleobiotec®. In this study, 192 chicks (Ross 308) one day old were randomly distributed to four treatments, each including three replicates of 16 birds, which were: control group T₁ (without addition) and the treatments T₂, T₃ and T₄ which received Oleobiotec® at concentrations 100, 150 and 200 mg/kg feed respectively. The results of this study indicated that the addition of Oleobiotec® to the broiler diet, particularly T₃ and T₄ enhanced the production performance of broiler especially in body weight and weight gain. Also, the results showed a significant improvement in the feed conversion ratio for T₃ (150 mg Oleobiotec® / kg feed). Also, the results revealed no significant effect in feed consumption rate in all treatments and for all periods except two weeks. It was concluded from the results of this experiment that's adding different levels of Oleobiotec® to the broiler diets enhanced the productive traits of birds especially for the treatment T₃.

Keywords:

Oleobiotec®, Broiler (Ross 308), Productive performance.

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INTRODUCTION

The continuous use of industrial antibiotics as growth promoters in poultry diets led to the emergence of resistant bacteria, which prompted Europe Union countries to ban their use in 2006 (Grashorn, 2010). The researchers encouraged the selection of many alternatives, including probiotics, prebiotics, organic acids, enzymes, herbs and medicinal plants. Most of these substances are natural sources that work towards enhancing the environment of digestive tract and enhance immunity through its role as antifungal and antibacterial (Panda *et al.*, 2006). Using of medicinal plants as additives to the broiler diets has great importance due to their containment of effective substances such as flavins, glycosides, polyphenols, terpenoids and saponins (Tipu *et al.*, 2006). Plant oils or extracts can be used as an alternative to antibiotics because these plants have antibacterial efficacy as well as their beneficial effect on the digestive system (Acamovic and Brooker, 2005; Wenk, 2006), and improve immune status and support growth and public health without toxic residues that may be caused by drugs and antibiotics (Toghyani *et al.*, 2011).

The Oleobiotec[®], extracted from a number of medicinal plants and spices, has been used for nearly 12 years of research and experiments which contain effective substances that increase the metabolic rate of food and supply the body with oxygen and nutrients (Noaman and Allaw, 2016). It also contains phenolic compounds such as thymol and carvacrol, which are highly effective antioxidants and thus protect red blood cells from damage caused by oxidation as antioxidant activity improves through the transport of oxygen needed to form hemoglobin (Jamroz and Kamel, 2002; Bolukbasi and Erhan, 2007) as well as contains both terpenoids and flavonoids within essential oils and spices which acts as anti-inflammatory and work to maintain the level of white blood cells within the normal range (Blomhorff, 2004; Anderson, 2008), also it contains an

active substances as cinnamaldehyde which has a significant role in enhancing the function of the immune system in the bird body (Yahaya *et al.*, 2012). Furthermore, the Oleobiotec[®] contain shogaol and zingerone that's act as antibacterial agents. Oleobiotec[®] product is a mixture of extracts of six medicinal plants, three of which are essential oils of each of the plants of marjoram, thyme, cinnamon and the other three components are powder of spices for each of the ginger, turmeric and pepper plants, this product specialized for poultry nutrition is a fine yellow powder added to the broiler diets by 100 g/ton (Noirod and Phodé, 2009). Therefore, the aim of this study was to know the effect of adding the Oleobiotec[®] product to the diets on the production performance of the broiler chicks.

MATERIALS AND METHODS

This study was conducted in the poultry field of the Department of Animal Production at the College of

Table 1. Ingredient composition and chemical analysis of the basal diet

S. No	Feed ingredient (%)	Starter (1-21 d)	Finisher (22-35 d)
1	Yellow corn	30	30
2	Wheat	27.7	35.5
3	Soybean meal	28	20
4	Protein concentration ⁽¹⁾	10	10
5	Sunflower oil	3	3
6	Limestone	1	1.2
7	Salt	0.3	0.3
	Total	100	100
	Calculated chemical structure⁽²⁾		
8	Crude protein	22.74	20.16
9	ME, kcal/kg feed	3078	3125.2
10	Lysine	1.02	0.95
11	Methionine + cystine (%)	0.83	0.75
12	Calcium	0.97	1.0
13	Available phosphorus	0.41	0.48

⁽¹⁾ Life Company – Jordan, contain 44% protein 2800 kcal, 12% fat, 25% ash, 5% calcium, 2.9% phosphorus, 2.55% Methionine + Cystine, 2.8% lysine.

⁽²⁾Chemical structure was calculated according to the analysis of diet material found in NRC (1994)

Table 2. Effect of adding different levels of Oleobiotec® to the broiler diets on average live body weight (mean ± standard error)

S. No	Treatments	Body weight (g/bird)				
		1 week	2 week	3 week	4 week	5 week
1	T ₁	169.00±0.00 ^a	446.00±4.00	856.33±12.81	1404.00±18.01	1963.67±18.01 ^b
2	T ₂	161.33±2.72 ^{ab}	458.67±10.33	846.00±24.55	1422.00±21.00	2015.33±15.33 ^{ab}
3	T ₃	160.33±1.33 ^b	462.67±6.33	864.67±14.67	1374.67±32.62	2083.00±27.15 ^a
4	T ₄	167.67±3.71 ^a	454.33±8.98	862.33±15.14	1383.00±29.14	2070.33±4.63 ^a
5	Significant	*	NS	NS	NS	*

^{a,b} Means within the same column with different letters are significantly different P<0.05.

NS: Not significant

Agriculture, Al-Qasim Green University for the period from 12 February to 18 March 2016 to investigate the effects of adding different levels of Oleobiotec® products to the diets on the production performance of broiler. In this study, 192 chicks (Ross 308) of one day old were randomly distributed to four treatments with 48 chicks per treatment, each treatment included three replicates of 16 birds. Chicks were weighed and distributed to the treatments which were: T₁ control group (without addition) and the treatments T₂, T₃ and T₄ received Oleobiotec® at concentrations 100, 150 and 200 mg/kg feed respectively. The chicks were breed in ground cages its dimensions are 2x2 m covered with sawdust, water introduced to the chicks *ad libitum* while diet was given to the chicks as the starter and finisher diets (Table 1). The experiment continued for 35 days and the productivity traits were measured for each week of the experiment which included body weight, weight gain, feed consumption and Feed Conversion Ratio (FCR).

Completely Randomized Design (CRD) were used to study the effect of treatments on the studied traits and comparing the significant differences between the means using Duncan test (Duncan, 1955), while the Statistical Analysis System (SAS) was used to analyze the data statistically (SAS, 2010).

RESULTS AND DISCUSSION

Table 2 shows the effect of adding different concentration of Oleobiotec to broiler diet on the mean of body weight during the weeks of the experiment. The results revealed a significant increasing (P<0.05) for the treatments T₁ and T₄ in body weight which were (169.0 and 167.6 g) respectively, compared with T₃ that's recorded less mean of body weight 160.3 g in the first week of experiment. While no significant differences were found between all treatments for the period two, three and four weeks of experiment. Whereas, at the five week period the results showed a significant in-

Table 3. Effect of adding different levels of Oleobiotec® to the broiler diet on body weight gain (mean ± standard error)

S. No	Treatments	Body weight gain (g/bird)					
		1 week	2 week	3 week	4 week	5 week	(1-5) week
1	T ₁	127.00±0.33 ^a	277.00±4.33	410.33±12.47	547.67±5.29	559.67±43.55 ^b	1921.67±41.83 ^b
2	T ₂	119.33±2.64 ^{ab}	297.34±7.88	387.33±18.98	576.00±18.73	593.33±36.33 ^{ab}	1973.33±15.17 ^{ab}
3	T ₃	118.33±1.33 ^b	302.34±5.89	402.00±12.74	510.00±21.28	708.33±29.45 ^a	2041.00±29.45 ^a
4	T ₄	125.67±3.71 ^{ab}	286.66±12.11	408.67±10.89	520.67±43.06	687.33±24.63 ^a	2028.33±4.93 ^a
5	Significant	*	NS	NS	NS	*	*

^{a,b} Means within the same column with different letters are significantly different P<0.05.

N.S: Not significant

Table 4. Effect of adding different levels of Oleobiotec® to the broiler diet on feed consumption rate (g/bird) (mean±standard error)

S. No	Treatments	Feed consumption rate (g/bird)					
		1 week	2 week	3 week	4 week	5 week	(1-5) week
1	T ₁	155.33±3.92	469.67±6.35 ^a	636.00±5.29	909.67±42.60	1279.00±52.55	3449.67±37.49
2	T ₂	152.67±2.02	435.33±6.38 ^b	657.33±10.33	896.00±23.06	1224.33±53.18	3365.67±40.22
3	T ₃	155.00±2.64	437.33±3.33 ^b	638.67±2.91	870.00±10.69	1343.67±28.69	3444.67±27.76
4	T ₄	162.66±6.17	440.00±2.00 ^b	635.33±9.21	898.67±30.96	1307.00±37.87	3443.67±36.24
5	Significant	N.S	*	NS	NS	NS	NS

^{a,b} Means within the same column with different letters are significantly different P<0.05.
NS: Not significant

crease (P<0.05) for the treatments T₃ and T₄ compared with T₁ which were 208.3, 2070.3 and 1963.6 g respectively.

The results of effect adding different concentration of Oleobiotec to the broiler diet on weekly weight gain (g) are summarizing in Table 3. The result showed a significant increase (P<0.05) in weight gain (g) for the treatment T₁ at one week of experiment compared with T₃ which were 127.0 and 118.3 g, respectively. While the results revealed no significant differences between the treatments at two, three and 4 four weeks of experiment. Whereas, the treatments T₃ and T₄ indicate to a significant increasing (P<0.05) in the weight gain compared with the treatment T₁ at five week of experiment which were 708.3, 687.3 and 559.6 g respectively. Also, the cumulative weight gain revealed to a significant increasing (P<0.05) for the treatments T₃ and T₄ compared with control treatment T₁.

The results of Table 4 manifest the effect of the addition of Oleobiotec to broiler diet on the weekly and accumulative feed consumption rate. The treatments T₂, T₃ and T₄ appeared a significant decrease (P<0.05) in the feed consumption rate during the second week compared with control group T₁. Also, the results revealed no significant differences between the experiment treatments in the accumulative feed consumption rate (1-35 day).

Table 5 shows the effect of supplementation different levels of Oleobiotec product to the broiler diet on Feed Conversion Ratio (FCR). At one week of experiment the results appeared a significant increase (P<0.05) in the FCR for the treatment T₃ compared with T₁ which were 1.3 and 1.22 respectively. While the results indicate to a significant decrease (P<0.05) in the FCR for the treatments T₂ and T₃ compared with control group T₁ for the period two week which recorded 1.46, 1.44 and 1.69 respectively. No significant differences

Table 5. Effect of adding different levels of Oleobiotec® to the broiler diet on feed conversion ratio (g feed/g gain) (mean±standard error)

S. No	Treatments	Feed conversion ratio (g feed / g gain)					
		1 week	2 week	3 week	4 week	5 week	(1-5) week
1	T ₁	1.22±0.02 ^b	1.69±0.05 ^a	1.55±0.06	1.66±0.06	2.28±0.11 ^a	1.79±0.03 ^a
2	T ₂	1.27±0.02 ^{ab}	1.46±0.04 ^b	1.69±0.09	1.55±0.05	2.06±0.11 ^{ab}	1.70±0.01 ^{ab}
3	T ₃	1.31±0.02 ^a	1.44±0.02 ^b	1.58±0.05	1.70±0.06	1.89±0.11 ^b	1.68±0.03 ^b
4	T ₄	1.29±0.01 ^{ab}	1.53±0.06 ^{ab}	1.55±0.05	1.72±0.17	1.90±0.12 ^b	1.69±0.02 ^{ab}
5	Significant	*	*	N.S	N.S	*	*

^{a,b} Means within the same column with different letters are significantly different P<0.05.
NS: Not significant

were found between all treatments at the third and fourth week of age, while in the fifth week the results observed a significant decrease ($P < 0.05$) for the treatments T_3 and T_4 which reached 1.9 for each compared with the control treatment T_1 which reached 2.29. As well as, accumulative FCR for the period from 1 to 35 days, showed a significant decrease ($P < 0.05$) for the treatment T_3 compared with control group which were 1.68 and 1.79 respectively.

From the results of the present study, it was concluded that all enhancements observed in the productive traits for the treatments T_2 , T_3 and T_4 may be due to containing the previous treatment on different levels of Oleobiotec® product and its containing a number of medicinal plants and its active compounds improved the taste of diet and improve appetite and health of birds, then improved digestion and absorption, which had a positive effect on the qualities of productivity.

The birds that fed diet supplemented by 150 and 200 mg Oleobiotec®/kg feed enhanced the amount of feed consumed then improve the FCR which increased the birds weight and this significant enhancement in productive parameters may be due to containing the Oleobiotec® product to many effective compounds that acts as antioxidant (Ruby *et al.*, 1995; Botsoglou *et al.*, 2004; Bozin *et al.*, 2006). The oils found in the Oleobiotec® formula are rich in essential fatty acids that enough the needs of body for growth. These ingredients also improve the nutritional value of nutrients through stimulation the secretion of a number of digestive enzymes such as lipase, amylase and protease which has an important role in the process of digestion and absorption through its prominent role in the analysis of fat, carbohydrate and protein components (Yamahara *et al.*, 1990; Namagirilakshmi, 2005; Yamamoto and Gaynor, 2006). The Oleobiotec® product contains aromatic oils that contain an active ingredients as carvacrol, thymol and eugenol, which in turn stimulates digestion and increases the digestibility of nutrients as well as its role as

antimicrobial, antiviral, antifungal and gas expeller, and these active substances promote metabolism of proteins, carbohydrates and fats, and thus increase the rate of growth (Lee *et al.*, 2004; Razooqi, 2011; Saeid *et al.*, 2011). These factors were reflected in the improvement of the productive parameters of the birds. These results agreed with Noaman and Allaw (2016), that's confirmed the existence of a significant enhancement in the productive parameters when fed the broiler chicks on a capsules containing different levels of Oleobiotec® at 50, 100 and 150 ppm three times per week.

CONCLUSION

It was concluded that supplementation of Oleobiotec to the broilers enhanced the productive traits of the birds such as body weight, weight gain and feed conversion ratio.

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