

ISSN 1682-8356
ansinet.org/ijps



INTERNATIONAL JOURNAL OF
POULTRY SCIENCE

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Effect of Using Date By-product with Enzyme on Performance and Blood Parameter of Broiler

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Abstract: Effect of date by-product on productive and blood characteristic was studied in broiler chicks. Seven formulated diets contained (0, 5, 10 and 15) % date by-product without enzyme and (0, 5, 10 and 15) % date by-product with enzyme instead of yellow corn. A total of 210 one-day old chicks were used for 42 days. Body weight, feed intake, feed conversion and economic figure were not significantly effects by using date by-product. However, total protein, albumin, globulin and glucose in serum blood showed significant ($p < 0.05$) effects. While, cholesterol of treated chicks did not show any significant effect.

Key words: Date by-product, broiler chicks, blood parameter

INTRODUCTION

Dates were produced in Iraq; it is a good nutrient for human. Some of the dates were not suitable for human consumption due to its poor quality. As well as, the date by-products (such as the residue after extracted syrup (Dibis) from date) were not suitable for human consumption too. Therefore, they can use it for poultry feeding. Dates waste showed variable percentage of moisture (10.05-14.07)%, crude protein (3.9-8) %, crude fiber (5.7-15.6) %, ether extracts (0.64-3.8) %, ash (1.74-3.2) %, NFE (75.71-76.2) % and ME (3549-3590) kcal/kg (Kamel *et al.*, 1981; Najib *et al.*, 1995; E. Hag *et al.*, 1999; Al-Ani *et al.*, 2004; Al-Harithi, 2006; Deek *et al.*, 2008).

Studies reported difference results for using date wastes in broiler diets. Al-Hiti and Rous (1978) showed no significant increase in body weight and feed consumption when they used date waste in boiler diets. While, Al-Soudi and Al-Hiti (1978) obtained significant decrease in body weight of broiler. Al-Ani *et al.* (2004) reported no harmful effect on the performance of chicks of feeding 5% of date puple to the broiler chicks. Al-Harithi (2006) showed that date waste meal could be used in broiler diets with percentage up to 21% without any decline effects on the productive performance. Deek *et al.* (2008) found that date waste meal should be not exceeding 10% in laying diets. Enzyme can improve the digestion of nutrients and birds performance (Bedford and Schulze, 1998; Jaroni *et al.*, 1999; Ghazalah *et al.*, 2005; Wang *et al.*, 2005; Al-Harithi, 2006; Silversides *et al.*, 2006; Deek *et al.*, 2008).

The objective of this study was the use of date by-products (waste) without its pits with and without enzyme and its effects on the broiler performance and blood characteristics of chicks.

MATERIALS AND METHODS

The study was carried out at poultry hall (house), Animal Rresources Department, College of Agriculture, University of Basra, Basra, Iraq from 26/11/2008 to 5/1/2009. Two hundred and ten one day-old chicks (Fawbro) were distributed randomly with three replicates. Seven dietary date by-product (residue after extracted dibis removing its pits) were fed to the chicks instead of yellow corn at levels (0, 5, 10 and 15) % with and without enzyme. Then added 0.5 g/kg of the mixture enzyme contains amylase 400, xylanase 300 and protease 4000 U/g to the above diets. The feed and water were supplied to the chicks Ab-Libitium for 42 days of age. Samples of ingredients and date by-product were analyzed according to (AOAC, 1998) to find the chemical composition (Table 1). Broiler was weighted in groups. Feed intake recorded and feed conversion (feed: gain) were calculated at 2,4 and 6 weeks of age. Economic Figure (EF) was calculated as:

$$EF = \frac{\text{Total weight of solds birds (kg)}}{\text{Number of sold birds} \times \text{The period of breeding} \times \text{Feed conversion}} \times 1000$$

(Naji, 2006)

At the end of the experiment, three chicks per treatment were slaughtered. Then samples of blood were collected to determine total protein, albumin, globulin, cholesterol and glucose concentration in blood serum according to the Tiez (1999) method by using the commercial kits (Biolabosa As. Frances). All dates were classified according to a ANOVAs procedure of SPSS, (1999). The significant treatment means were separated by using the multiple range test of Duncan (SPSS, 1999).

Table 1: Composition of the experimental diets

Ingredient	Starter				Grower			
	0%	5%	10%	15%	0%	5%	10%	15%
Yellow corn	50.00	45.00	40.00	35.00	50.00	45.00	40.00	35.00
Wheat	11.80	11.80	11.80	11.80	16.80	16.80	16.80	16.80
Date by-product	0.00	5.00	10.00	15.00	0.00	5.00	10.00	15.00
Soybean meal (44%)	24.00	24.00	24.00	24.00	20.00	20.00	20.00	20.00
Protein conc.	12.00	12.00	12.00	12.00	10.00	10.00	10.00	10.00
Vitamins and minerals mixed	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Salt	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Oil	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Calculated composition (%)								
Kcal ME/kg diet	2993.00	2997.00	3001.00	3006.00	3083.00	3087.00	3092.00	3096.00
Crude protein	22.50	22.47	22.43	22.4	20.21	20.18	20.14	20.11
Crude fiber	3.09	3.85	4.00	4.16	3.58	3.74	3.89	4.05
Fat	3.04	2.86	2.69	2.52	2.99	2.81	2.64	2.47

Table 2: Proximate analysis of date by-product

Nutrient	Moisture	CP	CF	EE	Ash	NFE	ME (kcal/kg)
%	10.1	7.3	5.6	0.4	3.1	73.4	3490

Table 3: Effect of using date by-product on the broiler performance

Parameter	Without enzyme				With enzyme			SEM	Sig.*
	0%	5%	10%	15%	5%	10%	15%		
Body weight (g)									
2 weeks	316.00	316.00	320.00	314.00	325.00	313.00	324.00	13.63	NS
4 weeks	910.00	909.00	912.00	905.00	920.00	913.00	922.00	23.26	NS
6 weeks	1782.00	1775.00	1774.00	1771.00	1791.00	1788.00	1785.00	78.63	NS
Feed intake (g/bird)									
2 weeks	388.00	389.00	392.00	395.00	399.00	396.00	397.00	8.26	NS
4 weeks	1424.00	1426.00	1424.00	1428.00	1431.00	1428.00	1432.00	4.29	NS
6 weeks	3521.00	3523.00	3524.00	3530.00	3525.00	3528.00	3523.00	7.74	NS
Feed conversion (g feed: g gain)									
2 weeks	1.41	1.44	1.43	1.43	1.40	1.45	1.40	0.08	NS
4 weeks	1.64	1.65	1.63	1.66	1.64	1.64	1.62	0.04	NS
6 weeks	2.02	2.03	2.03	2.06	2.02	2.02	2.02	0.09	NS
Economic Figure (EF)	195.53	194.53	195.05	193.35	191.20	190.98	194.28	17.37	NS

*: Significant

RESULTS AND DISCUSSION

Proximate analysis of date by-product (Table 2) indicated that date by product contain a good amount of nutrients such as sugar which is exists in form of nitrogen free extract that provide the energy requirement to the birds. In addition, it contains a crude protein with percentage close to the percentage in the yellow corn. These results are consistent to the results found by E. Hag *et al.* (1999). Who showed that the date by-products contain high energy, rich in sugar. Also the results are consistent to the results found by Al-Harithi (2006). Who reported that the date by-products meal contain substantial with amount of nutrients and promising energy source in the poultry feeding.

Table 3 showed there is no significant difference among treatment on the body weight, feed intake and feed conversion. This may be due to the nutrient of date by-product such as simple sugar and protein. In addition,

the economic figure showed no significant affect due to level of date by-products.

The supplementation of enzymes to the treatment diets was insignificant in body weight, although it gave better growth as compared with these diet and control. The beneficial effect of feed additives improved body weight of broiler which was associated with the improvement in protein, fat and carbohydrate digestibility's (Ritz *et al.*, 1995; Nahas and Leferanceois, 2001; He *et al.*, 2003). It reduced the anti-nutritional effect of NSP leading to better performance (Mathlouthi *et al.*, 2003). The results were consistent with the founding of Al-Harithi (2006), that date waste meal can be used up to 21% in the diets of broilers.

The serum blood characteristics (Table 4) showed that there were significant ($p < 0.05$) effects of the dietary levels of the date by-product in serum total protein, albumin, globulin and glucose. That may be due to the

Table 4: Effect of using date by-product on blood characteristic

Parameter	Without enzyme				With enzyme			SEM	Sig.*
	0%	5%	10%	15%	5%	10%	15%		
Total protein (g/dl)	4.12 ^b ±0.03	4.15 ^b ±0.01	4.10 ^b ±0.01	4.0 ^b ±0.11	4.12 ^b ±0.02	4.24 ^a ±0.01	4.30 ^a ±0.01	0.015	0.05
Albumin (g/dl)	2.99 ^b ±0.02	2.98 ^b ±0.04	2.88 ^b ±0.02	2.86 ^b ±0.03	2.87 ^b ±0.03	2.97 ^b ±0.01	3.01 ^b ±0.02	0.01	0.05
Glubulin (g/dl)	1.13 ^b ±0.01	1.17 ^b ±0.006	1.22 ^b ±0.01	1.14 ^b ±0.01	1.25 ^a ±0.01	1.27 ^a ±0.01	1.29 ^a ±0.03	0.05	0.05
Glucose (Mg/dl)	203.00±1.73	2.06 ^a ±4.61	209.00 ^b ±2.88	211.00 ^b ±4.04	214.00 ^a ±4.73	218.00±1.15	219.00±0.58	9	0.05
Cholesterol (Mg/dl)	160.00±1.73	162.00±1.15	160.00±0.57	161.00±1.73	164.00±1.73	162.00±1.15	161.00±2.04	NS	NS

*: Significant

improvement in nutrient utilization especially protein and simple sugars of date by-product which goes directly to the blood (El-Deek *et al.*, 2003; Choct, 2004). While serum cholesterol, did not influence by treatment levels of date by-products.

Finally, it is possible to use date by-product instead of yellow corn in broiler diets up to 15% with or without enzyme.

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