

The Effect of Replacing Barley with Ground Date Seeds on the Performance of Growing Male Goats

Short Communication

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ABSTRACT

This study was conducted to investigate the effect of replacing barley with different levels of ground date seeds (GDS) in the diet (0, 15, 30 and 45%) on performance of local growing male goats. Sixteen local male kids (average live weight 16.1±1.41 kg) were allocated randomly to four treatments (4 animal/treatment). The trial consisted of a 14 day acclimatization period followed by a 60-day measurements. The chemical analysis revealed that the ground date seeds used in this study contain (%) 6.3, 8.7, 62.4, 49.5 and 3.7 of crude protein, crude fat, neutral detergent fiber, acid detergent fiber and ash respectively. The results showed that there were no significant differences in the average daily gain (54.38, 56.67, 44.58 and 47.92 g) or total gain (3.28, 3.40, 2.68 and 2.88 kg) and also in the total intake (35.12, 28.53, 28.12, and 29.15 kg) or in the intake of the concentrate, although the hay intake was higher ($P<0.05$) for the control compared with other treatments (8.33, 5.82, 6.18 and 6.3) for 0, 30, 15, and 45% ground date seeds respectively. There was no significant ($P>0.05$) difference in feed conversion rates (11.09, 8.98, 12.24 and 11.50) between the treatments. Economic criteria indicated that increasing the levels of ground date seeds in the ration resulted in a decrease in the cost of total intake (12.08, 8.82, 7.48 and 6.57 LD) for 0, 15, 30, and 45% treatments respectively. It was shown that the net return was doubled with inclusion of 15, and 45% GDS when compared with control ration (8.2 and 7.8 vs. 4.3). It was observed that the relative economic efficiency was increased with increased ground date stone levels. The current study concluded that ground date seeds can be included in the ration of local growing goats up to 15% without any detrimental effect on performance. However, the economic benefit could be obtained up to 45% ground date seeds.

KEY WORDS date seeds, goat in Libya, growth trials, inconvenient feedstuff.

INTRODUCTION

Goats are the most popular domesticated animals in the world and provide meat and milk for the society. Goats are scavenger animals and efficient browsers, so that, they are popular with small holders. They adapt to a wide range of climatic and nutritional conditions which could possibly be accounted for worldwide distribution (Goatcher and Church, 1970). Goats are distributed throughout Libya making valuable contribution to the livestock sector.

According to FAO production yearbook (2010) estimated goat population is 2700000 head, making about 34% of the total livestock population in the country. This number has a contribution of about 40% of milk production in Libya (Haenlein, 2001). Akraim (2012) reviewed goat production in Libya and stated that the systems of production are based on rain-fed range land and crop residues. It is obvious that the main constraint of animal production in Libya is the availability of feeds that meet animal requirements. However, there are many agricultural and industrial by products

can be manipulated and/or treated to include them in animal ration. [Abo El Nor *et al.* \(1995\)](#) found improvement in dry matter intake when ground date seeds comprise 30% of goat male ration. Inclusion of ground date seeds up to 20% in the ration of male goats improved feed conversion rate compared to control diet ([Fayed *et al.* \(2001\)](#)). Cull dates also, could efficiently be used as useful ingredients in the ration of small ruminants taking into account the right proportion of dates added and could be economically sound in hot climate countries ([Abd El Rahman *et al.* \(2012\)](#)). This study was therefore conducted in order to investigate the effect of replacing barley by different levels of ground date seeds on the performance of growing kids.

MATERIALS AND METHODS

This study was conducted in the experimental station belonging to the department of animal production, Sebbha University, Sebbha, Libya (27° 02' N 014° 26' E).

Growth trial

Animals and diets

Sixteen local male kids (five months old and average live weight 16.1±1.41 kg) were allocated randomly to four treatments (4 animal/treatment). The animals were maintained in stall feeding system, where they received the concentrates and Lucerne hay *ad libitum*. The trial consisted of a 14 day acclimatization period followed by a 60-day measurement. Treatments were consisting of replacing barley with different levels of ground date seeds in the diet (0, 15, 30 and 45%) Table 1.

Chemical analysis

Rations and the individual components were chemically analysed for dry matter, organic matter, crude protein, ether extract, neutral detergent fibre (NDF) and acid detergent fibre (ADF). The moisture content was determined by drying at 102 °C for 24 h. The organic matter content was determined by ignition in a muffle furnace at 500 °C overnight.

The total nitrogen content was determined using a Kjeldahl technique and crude protein (CP) was calculated by multiplying N content by 6.25 ([AOAC, 1990](#)). The neutral-detergent fibre (NDF) and acid-detergent fibre (ADF) were determined by the methods of [Goering and Van Soest \(1970\)](#), Table 2.

Measurements

Feed intakes were monitored daily from the amount given to the animals and the amount refused. Daily weight gains were determined from changes in body weight by weighing the animals each two weeks. Feed conversion rate was calculated by dividing total feed intake by total body gain.

Table 1 Composition of the experimental rations (%)

Ingredients	Control	15% GDS	30% GDS	45% GDS
Barley grains	60	45	30	15
Ground date seeds	0	15	30	45
Soybean meal	11	12	13	13.5
Wheat bran	25.8	24.8	23.8	23.3
Limestone	2	2	2	2
Salt	1	1	1	1
Mineral-vitamin premix	0.2	0.2	0.2	0.2
Total	100	100	100	100

GDS: ground date seeds.

Table 2 Chemical composition of feed ingredient (%)

Content	GDS	Barley grains	Lucerne hay	Wheat bran	Soybean meal
Dry matter	91.2	92.5	92.8	91.8	90.0
Crude protein	6.3	10.7	18.1	15.9	44
Ether extract	6.7	2.7	1.9	2.6	1.7
NDF	62.4	36.2	31.4	41.9	11.9
ADF	49.4	5.7	26.1	10.8	7.8
Ash	3.7	2.4	8.9	3.4	6.0

GDS: ground date seeds; NDF: neutral detergent fiber and ADF: acid detergent fiber.

Statistical analysis

Data were analysed using [SAS \(1996\)](#). Differences between means were tested as mentioned by [Duncan \(1955\)](#). The following statistical model was used:

$$Y_{ij} = \mu + t_i + e_{ij}$$

Where:

Y_{ij} : the response.

μ : the general mean.

t_i : the treatment effect.

e_{ij} : the experimental error.

RESULTS AND DISCUSSION

Table 2 revealed that ground date seed used in this study contains fairly little crude protein, and this was in agreement with figures found by [Yousif *et al.* \(1996\)](#) and [Shawket *et al.* \(2010\)](#), but slightly less than the results of [Fayed *et al.* \(2001\)](#), on the other hand the current result was higher than results obtained by [Besbes *et al.* \(2004\)](#). Ether extract content of ground date seeds was slightly high, and this was comparable with findings of [Al Masri \(2005\)](#). Neutral detergent fiber in ground date seeds was comparatively high, and this was in agreement with those reported by [Sallam *et al.* \(2007\)](#) who stated that NDF was 61.4%. These differences may be attributed to cultivars or growing conditions.

Crude protein of the ration decreased with increasing levels of ground date seeds (Table 3) and this in fact, related to the differences of crude protein between barley grains and ground date seeds (10.7 vs 6.3), however these

rations covered the protein requirements for growing goats according to Libyan specifications and standards for animal feeds.

Table 3 Chemical analyses of experimental rations (%)

Content	Control	15% GDS	30% GDS	45% GDS
Dry matter	91.6	91.8	92.2	91.8
Organic matter	93.1	91.3	90.0	91.9
Ash	6.8	8.7	7.9	8.1
Crude protein	13.4	12.7	12.4	11.7
Ether extract	2.1	3.7	3.9	5.0
NDF	39.5	42.7	50.9	54.9
ADF	10.6	20	25.7	28
Metabolisable energy* (kcal/kg)	3159	3237	3002	3041

* From Cheeke *et al.* (1982).

GDS: ground date seeds.

The data shown in Table 4 summarize animal performance.

Table 4 Effect of replacing barley with ground date seeds on the performance of male kids

Parameters	Treatment (% Ground date seeds)			
	0	15	30	45
Initial body (wt/kg)	16.8± 1.67 ^a	15.7± 1.15 ^a	15.5± 1.29 ^a	16.3± 1.53 ^a
Final body (wt/kg)	20.1± 1.95 ^a	19.1± 1.40 ^a	18.1± 1.59 ^a	19.1± 1.92 ^a
Total gain (kg)	3.28± 0.39 ^a	3.4± 0.50 ^a	2.68± 0.63 ^a	2.88± 0.57 ^a
Daily weight gain (g)	54.38± 6.50 ^a	56.67± 8.36 ^a	44.58± 10.57 ^a	47.92± 9.56 ^a
Concentrate intake (kg)	26.8± 2.36 ^a	22.71± 2.19 ^a	21.95± 1.77 ^a	23.02± 2.57 ^a
Roughage intake (kg)	8.33± 0.39 ^a	5.82± 0.57 ^b	6.18± 0.37 ^b	6.13± 0.46 ^b
Total feed intake (kg)	35.12± 2.20 ^a	28.53± 2.31 ^a	28.12± 2.07 ^a	29.15± 2.68 ^a
Feed conversion rate	11.09± 1.30 ^a	8.98± 1.47 ^a	12.24± 2.46 ^a	11.5± 2.53 ^a

The means within the same row with at least one common letter, do not have significant difference ($P>0.05$).

It can be noted that although there were no significant differences between treatments in respect of total body weight, daily weight gains, and feed conversion rate, but inclusion of 15% ground date seeds was numerically better than the control in feed conversion rate and daily weight gain (8.98 vs 11.09) and (56.67 vs 54.38) respectively.

CONCLUSION

The results of the current study were in agreement with that of Awadalla *et al.* (2002) who used 25% of ground date seeds in place of yellow corn in Rahmani rams rations. Al-Owaimer *et al.* (2011) and Shawket *et al.* (2010) found improvement in lamb performance reflected in feed conversion

rate and satisfactory growth gain when they used ground date seeds and barley and *Atriplex halimus* as a roughage source. It can be concluded from these findings that ground date seeds can be included in the ration of local growing goats up to 15% without any detrimental effects on animal performance.

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