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Economic Value of Date Pits Replaced with Maize in Broiler Chicken Diet

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Abstract: Study was conducted to evaluate the economic value of broiler chicken diets containing Date Pits (DP) replaced by maize. About 180 days old commercial broiler chickens randomly were assigned to four experimental diets; treatments 1-4 included dietary containing 0, 10, 20 and 30% of date pits, respectively. All diets were isonitrogenous and isocaloric and formulated according to Nutrient Requirements of poultry (NRC). The results showed that in compared with control group cost (kg) of feed decreased with increasing of date pits in diets. At whole of starter and grower periods, there were no significant differences ($p>0.05$) in feed intake. Feed conversion ratio of diets containing 20 and 30% of date pits was significantly more than control diet (respectively, 2.44 and 2.53 vs. 1.91) ($p<0.05$) but there was no significant difference with diet containing 10% date pits ($p>0.05$). As cost (kg) of meat production there was no significant difference ($p>0.05$) between diets, although the cost of meat production was higher in diets containing of date pits ($p>0.05$). Therefore, date pits reduce the cost of diets but not meat.

Key words: Date pits, economic value, broiler chicken, maize, Khuzestan, Iran

INTRODUCTION

The limited supply of good quality raw materials such as soybean meal, maize and cotton seed cake for the poultry feed industry has resulted in a continuous increase in the cost of production causing a phenomenal rise in the unit cost of products. Thus, these products have become too expensive for the majority of the population in different regions (Tewe, 2003; Esonu *et al*., 2003). Feed cost is perhaps the most expensive input in poultry production as it constitutes about 70-80% of the real cost of production for intensively reared stocks (Omeje *et al*., 1999). Many poultry researchers have attempted to reduce feed costs by using locally available cheaper unconventional feedstuffs.

Agro-industrial by-products in recent years become important feed components in poultry diets in some regions of the world mainly due to the increased competition for the conventional ingredients by humans and the food industries. High fiber ingredients such as dried tomato (Rahmatnejad *et al*., 2009) and date pits (Hussein and Alhadrami, 2003; Hussein *et al*., 1998) have been employed in the formulation of poultry feeds. Date pits (stones, kernels or seeds) form 6-12% of the date fruit depending on variety and quality grade. The date pits have the advantage of being locally produced in large quantities are cheap and high in energy content (Al-Bowait and Al-Sultan, 2006).

The chemical composition of date pits revealed percentages of 9.78, 5.12, 5.22, 0.84 and 11.58 for moisture, crude protein, ether extract, ash and crude fiber, respectively (Al-Hiti, 1978). Akpodiete *et al*. (2006) reported that the cost of feed reduction with increasing level of Palm Kernel Meal (PKM) in diet which is agree with other reports (Esuga *et al*., 2008; Iyayi and Davies, 2005; Ugwu *et al*., 2008; Ezieshi and Olomu, 2008). As there are large amounts of date pits in the Southeastern province of Iran and base on recommendations of literature about its values as feed stuffs, the present study was designed to compare the economic value of broiler diets contain date pits as partial replacement by maize in the control diet.

MATERIALS AND METHODS

The study was conducted in two phases; starter (0-21 days) and grower (21-42 days) phases. Four diets were tested during the starter phase. Diets were contained 0, 10, 20 and 30% date pits (mixed of palm varieties), respectively. Chemical compositions of date pits are shown in Table 1. Diets were formulated to be isocaloric and isonitrogenous. The composition of the starter and finisher diets is shown in Table 2. About 180 days old Ross 308 strain broiler type chickens chicks were randomly assigned to 4 treatments with 4 replicate pens

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Table 1: Chemical composition of date pits (%)

	Nutrients						
References	DM	CP	CF	Fat	Ash	Ca	F
This experiment	91.76	6.2700	16.420	9.57	1.312	0.865	0.097
Kamel *et al.* (1981)	92.20	5.2-6.5	16.2-22	8.6-10.4	1.100	0.49-0.57	0.12-0.31

Table 2: Composition of experimental diets (%)

	Starter diets				Grower diets			
Ingredients	1 (control)	2 (10% DP)	3 (20% DP)	4 (30% DP)	1 control	2 (10% DP)	3 (20% DP)	4 (30% DP)
Corn	59.00	49.00	39.00	29.00	63.00	53.00	43.00	33.00
Data pits	0.00	10.00	20.00	30.00	0.00	10.00	20.00	30.00
Soybean meal-44	32.03	32.70	30.91	30.86	27.79	26.40	24.50	22.50
Fish meal	3.00	3.00	4.70	5.20	2.50	3.92	5.70	7.45
Soy oil	1.81	2.03	2.40	2.66	3.25	3.82	4.42	5.03
DCP	1.50	1.20	0.90	0.35	0.90	0.50	0.10	0.00
Oyster shale	1.50	1.20	1.20	1.20	1.55	1.50	1.45	1.25
Vit.and Min. Premix	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Salt	0.40	0.35	0.3	0.22	0.32	0.30	0.28	0.16
DL-Methionine	0.2	0.00	0.08	0.00	0.1	0.06	0.05	0.02
L-Lysine	0.07	0.02	0.01	0.00	0.09	0.00	0.00	0.00
Calculated composition								
ME (Kcal kg^{-1})	2950.00	2950.00	2950.00	2950.00	3100.00	3100.00	3100.00	3100.00
Protein (%)	21.20	21.20	21.20	21.20	19.37	19.37	19.37	19.37
Ca (%)	1.10	0.96	0.98	0.91	0.96	0.94	0.92	0.91
P (%)	0.50	0.49	0.50	0.45	0.37	0.36	0.36	0.42
Lysine (%)	1.26	1.24	1.27	1.20	1.14	1.11	1.14	1.17
Met. + Cys. (%)	0.91	0.69	0.76	0.66	0.76	0.70	0.68	0.64

DP = Date Pits; DCP = Di-Calcium-phosphate; Vit.and Min.: Vitamin and Mineral; Met.+Cys.= Methionine + Cysteine; ME = Metabolisable Energy

containing 12 birds each. The average weight of chickens was 45 g and rose from 1 day old to 6 weeks of age. During the experiment birds access *ad libitum* to water and feed. The economic evaluation was performed according to amounts of feed consumption and its cost and weight of chickens and its cost; the cost of 1 kg feed and 1 kg broiler meat at the end of experiment was calculated.

Data were analyzed using the General Linear Models (GLM) procedure of SAS (SAS Inst., Cary, NC). The differences between the means of groups were separated by Duncan's Multiple Range Test. The significant level used for the group comparisons was set at $p<0.05$.

RESULTS AND DISCUSSION

The effects of substituting maize with date pits on economic value of growing broiler chicken are shown in Table 3. In compared with control group, the cost of kg feed decreased with increasing date pits in diets. During in starter phase (0-21 days), feed intake had no significant difference ($p>0.05$) between diets. Nevertheless, birds fed diet 4 (30% DP) had lower feed intake than another diets. Feed conversion ratio at the starter phases was significantly ($p<0.05$) higher in birds receiving the diets containing date pits than those receiving the control diet.

The control group had the best feed conversion ratio (1.94) than other trial diets. There were no significant difference ($p>0.05$) between bird fed control diet with bird fed diet containing date pits (10, 20 and 30%) for the cost of kg meat production. The cost of kg meat production increasing with increasing date pits in diets ($p>0.05$).

During the grower phase (21-42 day), the lowest feed intake and feed conversion ratio was belonged to bird fed diet 4 (30% DP) and control, respectively ($p<0.05$). The cost of kg meat production had no significant difference ($p<0.05$) between experiment diet. At whole of period (0-42 days), there was no significant differences ($p>0.05$) in feed intake between diet 1 (control group) with 2 (10% DP) and 3 (20% DP) diets. However, control group and bird fed diet 4 (30% DP) had significant difference ($p<0.05$). The birds fed diet 4 had least feed intake than control and other trial group. Feed conversion ratio was significantly different in diets containing 20 and 30% date pits (diet 3 and 4) and was not significant difference with diet containing 10% date pits (diet 2). However, trial 4 had highest feed conversion and bird fed died control had best feed conversion than other group. The cost of kg meat production had no significant difference ($p>0.05$) between diets. The cost of kg meat production was higher with increasing date pits in diets ($p>0.05$). In compared with control group, the cost of kg feed decreased with increasing date pits replaced with maize in diets. This

Table 3: Economic evaluation: The effects of date pits as feed ingredient of broiler chickens on cost of feed and meat

	Diet (Percentage of DP/kg DM of diets)				
Parameters	1(control)	2 (10% DP)	3 (20% DP)	4 (30% DP)	SEM*
Starter					
C_f (Rial[1])	3752.00	3420.00	3249.00	2994.00	-
FI (g)	1011.57	1029.00	1044.58	966.61	13.530
FCR	1.83^{c}	2.04^{b}	2.24^{b}	2.53^{a}	0.083
C_m (Rial)	6865.60	6978.90	7297.50	7592.30	79.600
Grower					
C_f (Rial)	3564.00	3284.00	3031.00	2768.00	-
FI (gr)	2883.20^{a}	2831.70^{a}	2726.70^{a}	2400.80^{b}	69.470
FCR	1.94^{b}	2.23^{ab}	2.52^{a}	2.53^{a}	0.091
C_m (Rial)	6922.50	7331.50	7685.20	6996.00	185.870
Total					
C_f (Rial)	3658.00	3352.00	3140.00	2881.00	-
FI (gr)	3894.80^{a}	3860.70^{a}	3771.30^{a}	3367.40^{b}	79.600
FCR	1.91^{c}	2.18^{bc}	2.44^{ab}	2.53^{a}	0.084
C_m (Rial)	6894.10	7155.200	7294.100	7491.30	128.600

DP = Date Pits; 1$ = 10052 Rial; FI = Feed Intake; FCR = Feed Conversion Ratio; C_f = The Cost of 1kg feed; C_m = The Cost of 1 kg meat production; SEM = Standard Error of Means

could be attributed to the replacement of the more expensive maize with the relatively cheaper date pits. There were no significant differences ($p>0.05$) in feed intake between diet 1 (control group) with 2 (10% DP) and 3 (20% DP) diets except diet 4 (30% DP). This result is adverse with finding of Olomu and Offiong (1980) and Olomu (1995), Also disagreement with those obtains by Ezieshi and Olomu (2004, 2008) and Iyayi and Davies (2005). In fact, the Feed conversion ratio value that is the most sensitive factor in assessing performance, significantly increased, an indication of poor utilization of diets by the birds because probably due to the higher crude fiber levels of the diets compared to the basal diet. The results agreed with obtained by Ojewola and Ozuo (2006), Hussein and Alhadrami (2003) and Ezieshi and Olomu (2004).

The results obtained from cost of kg meat production contradicts by report of Ojewola and Ozuo (2006), those reported when up to 25% PKM was used to substitute soybean meal in diets for cockerels, the performance and economic parameters considered were better than all the other diets including the control diet which contained 20% soybean meal.

Also result this experiment disagreement whit reports by Esuga *et al*. (2008) and Iyayi and Davies (2005). This could be due to the high fiber level of date pits and its gritty nature which were report to reduce digestibility and possibly the availability of nutrients especially amino acids (Onwudike, 1986; Yeong, 1983). The fiber in PKM, according to Babatunde *et al*. (1975) may be reduced digestibility of PKM protein and availability of the protein.

CONCLUSION

Therefore, use of date pits reduces the cost of diets but had no significant effect on meat cost. Thus, date pits may use in poultry diets in replacement by maize but there are no profits unless when access to maize is limit. As this could be due to the high fiber level of date pits that were reported to reduce digestibility and possibly the availability of nutrients especially amino acids so may use fibrolytic enzymes be useful.

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