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Growth Performance and Carcass Characteristics of Friesian Calves Fed Different Discarded Dates Levels as a Replacor of Yellow Corn.

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ABSTRACT

Aim of the present study was to evaluate the effect of replacing yellow corn with different levels of discarded dates in concentrate feed mixture on, feed intake, growth performance, feed conversion, carcass characteristics and economic feed efficiency of fattening Friesian calves. Twenty male Friesian calves (241.20±2.14 kg and 11 mo of age) were randomly assigned into four groups (five in each). Discarded dates (DD) was used in partial replacement of yellow corn grains (YCG) (w/w) in concentrate feed mixture at levels of 0% (G1), 33% (G2), 66% (G3) and 100% (G4), respectively. Results showed that DD contained higher CF, ash, lucien, isolucien, lysine, methionine, cysteine and histidine contents and lower OM, CP and NFE contents compared with YCG. All DD--diets slightly increased feed intake up to 66% DD. Final body weight, total and daily weight gain, and relative weight gain were higher ($P<0.05$) in G2 and G3 than in G4 and G1. Feed conversion improved ($P<0.05$) with increasing DD level up to 66% in G2 and G3. Average weights of pre-slaughtered animals, hot carcass, and boneless meat were higher ($P<0.05$), while weight and percentage of bone decreased ($P<0.05$) in G2 and G3 as compared to G1 and G4. The highest percentages of dressing and boneless meat was in G2, followed by G3, while G1 and G4 showed the lowest ($P<0.05$) percentages. Rib cut weight was higher in G3 and G2 than in G1 and G4. Percentage of lean, fat and bone was higher in G2, followed by G3, G4 and G1, respectively. Economic feed efficiency was higher for calves in G2, G3 and G4 by 19.44, 30.56 and 21.53% compared with those in G1 (control group), respectively. The current study concluded that dietary incorporation of discarded dates up to a level of 66% instead of yellow corn had impact on growth performance, carcass traits and economic feed efficiency of fattening calves. In addition, using discarded dates as by-products in ruminant diets could be useful in reducing the environmental pollution in Egypt.

Keywords: Calves, productive performance, carcass quality, discarded dates, yellow corn.

INTRODUCTION

Worldwide, a shortage of feedstuffs for the manufacture of animal feed is a serious problem that has increased following the use of maize for biofuel production to decrease environmental pollution (Farrell, 2005; El-Deek *et al*., 2010; Al-Saffar *et al*., 2013). Nutrition is a vital factor in determining the efficiency of animal production. Recycling agricultural wastes and utilization alternative energy sources for ruminant feeding is important for economical and environmental reasons. Dates are an important crop in arid and semiarid areas and had an important role in economic and social life of these countries since ancient times as a food and, their by-products as feed for animals (Al-Homidan, 2003). Egypt is one of the most important date-producing countries in the world. The annual production of dates in Egypt is about by 1.4 million tons (FAO, 2011) and quantity of cull dates is about 20% of all dates produced (Al-Yousef *et al*., 1994).

The price of energy supplements increased dramatically with the increase of demand for feeds to animals. The manufacture of dates for various purposes such as the production of molasses, alcohol, vinegar and yeast, results in by-products and residuals including inedible dates, date stones, and refuse dates (in the following referred to as date waste). These by-products represent around 20% of the global date production and have an economic value as well as a considerable nutritional value that can be recycled through animal feed production (Al-Harthi, 2006; El-Deek *et al*., 2010). The main by-products are cull dates and date pits from packing operations, and pits, press cakes and mixed date seed and fiber, from date processing, which could be used feed animals (Al-Yousef *et al*., 1994). In Egypt, agricultural by-products and agro-industry wastes are commonly used in cattle diets.

Dates could be used as an energy source to replace a part of the concentrates in the ration (Al-Dabeeb, 2005; Ziaei, 2010 and Mebirouk -Boudechiche and Araba, 2011). Energy level and source in the diet affect the animal performance and feed utilization (Nunes, 1994). The level of energy supplementation in the diet depends on animal species, heat stress and productive performance (Sumeghy, 1995; Strzetelski, 1996). Date waste contains carbohydrates, minerals such as calcium, potassium and phosphorus and is a significant source of energy, thus, it may be possible to use date waste as an energy source for ruminants (Al-Ani *et* al., 1991). Dates can supply 87% of the digestible energy provided by the same quantity traditional feed grain (Al-khateeb and Ali-Dinar, 2001).

In ruminant diets, whole dates replaced 30% of barleyin diet of Omani calves. Date-containing diets improved feed conversion and growth performance and reduced feeding cost by 8.4% as compared to barley-based ones (El-Hag and Elkhangari, 1992). In addition, the completely unbitten dates were used to replace 12.5% of a commercial pelleted concentrate in goat diets in the United Arab Emirates (Alhadrami, 1996).

The objective of the present study was to evaluate the effect of replacing yellow corn with different levels of discarded dates in concentrate feed mixture on, feed intake, growth performance, feed conversion, carcass characteristics and economic feed efficiency of fattening Friesian calves.

MATERIALS AND METHODS

This experiment was conducted at Sakha Animal Production Research Station, Institute Animal

Production Research, Agricultural Research center, Egypt, during the period of April till September 2014.

Animals and feeding system:

Twenty male Friesian calves weighing 241.20±2.14 kg and aging 11 months were randomly assigned into four similar groups (five in each group). Discarded dates namely ghoush was brought from Luxor city, sun dried and classified as unfit for human consumption or in the nutritional industries and given to the animals in crushed form (with the seeds). In the present study, crushed discarded dates were used in partial replacement of ground yellow corn (w/w) in the concentrate feed mixture (CFM) at levels of 0, 33, 66 and 100% in diets of calves in G1, G2, G3 and G4, respectively. The CFM was in pelleted form for all groups and kept in plastic bags with 50 kg capacity. CFM was offered in two equal parts daily, beside berseem hay and rice straw once daily. Water was free for the calves all the day round.

Ingredients of different experimental CFMs are shown in Table (1). Animals were individually fed according to the NRC (1996) allowances for fattening calves. Rations were adjusted to body weight every two weeks.

Table (1). Ingredients of the experimental concentrate feed mixtures in different experimental groups.

Ingredient (%)	CFM1(G1)	CFM2 (G2)	CFM3 (G3)	CFM4 (G4)
Yellow corn grains	38.00	25.33	12.67	-
Discarded dates	-	12.67	25.33	38.00
Undecorticated cotton seed cake	32	32	32	32
Wheat bran	25	25	25	25
Molasses	3	3	3	3
Common salt	1	1	1	1
Limestone	1	1	1	1
Total	100	100	100	100

Management procedures:

During an experimental feeding period of 180 days, initial and final live body weight of calves were individually recorded in the morning before drinking and feeding, then total (TWG) and average daily gain (ADG) were calculated for each animal.. Average daily feed intake was recorded and f feed conversion ratio was calculated as the amounts of total DM, TDN and DCP required per 1 kg ADG.

Chemical composition and amino acid profile:

Chemical composition of different feedstuffs and CFMs was analyzed for dry matter (DM), crude protein (CP), ether extract (EE), crude fiber (CF) and ash according to the methods of A.O.A.C. (1995), then chemical composition of different the whole diets was calculated. However, amino acids were obtained by acid hydrolysis and determined by the method of Spackman *et al*. (1958) using a Beckman 119 CL amino acid analyzer.

Carcass traits:

At the end of the experimental period, three calves from each group were randomly chosen, weighed after fasting of 16 hours and slaughtered. Upon completion of bleeding, animals were skinned, dressed out and weight of hot carcasses and edible organs (liver, heart, kidneys and spleen) was recorded. Each carcass was split into two halves. Each half was divided into fore- and hind-quarters between 11 and 12th ribs. Each quarter was weighed, deboned, boneless meat was weighed and bone weight was calculated by the difference. Cuts of 9, 10 and 11th ribs were weighed and dissected into lean, fat and bone and their weights were recorded

Economic feed efficiency:

Economic feed efficiency (EFE) was calculated as the following:

EFE (%) = (Price of average daily gain/daily feed cost) x 100.

Statistical analysis:

The obtained data were statistically analyzed using SAS (2004). The significant differences among treatment groups were tested using Duncan's Multiple Range Test (Duncan, 1955). The statistical model was:

$$\mathbf{Y_{ij} = U + A_i + e_{ij}.}$$

Where: Y_{ij} = Observed traits, U = Overall mean, A_i = Experimental groups (G1…. G4) and e_{ij} = Random error.

RESULTS AND DISCUSSION

Chemical composition:

The proximate chemical composition of the tested ingredients, CFMs and experimental rations are shown in Table (2). Results revealed that Contents of OM, CP and NFE were higher, while CF and ash contents were lower in yellow corn grain (YCG) as compared to discarded dates (DD). The present CP in DD (5.12%) were higher than 3.62% as previously reported by Awadalla *et al*. (2002). Generally, the present chemical composition of are within ranges reported by several authors, who found that date waste has shown size able amounts of nutrients, i.e. DM (83.4-92.8%), CP (2.4-7.0%), EE (1.11-3.95%), CF (2.41-1.60%) and ash (1.15-2.05%) (Hussein *et al*., 1998; Al-Homidan, 2003; El-Deek *et al*., 2010).

Composition of CFM and the experimental rations reflected marked differences, regarding their levels from YCG and DD. In this respect, contents of OM, CP and NFE decreased, while content of CF and ash increased by increasing level of replacing YCG by DD in CFM. These results are in agreement with those reported by Herms and Al-Homidan (2004), Al-Dabeeb (2005), Allam *et al.* (2013) and El-Shora *et al*. (2014).

Table (2). Chemical composition of feedstuffs and different concentrate feed mixtures and calculated composition of experimental rations.

Item	DM (%)	Composition of DM %					
		OM	CP	CF	EE	NFE	Ash
Feedstuffs:							
YCG	88.72	97.85	9.18	2.67	4.12	81.92	2.15
DD	85.26	86.46	5.12	9.18	4.43	67.63	13.54
BH	87.68	87.04	14.31	22.34	2.64	47.75	12.96
RS	89.78	82.97	2.92	36.11	1.13	42.81	17.03
Concentrate feed mixtures:							
CFM1	91.60	90.56	14.42	10.82	2.88	62.44	9.44
CFM2	91.83	90.00	13.90	11.64	2.90	61.56	10.00
CFM3	92.05	89.13	13.39	12.47	2.92	60.35	10.87
CFM4	91.59	87.80	12.88	13.29	2.96	58.67	12.20
Experimental rations:							
G1	90.52	88.72	12.67	16.92	2.57	56.56	11.28
G2	90.66	88.35	12.34	17.45	2.58	55.98	11.65
G3	90.80	87.79	12.00	17.99	2.60	55.20	12.21
G4	90.51	86.92	11.67	18.52	2.62	54.11	13.08

YCG: Yellow corn grain, DD: Discarded dates, BH: Berseem hay and RS: Rice straw.
G1= Control (100%, yellow corn) and G2, G3 and G4= replacement of yellow corn in CFM by 33, 66 and 100% discarded date (w./w.), respectively.

Amino acid profile:

Amino acid composition of DD and YCG (Table 3) showed that DD contained higher content of lucien, isolucien, lysine, methionine, cysteine and histidine compared with yellow corn grains, while phenylalanine content was higher in YCG. These values agreed well with those reported by Abd El-Rahman *et al*. (2012) and El-Sohaimy and Hafez (2010). However, methionine ranged from 0.2 to 0.5 g per kg, methionine and cysteine between 0.7 to 1.2 g per kg and lysine between 0.4 to 1.3 g per kg in DD (Hussein *et al*., 1998; Al-Homidan, 2003; El-Deek *et al*., 2010).

Table (3). Amino acid (g/kg) profile of yellow corn grain and discarded dates.

Item	Yellow corn grain	Discarded dates
Phenylalanine	7.65	5.40
Lucien	8.40	12.31
Isolucien	2.92	3.43
Tryptophan	1.35	1.98
Lysine	2.90	3.39
Methionine	1.29	2.25
Cysteine	1.15	1.95
Threonine	2.09	2.84
Histidine	1.92	2.70
Valine	2.31	2.66

Growth performance parameters:

Feed intake:

Date of average daily feed intake (ADFI) by Friesian calves (Table 4) showed that dietary replacement of YCG by DD up to 66% (G3) slightly improved ADFI, These results are in line with that mentioned by El-Hag *et al.* (1993) and El-Gasim *et al*. (1986), who found that adding DD in diets of Awassi lambs increased feed intake. This increase could be attributed to high palatability of DD-rations. In addition, El-Shora *et al*. (2014) found that cows fed 66% DD showed higher ADFI than the control and 100% DD groups. Almitairy *et al*. (2011) showed that ADFI was significantly ($P<0.05$) higher for male lambs fed 30% than 0 or 15% DD-diets, in replacing the commercial concentrate mixture. In goats, Abd El-Rahman *et al*. (2012) reported that the DM intake of rations supplemented with high DD was higher than that of other tested rations.

Table (4). Average daily feed intake of calves from the experimental rations.

Item	G1	G2	G3	G4	SEM
CFM*	6.59	6.74	6.91	6.67	
Berseem hay (BH)*	2.12	2.17	2.23	2.14	
Rice straw (RS)*	1.55	1.59	1.64	1.57	
DMI	9.28 ^{b}	9.52a ^{b}	9.79 ^{a}	9.40 ^{b}	0.13
TDN	5.81 ^{c}	6.12 ^{b}	6.42 ^{a}	5.83 ^{c}	0.11
CP	1.18 ^{a}	1.17 ^{a}	1.17 ^{a}	1.10 ^{b}	0.02
DCP	0.72 ^{c}	0.77 ^{b}	0.82 ^{a}	0.74 ^{c}	0.01

$^{a, b \text{ and } c}$: Means within the same row with different superscripts are significantly different at $P<0.05$.

Live body weight gain:

Growth performance parameters (Table 5), included final body weight, total and daily weight gain, and relative weight gain were significantly ($P<0.05$) the highest ($P<0.05$) in G2 and G3 as compared to the G4 and control group. Body weight gain of calves in G2 and G3 increased by 17.4 and 24.2%, respectively compared with those in G1. The observed improvements in ADG of calves in G2 and G3 might be due to higher intake of TDN and DCP from these rations (Table 4). These results were in line with that mentioned by Almitairy *et al*. (2011) and El-Hag *et al*. (1993) and El-Gasim *et al*. (1986), who concluded that adding DD in diets increased weight gain of Awassi lambs.

Table 5. Growth performance parameters of Friesian calves fed the experimental diets during the experimental period.

Item	G1	G2	G3	G4	SEM
Growth performance					
Initial body weight (kg)	241.4	241.0	241.6	240.80	2.14
Final body weight (kg)	400.0^{b}	427.2^{a}	438.6^{a}	407.0^{b}	3.85
Total body weight gain (kg)	158.6^{b}	186.2^{a}	197.0^{a}	166.2^{b}	4.12
Daily body weight gain (kg)	0.881^{b}	1.034^{a}	1.094^{a}	0.923^{b}	0.023
Relative daily body weight gain%	100	117.4	124.2	104.8	-
Feed **conversion:**					
DMI kg/kg gain	10.55^{a}	9.24^{b}	8.98^{b}	10.22^{a}	0.27
TDN kg/kg gain	6.60^{a}	5.94^{b}	5.89^{b}	6.34^{ab}	0.22
CP kg/kg gain	1.34^{a}	1.14^{b}	1.07^{b}	1.20^{ab}	0.06
DCP kg/kg gain	0.82^{a}	0.75^{b}	0.75^{b}	0.80^{a}	0.01

$^{a\ and\ b}$: Means within the same row with different superscripts are significantly different at P<0.05.

Also, Hassan *et al*. (2013) reported the highest ADG in lambs fed diet containing 10% DD**.** Incorporation of cull dates at 100% of yellow corn showed an improvement in growth rate in goats (Abd El-Rahman *et al*., 2012) not in fattening Najdi sheep (Al-Dabeeb, 2005).

Feed conversion:

Results in Table (5) revealed that feed conversion ratio and the amounts of DM, TDN, CP and DCP required per one kg live weight gain significantly (P<0.05) improved with increasing DD level in CFM up to 66% (G3). These results were confirmed by increasing average daily gain with increasing DD level in G3 (Table 5). These results are in agreement with those reported by El-Shora *et al*. (2014), who reported that replacement of 66% YCG by DD led to an improvement in milk feed efficiency compared with the control group of Friesian cows.

Carcass traits:

Average weights of pre-slaughter animals, hot carcass, boneless meat and edible organs were significantly (P<0.05) higher, while weight and percentage of bone was significantly (P<0.05) lower in G2 and G3 than in G1 and G4 (Table 6). However, dressing percentages $^{(1\ and\ 2)}$ were significantly (P<0.05) higher in G2 than in G3, G4 and G1, respectively. On the other hand, boneless meat percentage $^{(2)}$ was not affected by the experimental diet. However, boneless meat percentages $^{(1\ and\ 2)}$ was significantly (P<0.05) the highest in G2 than in other groups (Table 6).

Table 6. Carcass traits of Friesian calves slaughter at the end of experimental period as affected by the experimental diet.

Item	G1	G2	G3	G4	SEM
Pre-slaughter weight (kg)	372.0^{b}	397.3^{a}	408.1^{a}	378.5^{b}	3.85
Hot carcass weight (kg)	196.43^{b}	220.71^{a}	218.40^{a}	202.33^{b}	3.77
Boneless meat weight (kg)	156.22^{b}	184.73^{a}	183.23^{a}	161.32^{b}	4.04
Bone weight (kg)	40.21^{a}	36.01^{b}	35.17^{b}	41.01^{a}	0.681
Bone percentage	20.47^{a}	16.32^{b}	16.10^{b}	20.27^{a}	0.781
Edible organs weight (kg) *	10.337^{b}	11.06^{a}	11.515^{a}	9.660^{b}	0.412
Edible: hot carcass weight ratio	5.26	5.01	5.27	4.77	0.351
Dressing (%)^{1}	52.8^{b}	55.55^{a}	53.52^{b}	53.46^{b}	0.687
Dressing (%)^{2}	55.58^{b}	58.34^{a}	56.34^{ab}	55.95^{b}	0.652
Boneless meat (%)^{1}	41.99^{c}	48.70^{a}	44.90^{b}	42.62^{c}	0.548
Boneless meat (%)^{2}	44.77	49.28^{a}	47.72^{a}	45.17	0.645

$^{a\ and\ b}$: Means within the same row with different superscripts are significantly different at P<0.05.

***Edible organs including heart, kidney, liver and spleen.**

Dressing (%)^{1}: (hot carcass weight/pre-slaughter weight)×100. Dressing (%)^{2}: (hot carcass weight+edible organs weight /pre-slaughter weight)×100. Boneless meat (%)^{2}:(Boneless meat weight/pre-slaughter weight)×100. Boneless meat (%)^{2}: (Boneless meat weight+edible organs /pre-slaughter weight)×100.

Physical components of rib cut:

Results in Table (7) showed significant (P<0.05) differences among groups in rib cut weight, and lean, fat and bone percentages. Rib cut weight scored the highest in G3, moderate in G2 and the lowest in G1 and G2. Lean percentage was significantly (P<0.05) higher in G2 than in G1, but the differences between treated groups were not significant. Lean percentage declined with the increase of DD level in the diets. These findings are in agreement with El-Gasim *et al.* (1998), who found that the percentage of muscle decreased from 59.4% to 52.2% with the increase of dietary DD level from 20 to 30%. In lambs, Mohammady *et al*. (2013) found also that lean meat percentagewas higher in lambs fed DD-diet than those in control. On the other hand, Almitairy *et al.* (2011) indicated that the eye muscle area did not reflect significant differences of lambs fed DD-diets as compared to control.

It is of interest to note that fat percentage significantly (P<0.05) decreased in G2 and G3 as compared to G1 and G4. This means that fat percentage declined with the increase of DD level in the diet up to 66%, then increased at level of 100% DD. In contrary, these results disagreed with El-Gasim *et al.* (1998), who reported that, the percentage of fat increased progressively with increasing of DD by-products in the rations. Results also revealed that, lean: fat ratio was significantly (P<0.05) higher in G2 and G3 than in G1 and G4, while lean: bone ratio was significantly (P<0.05) higher in G2 and G3 than in G4 and G1. In addition, eye muscle area was significantly higher in G2 and G3 than in G1 and G4, attaining 27.84 and 26.98 cm^2 vs. 25.21 and 24.62 cm^2, respectively). These results are in agreement with those reported by Almitairy *et al.* (2011).

Table 7. Percentages of physical components of 9-10-11 rib cut of Friesian calves slaughtered at the end of experimental period as affected by the experimental diet.

Item	G1	G2	G3	G4	SEM
9-10-11 rib cut weight (Kg)	8.83^{c}	11.10^{b}	13.33^{a}	8.33^{c}	0.67
Physical components (%)1 of 9-10-11 rib cut					
Lean meat %	51.08^{b}	55.14^{a}	53.41^{ab}	52.94^{ab}	1.2
Fat %	26.37^{a}	23.78^{b}	23.56^{b}	24.61^{ab}	0.74
Bone %	22.20^{ab}	21.05^{b}	23.03^{a}	22.45^{ab}	0.58
Lean : Fat ratio	191.1^{b}	231.8^{a}	226.8^{a}	215.1^{ab}	11.6
Lean : bone ratio	230.1^{b}	261.5^{a}	231.9^{b}	235.8^{ab}	9.58
Eye muscle area (cm^2)	24.62^{b}	27.84^{a}	26.98^{a}	25.21^{b}	0.52

$^{a\ and\ b}$: Means within the same row with different superscripts are significantly different at P<0.05.

Economic feed efficiency:

Data of economic feed efficiency (EFE) presented in Table (8) showed that average daily feed cost and feed cost per kg gain significantly (P<0.05) decreased with increasing DD level in CFM up to 66% (G2 and G3), while increased by increasing DD level to 100% (G4). On the other hand, price of daily weight gain was significantly (P<0.05) the highest in G3, followed by G2, G3 and G4, respectively. These results were reflected in EFE, being the highest in G3, moderate in G4 and G2, respectively, and the lowest in G1. This finding indicated that EFE of calves increased with increasing DD level in CFM up to 66% (G2 or G3).

Table (8): Economic efficiency of Friesian calves fed different level of discarded dates

Item	G1	G2	G3	G4	SEM
Average daily feed cost (L.E.)	19.53	19.13	18.52	16.81	-
Feed cost per kg gain (L.E.)	22.19^{a}	18.57^{b}	16.99^{b}	18.27^{b}	0.92
Price of average daily gain (L.E.)	23.76^{b}	27.81^{ab}	29.43^{a}	24.84^{b}	1.2
Economic feed efficiency (%)	1.22	1.45	1.59	1.48	-

Price of one ton of CFM1, CFM2, CFM3 and CFM4 was = 2500, 2342, 2183 and 2025 LE , respectively. One ton of YCG was 2250 L.E., DD was 1000 L.E., BH was 1300 L.E. and RS was 330 L.E.. However, price of kg live body weight gain = 27 L.E.

CONCLUSION

The current study concluded that dietary incorporation of discarded dates up to a level of 66% instead of yellow corn had impact on growth performance, carcass traits and economic feed efficiency of fattening calves. In addition, using discarded dates as by-products in ruminant diets could be useful in reducing the environmental pollution in Egypt.

REFERENCES

A.O.A.C. (1995). Official Methods of Analysis 15th ed. Association of Official Analytical Chemists. Arlington, Virginia, USA.

Abd El-Rahman, H.H.; A.A. Abedo; Y.A.A. El-Nomeary; M.M. Shoukry; M.I. Mohamed and Mona, S. Zaki (2012). Response of Replacement of Yellow Corn with Cull Dates as a Source of Energy on Productive Performance of Goats Kids. Life Science Journal, 9(4).

Al- Saffar, A.A.; Y.A. Attia; M.B. Mahmoud; H.S. Zewell and F. Bovera (2013). Productive and reproductive performance and egg quality of laying hens fed diets containing different levels of date pits with enzyme supplementations. Trop. Anim. Health and Prod., 45,327-334.

Al-Ani, A.N.; S.A. Hassan and R.A. Al-Jassim (1991). Dried date pulp in fattening diets for Awassi lambs. Small Rum. Res., 6: 31-37.

Al-Dabeeb, S.N. (2005). Effect of feeding low quality date palm on growth performance and apparent digestion coefficients in fattening Najdi sheep. Small Ruminant Researches, 57:37–42 .

Alhadrami. G.A. (1996).Effects of date supplimentation and crossing with Dhofari goats on the fattening performance of local goats in the United Arab Emirates. J. Food Agric;8 (1) : 63-72.

Al-Harthi, M.A. (2006). The influence of date waste meal supplemented with either enzymes, probiotics or their combination on broiler performance. Egypt. Poult. Sci. J., 26: 1031-1055.

Al-Homidan, A.H (2003). Date waste, whole dates and date pits as ingredients in broiler diets. Egypt Poult. Sci. J., 23: 15-35.

Al-Khateeb, A.A. and Ali-Dinar H.M. (2001). Date Palm (Phoenix dactylifera L.): Production and research inKingdom of Saudia Arabia. The Date Palm International Symposium, Windhoek, Nambia.

Allam, S.M.; M.A. Ali; M.M. Bendary; M.M. El-Nahrawy and A.A. El-Bana (2013). Evaluation of discarded date palm: 1-Nutritive value and ethanol production. Egyptian J. Nutrition and feeds, 16(2), Special Issue: 213-218.

Almitairy, M.H.; A.N. Alowaimer; A.M. El-Waziry and G.M. Suliman (2011). Effects of feeding discarded dates on growth performance and meat quality traits of Najdi Lambs. Journal of Animal and Veterinary Advances, 10(17): 2221-2224.

Al-Yousef, Y.M.; F.N. Al-Mulhim; G.A. El-Hag and G.A. Al-Gasim (1994). Apparent digestibility of discarded dates and date pits together with other agricultural by-products. Annals Agric. Sci., Ain shams Univ., 39(2):655-662.

Awadalla, I.M.; Y.A. Maareck; M.I. Mohamed and M.S. Farghaly (2002). Response to partial replacement of yellow corn in Rahmani lambs rations with ground date seeds on growth rate, digestion coefficients, rumen fermentation and carcass traits. Egypt. J. Nut. and Feeds., 5 (2): 139-154.

Duncan, N.B. (1955). Multiple ranges and multiple F test.

El.Sohaimy, S.A. and E.E. Hafez (2010). Biochemical nutritional characteristics of date palm fruits (Phoenix dactylifera L.) J. Applied. Sci. Res. 6: 1060-1067.

El-Deek, A.A.; Y.A. Attia and M.A. Al-Harthi (2010). Including whole inedible date in grower-finisher broiler diets and the impact on productive performance, nutrient digestibility and meat quality. Animal, 4, 1647-1652.

El-Gasim, E.A.; G.A. El-Hag; A.H. Khattab; A.I. Mustafa and I.E. Al-Shaib (1986). Chemical and nutritional evaluation of the by-products of date processing industry. Proceeding of the Second Symposium on Date Palm in Saudi Arabia, 11: 181-194.

El-Gasim, E.A.; Y.M. Al- Yousef and A.G.M. Humeida (1998). Hormonal activity of date pits and flesh used as animal feed for meat animals. Proceedings of the 2nd Symposium on Date Palm, (DP'86), King Faisal University, Saudi Arabia, pp: 425-431.

El-Hag, G.A.; Y.M. Al-Yousef and F.N. Al-Mulhim (1993). A study of different proportions of dates in the ration of sheep. In: Proceeding on the III Symposium on the Date Palm in Saudi Arabia. King Faisal University, Al-Hassa, KSA, pp. 343–350.

El-Hag, M. G. and H. H. El-Khanjari (1992). Dates and sardines as potential animal feed resources. World Animal Review, 73 (4).

El-Shora, M.A.; M.H. Abo El-Fadel; T.A. Deraz and Y.M. El-Diahy (2014). Effect of using Discarded dates on productive and reproductive performance of lactating Friesian cows. J. Animal and Poultry Prod., Mansoura Univ., Vol. 5 (12); 775-789.

FAO (2011). FAOSTAT. Food and Agriculture Organization of the United Nations.

Farrell, D. (2005). Matching poultry production with available fee resources: issues and constraints. World's Poult. Sci. J., 61: 298-307.

Hassan, S.A.; H.Y. Al-Baiati and J.E. Almosawy (2013). Effect of Substitution of Barley by Whole Dates on Performance and Digestion of Awassi Lambs. KSU J. Nat. Sci., 16(3): 12-15.

Herms, I.H. and A.H. Al-Homidan (2004). Effects of using date waste (whole dates and date pits) on performance, egg components and quality characteristics of Baladi Saudi and Loghorn laying hens. Egyptian J. Nutr. and Feeds, 7 (2): 223-241.

Hussein, A.S.; G.A. Alhadrami and Y.H. Khalil (1998). The use of dates and date pits in broiler starter and finisher diets. Bioresource Tech., 66: 219-223.

Mebirouk-Boudechiche, L. and A. Araba (2011). Effect of addition of dates rubbish grazing on animal performance of Berber ewes and their lambs. Revue de Médecine Vétérinaire, 162 (3): 111-117.

Mohammady, M.; I.M. Khattab; M.F. Shehata; A.M. Abdel-Wahed and K.Z. Kewan (2013). Growth performance, carcass traits and economic efficiency of Barki lambs fed Azzawi date. Egyptian J. Anim. Prod., 50(2):77-84.

NRC (1996). *Nutrient requirement of Beef cattle*. National Research Council. National Academic Press, Washington DC.

Nunes, C.S. (1994). Microbial probiotics and their utilization in husbandry. Portuguesa de Ciencias Veterinarias, 89: 166-174.

SAS (2004). SAS/STAT User's Guide: Volumes 1-7. SAS Institute Inc., Cary, North Carolina.

Spackman, D.H.; W.H. Stein and S. Moore (1958). Automatic recording apparatus for use in chromatography of amino acids. Anal. Chem., 30 (7):1190-1206.

Strzetelski, J. (1996). Modern principles and methods of fattened cattle nutrition. Instytut zootechniki biuletynin formacyjny, 34: 45-65.

Sumeghy, L. (1995). Production-oriented veterinary management and its results on the Holstein-Friesian dairy farm of Mczohegyes stud-estate Co. Magyar Allatorvosok Lapja, 50: 529-532.

Ziaei, N (2010). The effect of dietary Alhagi (Camel grass) ensiled with different levels of low quality date palm on apparent nutrient digestion coefficients in Kermani sheep. Res. J. Biol. Sci., 5 (4): 314-317.

أداء النمو وخصائص الذبيحة لعجول الفريزيان المغذاة علي مستويات مختلفة من البلح الفرز كبديل للذرة الصفراء

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هدفت هذه الدراسة الي الحصول علي افضل نسبة استبدال للذرة الصفراء بالبلح الفرز في العلائق المركزة وتأثير ذلك علي خصائص النمو ، وخصائص الذبيحة والكفاءة الاقتصادية في عجول الفريزيان المسمنه. استخدم في هذه الدراسة ٢٠ عجل فريزيان بمتوسط وزن ٢٤١±٢.١٤ كجم وعمر ١١ شهر قسمت عشوائيا الي اربعة مجموعات (خمسة عجول بكل مجموعة). تم استبدال الذرةالصفراء بالبلح الفرز (وزن/ وزن) بنسب المجموعة الاولي كنترول ٠%، المجموعة الثانية ٣٣% ، المجموعة الثالثة ٦٦% ، المجموعة الرابعة ١٠٠%.وكانت اهم النتائج المتحصل عليها كالاتي:- اظهرت النتائج ان البلح الفرز يحتوي علي نسبة مرتفعة من الالياف الخام والرماد والاحماض الامينية (ليسئين، ايسوليسن، ليسين، ميثيونين، سيستين و الهستدين) وانخفاض المادة العضويه والبروتين الخام المصتخلص خالي الازوت مقارنة بالمجموعة الذرة. اظهر الحيوانات المغذاة علي علائق البلح الفرز زيادة في المأكول وكانت اعلها في المجموعة الثالثة.. كان الوزن النهائي للحيوانات و معدل الزيادة اليومية والكلية والنسبية مرتفعا معنويا في المجموعتين الثانية والثالثة مقارنة بالاولي والرابعة كذلك معدل تحويل الغذاء. زاد وزن الحيوانات قبل الذح ووزن الذبيحة الساخن واللحم معنويا بينما انخفض الوزن والنسبة المئويه للعظام في المجموعتين الثانية والثالثة مقارنة بالاولي والرابعة. كانت النسبة المئوية للحم والدهن والعظام اعلي في المجموعة الثانية تلاها المجموعة الثالثة ثم الرابعة ثم المجموعة الاولي علي الترتيب.١- اظهرت المجموعة الثانية اعلي نسبة تصافي ونسبة لحم تلاها المجموعة الثالثة ثم الاولي ثم الرابعة علي الترتيب. ٢- ارتفعت الكفائة الاقصادية للتغذية في المجموعة الثانية والثالثة والرابعة بحوالي ١٩.٤٤، ٣٠.٥٦، ٢١.٥٣% مقارنة بالكنترول. وتوصي الدراسة بان استبدال الذرة الصفراء بالبلح الفرز بنسبه مئوية تصل الي ٦٦% له تأثير ايجابي علي خصائص النمو وخواص الذبيحة والكفاءة الاقتصادية للتغذية لعجول الفريزيان المسمنه بالاضافة الي ذلك فان استخدام البلح الفرز كمخلف زراعي في تغذية المجترات يكون مفيد في تقليل التلوث البيئ في مصر.