



THE INFLUENCE OF ADDING DATE TO BROILER DIET ON PERFORMANCE AND BLOOD CHARACTERS

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ABSTRACT

A total of 280 cob broilers were fed from day 1-21 on diets based on corn-soybean meal. At the age of 22-56 days the diets were supplemented with (2.5, 5, 7.5) % of Al-Zahdi whole dates. Body weight, feed intake, and feed conversion were significantly affected by the dietary inclusion of whole dates. Total protein, albumin, globulin, and glucose in serum blood showed significant effects while the cholesterol of groups fed with date didn't show any significant effect.

KEY WORDS: Whole date, broiler performance, blood parameters, Al-Zahdi

INTRODUCTION

Dates, the fruits of the date palm tree (*Phoenix dactylifera*) are major staple food in arid areas of North Africa and Middle East, and the date crop plays a central role in the economy and social life in these regions (FAO, 2007). Dates are growing in many developing countries where the supplying of animal feed is very limited. Iraq is the largest date producing country in the world (0.5 Mt per year) about 20% of the total production is unsuitable for human consumption and wasted (wasted dates are defined as one-year-old dates and/or fresh dates that are infested with insects). There are more than 3000 dates varieties in the

world. Iraq, Iran, Morocco and Tunisia have the most diversified germplasms (Al-Gaboori, 2010; Al-Farsi et al., 2006). Dates vary greatly in size (18 to 110 mm long), weight (2-60g), color (yellow to black) and taste, the date seed (pit, stone or kernel) is hard coated oblong weighing (0.5 to 4g) (Awan, 1999). Whole dates available for poultry production are generally culled or non edible dates, leading to high variability in composition. Whole dates contain approximately 15% pits, and their energy value is significantly lower energy than that of pitted dates and date pulp (Jasim, 2010).

TABLE 1: The composition of experimental diet

Ingredients %	Control	Diets		
		T1	T2	T3
Yellow corn	45	45	45	45
Soybean meal	25.5	26.5	27	28
Wheat	17.45	13.55	10.25	6.35
Broiler. Con	5	5	5	5
Dates	—	2.5	5	7.5
Oil	5	5.4	5.7	6.1
Dicalcium phosphate	1	1	1	1
Common salt	0.3	0.3	0.3	0.3
Limestone	0.7	0.7	0.7	0.7
METH	0.05	0.05	0.05	0.05
Total	100	100	100	100
C.P	19.1	19.1	19.1	19.1
M.E	3174	3174	3175	3173
METH+CYS	0.82	0.82	0.82	0.82
LYS	1.04	1.04	1.04	1.04
Ca	7.4	7.4	7.4	7.4
FAT	3.3			
Fiber	0.91			

Feed costs an amount to about 70% of the total production cost of broiler meat. The major ingredients of broiler feeds are maize and imported protein concentrates based on soy

bean concentrate or animal meals. Over the past few years the feed costs have increased because the price of locally produced maize is going up, and because the use of animal

meals has been prohibited. Yousif and Kado, 1982 indicated that Al-Zahdi dates contain higher values of Potassium, Calcium, Sulphur, Chlorine, Iron, Manganese, Cooper, and a small amount of Zink than the other three cultivates (Hallawi, Sayer, and Khadrawi). The objective of this study is to investigate the possibility of substitute cheap dates as potential alternative for expensive conventional feed using the high carbohydrate content of dates with pits. The response of broiler to partial replacement of wheat was studied by taking parameters of broiler growth, feed intake, feed conversion ratios (FCR), and changes of some blood parameters.

MATERIALS & METHODS

Bird husbandry

280 day-old (four groups of 30 chicks each), commercial broiler chicks from the cobb strain were obtained from poultry rearing station at Abu-Ghreib and referred to animal resources research department of state boards of agricultural research from December to January 2013. Chicks were weighed and divided into four groups of thirty chicks each. The groups were randomly assigned to four experimental diets of 2 replicates, 15 chicks each. Birds of all treatments were reared on similar environmental and management conditions through 42 days of the feeding period. The litter was mixed twice a week to keep it dry.

All management and rearing procedure followed the recommendation of the commercial chicken production manual (1981).

Experimental Diet

A controlled conventional diet was composed of soybean, corn, and concentrates. Table (1) shows the composition of experimental diet which was used for feeding. Whole Zahdi dates were incorporated in diets at 2.5, 5, and 7.5% replacing wheat. The diets were kept isonitrogenous and isocaloric in the experiments. Dates were added to the basal diet after separating pits by crushing (Morton, 1987), then dates were dried in automatic oven at (60 °c) for 24 hours, after that dates were ready to be grinded with crushing (Abdel Ghani et al., 2004). Grinding whole dates costs more energy (about 30%) than the sum of grinding the components of the mix separately. The pits are the highest energy consumer in grinding (a factor 10:1 compared with the energy required for the rest of the mix). To reduce the cost of energy some thought has been given to separate the pits from the flesh first and treat them on their own or discard them. Also date seeds are tough and need to be processed before being fed to animals (Geelen et al., 1964).

Dates analysis

The chemical analysis of whole dates was obtained from Alzahdy dates by a dry sample weighing 200g. The sample was analyzed to yield information on moisture content, crude protein, ether extract, and total ash according to the procedure of (AOAC), 1998.

TABLE 2: the chemical composition of commercial Iraqi Zahedi date cultivates.

Composition	Percentage
Moisture	10.70
Total solids dry matter	89.30
Total Carbohydrate	79.34
Protein	2.90
Fat	0.63
Ash	2.00
Crude Fiber	4.20

All percentages in the table are taken from dry matter

TABLE 3: Approximate composition of date pits

Moisture	5-10%
Protein (N X 6.25)	5-7%
Oil	7-10%
Crude Fiber	10-20%
Carbohydrates	55-65%
Ash	1-2%

Dowson, 1962; Eckey, 1945; Gabrid *et al.*, 1981 and Shurfa *et al.*, 1982.

The nutritional value of date seed is very low due to low protein content and very high fiber content. Enzymes are added to animal ration with the goal of increasing its digestibility, removing anti-nutritional factors improving nutrient availability as well for environmental issues (Ghazalah *et al.*, 2005; Wang *et al.*, 2005; Al-Harithi, 2006; Silver sides *et al.*, 2006, Deek *et al.*, 2008) therefore enzymes contain Amylase 160.000, Xylanase 1.500.00, Cellulase 1.000.000, B. Glucanase 100.000 U/g which are added to the above diets.

At the end of the experiment three chicks per treatment were slaughtered. 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).

Statistical analysis

Statistical analysis of date was performed on the basis of one way analysis of variance (ANOVA) using a significant level (P < 0.05). Specific group differences

were determined using least significant difference (LSD) as described by Snedecor and Cochran, (1937). The analysis of data was submitted by the SPSS statistics software.

RESULTS & DISCUSSION

Weight gain

A significant ($P < 0.05$) difference was found between treated groups and the control in the weekly body weight gain though 4, 5 and 6 wks. A group T2 recorded significantly ($P < 0.05$) the highest values compared with the other treatments and the control groups while group T3 (7.5% date) showed significant increase in body weight in the fourth week and similar to the control groups in the sixth week. These results are in agreement with the fact that different raw materials consist of highly digestible energy sources such as Glucose and Glucose derivative are believed to have the ability to increase the performance of

broiler chicks (Batal and Parsons, 2004). Also it agrees with the result of (Al-Mafraji, 1999) who proved that adding dates extract (Dibs) to broiler ration produced a significant increase in weight gain. Another study also proved that the addition of Al-Zahdi date leads to high increase on weight gain (Taha *et al.*, 2013). The date's sugar caused beneficial effect to broiler chicks when they were added to the diets and improved the digestibility of dry matter. While Kamel *et al.*, 1981, indicated that whole Zahdi dates incorporated at 5, 10 and 30% at the expense of corn have supported growth as efficiently as the control diet.

Taminie 1959 used crushed dates with seeds which causes a decrease in body weight while (Vandepopuliere *et al.*, 1995) indicated that there was no significant effect in body weight at the age of week 3 when date with and without seed was substituted with corn in boiler diet.

TABLE 5: Effect of adding dates on weight gain (g/bird/week) mean \pm SE

Parameter	Weight gain					
	1 st W	2 nd W	3 rd W	4 th W	5 th W	6 th W
Groups						
T0	103.9 \pm 1.13	285.7 \pm 1.5	461.9 \pm 7.4	580.4 \pm 16.6	645.8 \pm 22.4	694.1 \pm 20.4
	a	a	a	a	a	a
T1 2.5% dates	75.45 \pm 3.67	244.45 \pm 2.32	412.76 \pm 12.13	576.495 \pm 13.91	646.50 \pm 15.90	709.50 \pm 9.32
	b	a	c	a	a	b
T2 5% dates	85.50 \pm 1.70	257.50 \pm 4.38	432.25 \pm 3.92	617.67 \pm 2.64	674.45 \pm 32.64	774.60 \pm 11.58
	b	b	b	ab	b	c
T3 7.5% dates	90.50 \pm 1.32	231.43 \pm 1.97	424.56 \pm 13.65	606.56 \pm 10.95	571 \pm 3.53	194.43 \pm 12
	b	a	b	ab	ab	d

Feed Intake

Feed intake was effected by Al-Zahdi date in the diet as shown in Table (4). The result showed that there was a significant difference ($P < 0.05$) among treatment on the feed intake conception in groups T1, T2, T3 compared with the control. Group T1 (2.5 % date) showed a significant lowered feed conception than other groups at the fourth, fifth, and sixth week of age, while all groups T1, T2, T3 showed significantly a lower feed conception as compared with the control group at age of five and six weeks. The result agreed with Al-Mafraji *et al.*, 1999, who

found significant increase in feed intake due to date extracts (dibs) to broiler diet. A similar result proved by Taha 2013 reported that there is a significant increase in feed intake when date flesh is added to broiler ration under heat stress while Al-yousif and Vandepopuliere 1985, didn't find any significant difference between performance characteristics of birds which are fed whole date at levels 8, 16, and 24% and control group. The adverse effect was found by Jassim, 2010 who indicated that the inclusion of pitted dates at up to 15% didn't affect the performance and the addition of an enzyme mixture and didn't improve it.

TABLE 4: The effect of different levels of dates on broiler feed intake (g/bird/week) mean \pm SE

Parameter	Feed Intake					
	1 st W	2 nd W	3 rd W	4 th W	5 th W	6 th W
Groups						
T0	124.9 \pm 1.5	433.5 \pm 9.7	811.9 \pm 28.8	1058 \pm 24.6	1324.10 \pm 34.4	1577.6 \pm 33.6
	a	a	a	b	a	a
T1 2.5% dates	95.48 \pm 3.85	342.75 \pm 9.16	695.75 \pm 26.76	993.23 \pm 8.89	1225.32 \pm 10.43	1465.70 \pm 7.17
	b	d	d	c	c	c
T2 5% dates	106.26 \pm 5.28	405.25 \pm 3.09	756.25 \pm 8.26	1129.75 \pm 13.26	1257.50 \pm 9.01	1490.50 \pm 13.28
	b	b	c	a	b	b
T3 7.5% dates	120.43 \pm 2.47	362.25 \pm 7.70	731.25 \pm 9.96	1056.50 \pm 17.96	1227.75 \pm 12.12	1469.26 \pm 16.01
	a	c	b	b	c	c

Feed conversion

The addition of dates to the finishing ration significantly improved the efficiency of feed utilization of birds fed with this diet compared to control group. Significant ($P < 0.05$) differences were observed in table (6) in feed conversion ratio among treated and control groups at the fourth, fifth, and sixth weeks of age. However T1 (2.5%) date in the week 4 and 5 showed significant improvement

as compared with other treatments and control groups. Group T2 (5%) date showed significant performance at the age of 5 and 6 weeks compared with control and other groups.

This result agreed with the several researchers who reported that a good performance of broiler was found when they were fed with diets supplemented with whole dates or date pulp (El-Deek *et al.*, 2010; Hussein *et al.*,

1998). The result disagree with the findings of Kamel *et al.*, 1981 who indicated that the replacement of maize by whole dates resulted in decreased growth performance and

increased the feed conversion ratio. Taha *et al.*, 2013 proved a significant increase in feed conversion in groups supplemented with date flesh in the dietary diet.

TABLE 6: the effect of different levels of dates on broiler feed conversion ratio (g/bird/week) mean ± SE

Parameter Groups	Feed conversion ratio					
	1 st W	2 nd W	3 rd W	4 th W	5 th W	6 th W
T0	1.19 ± 1.13 a	1.50 ± 0.11 a	1.83 ± 0.11 a	1.82 ± 0.40 a	2.10 ± 0.11 a	2.3 ± 0.1 a
T1 2.5% dates	1.36 ± 0.14 b	1.47 ± 0.38 a	1.64 ± 0.02 c	1.70 ± 0.02 b	1.98 ± 0.04 b	2.26 ± 0.02 a
T2 5% dates	1.35 ± 0.04 b	1.61 ± 0.15 b	1.74 ± 0.02 b	1.79 ± 0.01 a	1.92 ± 0.04 c	2.09 ± 0.08 c
T3 7.5% dates	1.34 ± 0.06 b	1.52 ± 0.20 a	1.72 ± 0.03 b	1.76 ± 0.03 ab	2.13 ± 0.02 a	2.18 ± 0.03 b

TABLE 7: effect of date on the performance of broiler

Parameter Groups	Performance		
	Feed intake	Weight gain	Feed conversion
T0	5328.45 ± 43.50 a	2766.89 ± 36.56 a	1.93 ± 0.04 a
T1 2.5% dates	4887.33 ± 31.33 d	2725.55 ± 28.69 b	1.80 ± 0.03 b
T2 5% dates	5140.60 ± 16.45 b	2755.45 ± 38.75 a	1.83 ± 0.02 b
T3 7.5% dates	4959.50 ± 38.47 c	2629.78 ± 33.93 c	1.88 ± 0.02 a

Blood characteristics

The serum blood characteristics in Table (8) showed that there were significant (P < 0.05) effects of date in the diet in serum total protein, albumin, globulin, and glucose that may be due to the improvement in nutrient utilization especially protein and sugars of dates which are easily

digested and absorbed (El-Deek *et al.*, 2003; Choct, 2004) while serum cholesterol has no response when diet is treated with different level of date. In conclusion whole dates can contribute positively to the expanding poultry industry in the Middle East and especially in Iraq where an over population of dates occur.

TABLE 8: Effect of whole date on blood characteristics

Groups	Parameter	Total Protein	Albumin (g/dl)	Glubulin (g/dl)	Glucose (Mg/dl)	Cholesterol (Mg/dl)
T0		4.11 ± 0.03 a	2.96 ± 0.03 a	1.12 ± 0.01 a	203.00 ± 1.72 a	170 ± 1.73 a
T1 2.5% dates		4.15 ± 0.01 b	2.99 ± 0.02 b	1.17 ± 0.05 b	206 ± 4.60 b	170 ± 1.15 a
T2 5% dates		4.14 ± 0.01 c	2.97 ± 0.04 a	1.14 ± 0.06 c	205 ± 3.62 c	172 ± 1.15 b
T3 7.5% dates		4.11 ± 0.01 a	2.90 ± 0.02 c	1.21 ± 0.01 d	207 ± 2.90 d	172 ± 0.59 b

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