

Performance of breeding male camels fed sole dry moth fodder vis-à-vis complete feed blocks

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Received: 4 December 2009; Accepted: 19 September 2010

ABSTRACT

The study was conducted to assess the variations in body weight, feed and water intake over a period of 5 months and adequacy of energy, protein and macro-minerals in breeding male camels fed dry moth fodder and complete feed blocks. Eight Jaisalmeri breeding male camels (5–9 years old; 681.13 ± 20.13 kg BW) were randomly divided into 2 groups of 4 each and were fed dry moth fodder (T1) and complete feed blocks (T2) consisting of dry chaffed *guar* straw (65.25%), dry chaffed groundnut fodder (20%), molasses (4%), *guar churi* (6%), wheat bran (4%), mineral mixture (0.25%) and common salt (0.50%) for 147 days. The camels of both the groups showed decrease in body weights and feed intake/100 kg body weight till 3 months after which improvement was observed. The body weight loss was nonsignificantly higher in T1 (7%) than in T2 (3%). During digestibility trial, the daily DMI kg or DMI kg/100 kg BW were observed to be 4.6, 7.86 or 0.73, 1.08 in T1 and T2 respectively. Significantly higher digestibility coefficients of OM, CP and EE were observed in T2 than in T1 camels. Because of higher daily DMI and digestibility coefficients, the intake of DCP and TDN was 206.07 and 85.06% higher in T2 group than T1 group, former being significant. The mineral absorption of Na, K, P was significantly lower in T1 camels while reverse was true for Mg. The study inferred that feeding of complete feed blocks was better for camels in terms of body weight maintenance, energy, protein and minerals utilization.

Key words: Breeding, Complete feed blocks, Macro-minerals, Male camels, Nutrient utilization

Unlike male cattle and buffaloes, the male camels exhibit peaks of sexual vigor called rut or musth and this period coincides with the onset of winter. The behavioural features of male camels in rut, are grinding of teeth, gurgling sounds from mouth and throat, biting neck and legs of other camels, copious secretions from poll glands, protrusion of soft palate, white frothy saliva from mouth, typical standing posture of hind legs stretched wide apart, frequent urination and vigorous wagging of tail along with appetite loss resulting in body weight loss (Rathore 1986, Gahlot 2000). Such signs are not commonly observed in cattle and buffaloes. The feeding of energy supplementation to breeding male camels during winter is advantageous (Anonymous 1992-93) to meet their maintenance requirements. In Rajasthan, camel owners generally give supplementation of sesame oil plus jaggery to breeding male camels to maintain their live weights and libido which is a costly affair. Dry moth (*Phaseolus aconitifolius*) fodder or chara is normally fed to camels. It is not sufficient to maintain camels during breeding season.

Some supplements like crushed barley, linseed oil plus jaggery as suitable supplementation have already been tried on male camels and proved useful (Jakmola and Roy 1995, Nagpal *et al.* 2000). In this study, performance of breeding male camels fed dry moth chara was compared with those given complete feed blocks.

MATERIALS AND METHODS

Breeding male camels (8) of Jaisalmeri breeds (5–9 years of age) having body weight of 681.13 ± 20.13 kg were selected from the institute camel herd. The camels were randomly divided into 2 groups on the basis of body weights. One group of 4 camels was fed dry chaffed moth (*Phaseolus aconitifolius*) fodder while the second group of 4 camels was given complete feed blocks consisting of dry chaffed *guar* straw (65.25%), dry chaffed groundnut fodder (20%), molasses (4%), *guar churi* (6%), wheat bran (4%), mineral mixture (0.25%) and common salt (0.50%). The complete feed blocks weighing 3–5 kg were prepared on feed block formation machine at 2500 PSI developed by IARI, Pusa, Delhi. The camels were housed in separate pens for individual feeding in a shed with asbestos roof, sandy floor. The fresh

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drinking water was offered to all the animals daily once at 1430 hours. Animals were fed *ad lib.* dry moth fodder and complete feed blocks for 5 months from 5 December 2004 to 30 April 2005. The camels were allowed walking exercise daily in the morning. Daily weighed quantity of feed was given during morning and feed residue was recorded next day. The water intake was measured individually twice a week during the feeding trial. In the third month i.e. February 2005 of feeding trial, a digestibility trial of 5 days' duration was conducted on all the camels to determine the nutrient utilization. The total faecal output was measured by harnessing faecal bags to individual animals. The pooled samples of experimental feed, fodder and faeces were analyzed for proximate principles, phosphorus (AOAC 1990). The calcium and magnesium in water, feed and faeces were analyzed by complexo-metric titration methods (USSLS 1968). Sodium (Na) and potassium (K) in water, milk, feed, faeces and serum were estimated on flame photometer. The data were subjected to Student's t-test as described by Snedecor and Cochran (1994).

RESULTS AND DISCUSSION

Chemical composition of dry moth fodder and complete feed blocks fed to the experimental camels is given in Table 1. The breeding male camels showed their characteristics rutting features of standing with legs apart, raising and lowering their tails, protrusion of soft palate with white salivary froth etc. during the rut phase. During the 5 months of feeding trial starting from December 2004 the rutting male camels showed continuous decline in body weights and daily feed intake till March 2005 and showed increase thereafter. The loss in body weight was 7.70 and 3.00% in T1 and T2 respectively (Table 2). This was because of seasonal sexual and breeding behavior of the male camels. The decrease in body weights was more in group T1 camels as compared to T2 camels. Further the feed intake was more in T2 camels than in T1 camels because of higher palatability of complete

Table 1. Chemical composition of moth chara, complete feed blocks (DMB) and drinking water on fresh basis

Parameter	T1 (Moth fodder)	T2 (Complete feed block)	Water
Proximate components (%)			
CP	10.49	14.15	-
EE	3.55	1.81	-
CF	17.92	21.10	-
Total ash	14.18	11.79	-
NFE	53.86	51.16	-
Macro-minerals (g/kg) (mg/litre)			
Na	0.215	2.121	230
K	11.02	13.65	4.056
Ca	32.27	16.39	68.14
P	1.76	2.07	7.0
Mg	6.79	8.79	46.17

Table 2. Variations in the monthly body weights, feed intake and water intake of breeding male camels

Parameter	T1 (Moth fodder)	T2 (Complete feed block)
No. of camels	4	4
Body weights (kg)		
5-Dec- 04	662.00±16.19	700.25±20.97
5-Jan- 05	654.25±9.28	697.50±18.87
5-Feb- 05	639.50±15.84	691.25±20.38
5-March- 05	611.00±15.07	679.50±35.98
Body Wt. loss, kg/d	0.57±0.16	0.23±0.35
5-April 2005	620.00±19.78	698.50±37.43
30-April 2005	681.75±27.42	730.50±37.46
Feed intake, kg/d (Feed intake kg/100 kg B.Wt.)		
December 2004	6.62±1.49 (1.00)	11.64±1.03 (1.66)
January 2005	6.14±0.88 (0.94)	8.74±2.21 (1.25)
February 2005	5.43±0.90 (0.85)	7.79±1.56 (1.27)
March 2005	4.95±0.42 (0.81)	8.30±1.74 (1.22)
April 2005	8.22±0.75 (1.36)	10.22±1.23 (1.46)
Water intake, Litre/d (water intake litre/kg feed intake)		
December 2004	13.6±4.05 (2.05)	26.2±2.70 (2.25)
January 2005	15.4±3.60 (2.51)	19.3±3.67 (2.21)
February 2005	16.3±2.17 (3.00)	23.6±2.99 (3.03)
March 2005	16.2±1.73 (3.27)	27.2±4.75 (3.28)
April 2005	30.3±2.33 (3.69)	40.3±2.94 (3.94)

feed blocks having more nutrients than the sole dry moth fodder ration. Daily feed intake as well as feed intake kg/ 100 kg body weight showed continuous decline till March 2005 after which there was rise, however it was below the normal level of around 1.5% of the body weight. The breeding male camels on an average lost 16.24% of body weight from December to March and regained 17.09% during April to July (Anonymous 1989–90). Similar trend of decline and rise in body weight and feed intake of breeding male camels was observed by Nagpal *et al.* (2009) during 151 days period of study starting from December. It was further reported (Anonymous 1992–93) that male camels showed reduction in feed intake by 20–30%, the body weight loss ranged from 20–60 kg per breeding stud. Reduction in dry matter, water intake and body weight of breeding male camels unexposed to female camels was 33.8, 26.6 and 8.4% during 10 week study of Bhakat *et al.* (2005) while reduction was still more and 45.5, 29.8 and 9.6% in male camels exposed to female camels indicating the influence of rutting intensity on nutrient intake. Jakhmola and Roy (1995) reported that camels maintained in a 3×3 latin square design on sole roughage ration of dry moth chara lost 145 g/100 kg a day while loss was reduced by 63% in camel supplemented crushed barley and the loss was merely 10% that occurred on sole moth chara. Mokhtar *et al.* (1989) observed that camels need 1.00 kg DMI/100 kg body weight for maintenance of their live weights below which they lose their weights.

Table 3. Daily DM intake and its digestibility in breeding male camels

Parameter	T1 (Moth fodder)	T2 (Complete feed block)
No. of camels	4	4
Feeding	Moth chara	Complete feed block
Body weights kg	625.25±15.27	685.50±28.06
DMI (kg/d)	4.589±0.67	7.854±1.69
DMI kg/100 kg B. Wt.	0.73±0.10	1.08±0.20
Water intake (litre/d)	13.42±1.76	20.08±4.18
Water intake litre/kg dry matter intake	3.05±0.45	2.74±0.29
Digestibility (%)		
DM	56.65±1.99	58.26±1.20
OM*	66.24± 0.83	70.41±1.06
CP**	50.92±0.97	70.32±0.59
EE**	7.95±2.38	42.85±1.27
CF	58.34±1.14	58.48±1.33
NFE	75.69±1.05	76.34±1.27
Nutrient intake		
DM (kg/d)	4.589±0.67	7.854±1.69
DCP (kg/d)	0.247±0.04	0.756±0.17
TDN (kg/d)	2.636±0.41	4.83±1.14
ME (MJ/d)	39.70±6.16	72.76±17.12
DM (g/kgW ^{0.75})	36.64±5.23	57.03±13.66
DCP (g/kgW ^{0.75}) *	1.97±0.32	5.68±1.38
TDN (g/kgW ^{0.75})	21.04±3.19	36.35±9.14
ME (MJ/kgW ^{0.75})	0.32±0.05	0.55±0.14
Nutritive value (%)		
DCP	5.38	9.63
TDN	57.51	61.51

* P<0.05, ** P<0.01.

During the digestibility trial, DMI kg/100 kg body weight was more in T2 group (1.08) than in T1 group, which was below normal feed intake of around 1.6–1.8% of body weights (Jakhmola and Roy 1995, Nagpal *et al.* 2000) sufficient to maintain the body weights, hence the camels of both the groups lost their body weights (Table 3). Water intake litre/kg DMI was statistically similar between 2 groups. The digestibility coefficients of OM, CP and EE were significantly (P<0.01) higher in T2 camels given complete feed blocks than in T1 camels. Because of higher daily DMI and digestibility coefficients, the intake of DCP and TDN was 206.07 and 85.06% higher in T2 group than T1 group. On the basis of metabolic body weight basis also, the nutrient intake of DCP, TDN and ME was higher in T2 camels as compared to T1 camels. Nutritional value of sole dry moth roughage ration was lower than the complete feed blocks having concentrate ingredients. Almost similar values of DMI and digestibility coefficients of proximate principles were observed in breeding male camels given moth fodder and concentrate (Nagpal *et al.* 2000). Body weight loss/gain is a function of protein/energy intake, the lower nutrient intake by breeding male camels resulted in body weight loss. Higher

Table 4. Intake and apparent absorption (%) of macro minerals in stud camels

Parameter	T1 (Moth fodder)	T2 (Complete feed block)
Na intake (g/d)		
Feed	0.99±0.14	16.08±3.10
Water	3.09±0.41	4.62±0.83
Total	4.07± 0.49	20.70± 3.86
Faecal outgo (g/d)	2.50± 0.21	2.66±0.44
Absorbed (g/d)	1.58±0.51	18.50± 3.42
Na absorption (%) **	36.50±8.11	86.96±0.41
K intake (g/d)		
Feed	50.57±7.39	103.51± 19.95
Water	0.05±0.01	0.08±0.01
Total	50.62±7.39	103.60±19.96
Faecal outgo (g/d)	6.71±1.15	4.25±0.42
Absorbed (g/d)	43.91±6.31	99.35±19.66
K absorption (%) **	86.84±0.78	95.45±0.85
Ca intake (g/d)		
Feed	148.07±21.64	124.29±23.96
Water	0.91±0.12	1.37±0.25
Total	148.99±21.69	125.66±24.18
Faecal outgo (g/d)	164.33± 23.13	119.21±20.11
Absorbed (g/d)	-15.35±8.77	6.46±6.77
Ca absorption (%)	-11.35±7.87	2.94±4.55
P intake (g/d)		
Feed	8.08±1.18	15.70±3.03
Water	0.09±0.01	0.14±0.03
Total	8.17±1.19	15.84±3.05
Faecal outgo (g/d)	9.37±1.00	10.75±1.44
Absorbed (g/d)	-1.20±0.39	5.09±1.82
P absorption (%)**	-17.14±7.51	28.10±6.69
Mg intake (g/d)		
Feed	31.16±4.55	66.66±12.85
Water	0.62±0.08	0.93±0.17
Total	31.78±4.59	67.59±13.00
Faecal outgo (g/d)	9.33±2.30	43.86±7.61
Absorbed (g/d)	22.44±3.08	23.72±5.94
Mg absorption (%)**	71.12±4.30	33.49±3.69

**P<0.01.

supplementation is required to maintain the body weights of camels.

Total intake of macro minerals of Na, K, P and Mg was higher in T2 camels than in T1 camels due to higher DM intake and higher mineral contents of complete feed block (Table 4). The Ca intake was higher in T1 than in T2 because of higher Ca contents of moth fodder (32.27 g/kg). The contribution of water towards Na intake was significant (76%) in total Na intake in T1 and 22% in T2 while those of K, Ca, P and Mg varied between 0.08 to 1.95% in both the groups since the water had low levels of these minerals. The per cent absorption of Na, K, and P from the gastro-intestinal tract was significantly (P<0.01) higher in T2 as compared to those in T1 camels. The absorption of Ca was even negative in T1 in spite of higher Ca intake which might be due to

antimetabolite present in moth fodder or improper Ca : P ratio. Garg *et al.* (2005) reported that Ca is absorbed from the gut according to body needs. Significant higher Mg absorption was observed in T1 than in T2. Higher intake of macro-minerals and their apparent absorption at higher dietary level in rutting camels was also observed by Nagpal *et al.* (2000). Because of various factors involved in mineral absorption, it is suggested that the mineral requirements of animals should be given as absorbed/retained mineral levels rather than mineral contents of feeds which are generally not true values.

The results showed that complete feed block feeding was beneficial to the breeding male camels in terms of lessening body weight loss, higher protein, energy and minerals utilization but higher level of supplementation is required to maintain the live weight of stud camels.

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