

## Effects of Feeding Discarded Dates on Growth Performance and Meat Quality Traits of Najdi Lambs

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**Abstract:** A total of 21 Najdi male lambs were used to evaluate inclusion of discarded dates in lambs' diets. Experimental diets are presented in two levels 15 and 30% to replace commercial concentrate mixture. The results showed that daily feed intake was significantly ( $p < 0.05$ ) higher in 30% group than control group. Feed conversion ratio did not differ significantly ( $p > 0.05$ ) between the treatment groups. The highest averages of daily gain and final weight were attained by 30% group which is significantly ( $p < 0.05$ ) higher than that of the control group followed by the 15% group that is not differ significantly ( $p > 0.05$ ) from both other groups. Carcass components showed no significant differences between the treatments except for liver and lungs and trachea. The results revealed that feeding lamb on 30% discarded date was associated with improving meat quality traits as juiciness, flavor and general acceptability.

**Key words:** Discarded-dates, lambs, meat, price, energy, Najdi

### INTRODUCTION

Palm date is produced largely in the hot and arid regions of the Middle East and North Africa and remains an extremely important subsistence product in many of the desert areas. The palm tree is a tolerant crop that withstands harsh environmental conditions as high temperatures, strong winds and soil salinity. Saudi production of date fruits is estimated to be 9,91,000 ton. Due to increasing production and processing of dates, the discarded quantities are also increase as an inevitable result.

Discarded dates are characterized by having high Total Digestible Nutrient (TDN) and being palatable for livestock (Al-Dobaib *et al.*, 2009). Many animal-herds' owners in different countries that producing dates are using discarded dates as a supplement to their animals' feed and Saudi farmers are not an exception. It is the high time to use local unconventional sources of feed to fill the gap between demand and supply of the limited feed resources and to substitute the conventional high-priced imported sources.

Hence, the objective of this study was to evaluate inclusion of discarded dates in sheep diet and their effects on animal growth performance and meat quality characteristics.

### MATERIALS AND METHODS

**Experimental animals:** In this study, 21 males (3 months old) of Najdi lambs were used. They were ear tagged then distributed into three groups of seven animals each according to their mean live weight (23 kg).

**Feeds and feeding:** Individual feeding was applied throughout the experiment. Each animal was put in a separate pen and provided with feeding and watering facilities. Three iso-caloric and nitrogenous rations were formulated (Table 1). The control ration contained 73% of a commercial concentrated mixture in addition to 27% alfa alfa hay (*Medicago sativa*). The other two rations were formulated to replace 15 and 30% of the control ration concentrate with discarded dates (low

Table 1: Experimental ratios formulation

Ingredients	Control	Discarded dates (%)	
		15	30
Alfa alfa hay	27.03	27.03	27.03
Discarded dates	0.00	15.00	30.00
Barley	65.02	46.61	28.21
Soy bean	5.18	8.59	11.99
Limestone	0.77	0.77	0.77
Sodium chloride	0.80	0.80	0.80
Vitamins	0.20	0.20	0.20
Sodium bicarbonate	1.00	1.00	1.00

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grades and processing byproducts), respectively. Alfa alfa hay was also added to the other both rations at the same percentage of the control.

**Experimental period:** The experiment was extended for 84 days. Formulated rations were introduced gradually to the animals during the 1st 2 weeks pre-experimental period. During it all lambs were vaccinated and drenched against internal and external parasites. Animals were weighed every 2 weeks after an overnight fast except for water and the average daily gain was calculated. At the end of feeding period, slaughter weight was recorded after 12 h fasting while providing drinking water and then lambs were exsanguinated by completely severing jugular and carotid vessels without stunning. After skinning and evisceration, slaughter data were taken. These included hot and cold carcass weights, dressing percentage, body-parts' weights, eye-muscle area and body fat thickness.

**Meat quality parameters:** Meat final pH was recorded after 24 h using a pH-meter (MP model 220, Mettler Toledo, USA). Meat color components L\*, a\* and b\* were recorded immediately after slaughtering over the eye muscle using a colorimeter (Minolta chroma meter CR-400, Japan). A longissimus dorsi muscle was taken to evaluate shear force using a Warner-Bratzler shear force device as Shanks *et al.* (2002)'s procedure. Cooking loss percentage was also performed. Meat chemical composition was obtained according to AOAC (1990). Meat:bone:fat ratio was calculated (Paulino *et al.*, 2005) and Sarcomere length was obtained according to Cross *et al.* (1981) protocol.

**Statistical analysis:** Data obtained were analyzed using one-way ANOVA of statistical package SAS (1990). Then differences between mean were separated by Duncan's multiple range test (Steel and Torrie, 1980).

**RESULTS AND DISCUSSION**

Growth performance of the animals allocated to the treatments is shown in Table 2. Final weight, daily gain and daily feed intake were significantly ( $p < 0.05$ ) different between the treatments. Lambs fed on 30% discarded dates attained the highest ( $p < 0.05$ ) values for the three parameters compared to the control group and not so with the 15% group. These results were in line with that mentioned by El-Hag *et al.* (1993) and El-Gasim *et al.* (1986) who concluded that adding discarded dates in diets of Awassi lambs increased gain. This could be attributed to the palatability of the ration that contained higher

percentage of discarded dates which lead to higher feed intake. Feed Conversion Ratio (FCR) did not differ ( $p > 0.05$ ) between the treatment groups. This result was in agreement with that obtained by El-Gasim *et al.* (1986) and Al-Dabeeb (2005). No improvement was observed in 30% cold carcass weights were highest ( $p < 0.05$ ) in 30% discarded dates group. This result also was in line with that stated by El-Gasim *et al.* (1986). Carcass components are shown in Table 3. They were not differ ( $p > 0.05$ ) between the treatment groups except for lungs and trachea and liver. Table 4 shows meat chemical composition of the animals. All parameters of chemical composition did not differ between the treatments except for ash where, 15% group attained the highest ( $p < 0.05$ ) percentage. Studies regarding effect of conventional diets

Table 2: Growth performance of Najdi lambs fed on experimental rations contained different levels of discarded dates

Parameters	Control	Discarded dates (%)	
		15	30
Initial weight (kg)	22.14±1.35	23.13±1.43	22.99±1.05
Final weight (kg)	35.93±2.32 <sup>b</sup>	38.00±1.96 <sup>ab</sup>	40.92±3.45 <sup>a</sup>
Daily gain (g day <sup>-1</sup> )	162.25±36.0 <sup>b</sup>	174.90±15.27 <sup>ab</sup>	210.98±34.96 <sup>ab</sup>
Feed intake (g day <sup>-1</sup> )	1201.82±181.87 <sup>b</sup>	1299.59±89.97 <sup>ab</sup>	1465.89±258.66 <sup>a</sup>
FCR	7.61±1.37	7.47±0.80	6.97±0.68
Hot carcass wet (kg)	18.10±1.01 <sup>b</sup>	18.91±1.27 <sup>ab</sup>	20.22±2.05 <sup>a</sup>
Dressing (%) on hot carcass weight	48.57±3.75	49.29±2.34	49.37±1.67
Cold carcass weight (kg)	17.40±1.42 <sup>b</sup>	18.52±1.45 <sup>ab</sup>	19.90±2.04 <sup>a</sup>
Dressing (%) on cold carcass weight	48.49±3.81	48.72±2.09	48.58±1.63

Table 3: Carcass components of Najdi lambs fed on experimental rations contained different levels of discarded dates (based on hot carcass weight)

Parameters (%)	Control	Discarded dates (%)	
		15	30
Head	5.86±0.33	5.63±0.40	5.65±0.51
Feet	3.24±0.21	3.06±0.21	3.41±1.04
Skin	10.63±1.12	11.18±1.59	11.42±0.72
Kidneys	0.51±0.10	0.49±0.05	0.55±0.09
Kidneys' fat	0.75±0.12	0.67±0.11	0.72±0.28
Heart	0.93±0.15	0.96±0.17	0.93±0.22
Lungs and trachea	2.92±0.41 <sup>a</sup>	2.47±0.26 <sup>b</sup>	2.44±0.32 <sup>b</sup>
Liver	3.88±0.30 <sup>ab</sup>	3.63±0.35 <sup>b</sup>	4.21±0.62 <sup>a</sup>
Spleen	0.42±0.07	0.38±0.04	0.41±0.12
Tail	8.50±2.74	10.67±1.72	10.34±1.53

Table 4: Meat chemical compositions of Najdi lambs fed on experimental rations contained different levels of discarded dates (on fresh weight basis)

Parameters (%)	Control	Discarded dates (%)	
		15	30
Moisture	68.15±2.170	68.63±1.35	67.58±2.311
CP	20.18±0.580	19.54±0.74	20.25±0.820
EE	11.16±1.930	10.14±1.71	11.24±2.730
Ash	1.05±0.220 <sup>b</sup>	1.45±0.21 <sup>a</sup>	1.31±0.200 <sup>ab</sup>

<sup>a, b</sup>Means in the same row with different superscripts are significantly different ( $p < 0.05$ )

Table 5: Meat pH and color of Najdi lambs fed on experimental rations contained different levels of discarded dates

Parameters (%)	Control	Discarded dates (%)	
		15	30
pH	5.70±0.08	5.77±0.12	5.76±0.09
Color:L*	44.12±1.45	45.19±3.11	45.08±2.05
a*	17.22±0.79	16.85±1.35	17.25±1.25
b*	6.86±1.12	6.68±0.90	6.91±0.73

Table 6: Carcass traits of Najdi lambs fed on experimental rations contained different levels of discarded dates

Parameters	Control	Discarded dates (%)	
		15	30
Eye muscle area (cm <sup>2</sup> )	14.32±2.560	12.83±2.070	14.58±2.250
Fat over eye muscle (mm)	5.50±1.220	6.50±1.370	6.83±1.720
Subcutaneous fat (mm)	12.33±1.630 <sup>b</sup>	10.66±1.750 <sup>b</sup>	13.00±1.780 <sup>b</sup>
Bone (%)	4.70±24.11	3.68±19.29	3.35±21.45
Muscle (%)	6.05±41.13	5.92±40.76	4.57±41.65
Fat (%)	6.70±31.63	5.30±35.94	5.74±33.36

Table 7: Shear force, cooking loss and sarcomere length of Najdi lambs fed on experimental rations contained different levels of discarded dates

Parameters (%)	Control	Discarded dates (%)	
		15	30
Shear force (kg cm <sup>-2</sup> )	3.00±0.45	3.04±0.32	3.04±0.40
Cooking loss (%)	39.43±1.71	38.47±3.79	35.77±2.75
Sarcomere length (µm)	1.16±0.14	1.09±0.08	1.15±0.02

on meat characteristics are well reviewed (Oddy *et al.*, 2001; Thompson, 2002; Salvatori *et al.*, 2003; Olfaz *et al.*, 2005; Maiorano *et al.*, 2007).

The results obtained here are comparable to that mentioned by Abdullah and Musallam (2007) and Suliman and Babiker (2007). Meat pH and color components did not differ between treatment groups (Table 5).

The obtained result here where comparable to those showed by Abdullah and Musallam (2007) and Suliman and Babiker (2007). Results of carcass traits are shown in Table 6. Eye muscle area did not reflect significant differences between the treatments although, 30% group attained the highest value (14.58±2.25). This result is totally going with the highest (p>0.05) percentage of carcass muscle attained by the group.

Both total carcass fat and over eye muscle fat did not differ between the treatments while subcutaneous fat was significantly (p<0.05) greater in 30% group. Carcass bone did not show differences between the tested groups. Table 7 shows shear force, cooking loss and sarcomere length. No significant differences were observed regarding these parameters.

### CONCLUSION

It is founded that adding discarded dates to diets for feeding lambs up to 30% will improve quality of the meat and reducing total cost of production.

### RECOMMENDATION

It is recommended that discarded dates could be added in diets for feeding lambs as a source of energy at the least price than conventional sources.

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