بسم الله الرحمن الرحيم

Feedlot performance of dromedary camel (*Camelus dromedarius*) calves fed different dietary regimes

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Abstract

The aim of the present study was to evaluate the feeding performance of Sudanese dromedary camel calves kept under controlled management systems and fed three different dietary regimes. It was also aimed to compare the body weight obtained by using direct weighing bridge and the body weight obtained by using certain body dimensions. The study was carried out at the Animal Research Unit, College of Veterinary Medicine and Animal Production, Khartoum North (Kuku). Twelve growing dromedary male camels were used in the 70 days study trial. The average initial body weight of the calves was 175.75 ± 0.25 kg. The calves were randomly divided into 3 groups, of 4 animals each. The calves in each group were randomly allotted into a separate iso-caloric and iso-nitrogenous dietary treatment. The fattening performance of experimental camels was significantly (P<0.05) affected by dietary treatments. Dry matter (DM) intake, average daily weight gain and feed conversion ratio were significantly (P<0.05) different among dietary treatments. Kenana feed (complete fattening pellets) tended to be superior for daily weight gain (0.815kg), daily DM intake (4.35kg) and final live body weight (233.28kg). Camels fed diet of cottonseed cake (CSC) had lowes (P<0.05) feed intake (3.99kg) and daily gain (0.591kg) with poor feed conversion ratio (9.98). Prediction of body weight from body measurements has been proved in this study. The results showed that there was a high correlation (p<0.0001) between body weight obtained by direct weighing using a weigh bridge and the body weight obtained using certain body measurements.

Keywords: Camels; performance; body weight & measurements.

Introduction

Sudan is well-known as one of the largest camel (*Camelus dromedarius*) populated countries in the world. The total camel population of Sudan is estimated as 3 million heads (Ministry of Animal Resources, Sudan, 1999) while there are about 20 millions camels in the world (FAO, 1990). In Sudan camels are classified into pack and riding (Babiker, 2000). They are concentrated in Butana region of North-eastern Sudan, in Kordofan and Darfur States (in the Northern dry lands of Sudan). Camels are raised for a variety of purposes including riding, racing, ploughing, packing and loading of goods. Camel meat and milk are important staples and essential components for the pastoralist's life. There is a growing interest in slaughter of camels, particularly the young calves (around 1 – 2 years of age), as a favourable source of meat in many countries such as Libya, Egypt and the gulf countries in the Arabian Peninsula. In Sudan, proper data on the potential of camels for meat production are lacking. The objectives of this study are to investigate the actual performance of camel calves fed three different dietary regimes. Also this study aimed to predict live body weight from body measurements and compare these results with body weight obtained through direct weighing using a static weighing scale.

Materials and Methods

Animals and diets: Twelve male Sudanese dromedary camel calves, of two years old and an average weight of 175.75 ± 25 kg were used in a 70- day feeding trial. The calves were purchased from the local animal market of Omdurman (*El Moueleh*). The experiment was conducted at the College of Veterinary Medicine and Animal Production, Sudan University of Science and Technology, Kuku. Khartoum North. After the camels were received at

the experimental unit, they were de-wormed and treated against both internal and external parasites. All were ear-tagged for easy identification. The camel calves were randomly divided into 3 similar groups (of 4 animals each) and then each group was housed in a separate shaded pen.

Three complete concentrate diets containing different dietary feed ingredients were formulated for the experiment and offered to the animals beside the roughages and green fodder. The diets were iso-caloric and iso-nitrogenous. Before beginning feeding trial, camels were adapted to the experimental diets for a period of three weeks. The three diets were *Kenana* pelleted feed, cotton seed cake (CSC) and groundnut cake (GNC). Percentages of the ingredients of the experimental diets are shown in Table 1, except for the *Kenana* feed where the ingredients were not provided by the manufacturer. The metabolizable energy (ME), crude protein (CP) and crude fat (CF) were calculated according to Ellis (1980)..

Dry matter intake: The feed intake of each group was calculated as the difference between the residual amount of feed remaining and the amount offered. The average dry matter values of feed were measured and the dry matter intake was then determined.

Live weight gain: The calves were weighed individually and on weekly basis. Initial live weight, weekly live body weight and final live body weights were measured and recorded. Two methods were applied to obtain the body weights:

a- Using a weighing bridge of 1000 kg capacity where this technique was used in the morning before feed is offered to the animals.

b- Simultaneously, the body weights of all experimental calves were calculated after recording certain body dimensions using a plastic tape

according to the following equation as described by Kohler-Rollefson *et al*. (2001):

Live body weight (kg) =

shoulder height X chest girth X hump girth X 50kgs.

Where: **Shoulder height** = height of the shoulder (in meters).

Chest girth =Distance (in meters) around the camel's chest measured in front of the hump and behind the front legs and chest pad.

Hump girth =Distance (in meters) around the camel's body measured at its widest point from the top of the hump around the belly.

Statistical analysis: The data of feed intake, FCR and growth rate measured by both methods were subjected to analysis of variance using the SPSS as described by Snedecor and Coehran (1980).

Results and Discussion

According to the experimental design, initial body weights of the experimental camels were similar. The fattening performance of the experimental camels was significantly ($P<0.05$) affected by dietary treatments (Table 2). This result agrees with Bakkar *et al*. (1998) and Mohamed (2006) who observed a clear variation in camel performance when fed different types of rations. DM intake, average daily weight gain and feed conversion ratio (FCR) were significantly ($P<0.05$) different among each of the three dietary treatments (Figs. 1, 2 and 3). Camels fed *Kenana* diet had a higher daily weight gain, daily DM intake and final live body weight than the other two groups. This work showed a higher value for average daily weight gain than that recorded by Al Saiady *et al*. (2006) who recorded

0.741 kg average daily weight gain during 90 days when camels fed 75% concentrate and 25% hay. However, the result for FCR (7.74 DM kg/gain) was nearly similar to the findings of this study. Animals offered GNC were intermediate in daily weight gain and DM intake. The average daily weight gain of this group are comparable with the results obtained by Dabiri *et al*. (2003) who reported 0.688 kg body weight gain for camels at 1-2 years old. Camels fed diet of cottonseed cake had a lower ($P<0.05$) feed intake and lower daily weight gain with poor feed conversion ratio. A wide range of FCR (10.76 DM kg/day) for Sudanese camels calves aged 24 months old and weighed 376.2±42.21kg was reported by El Badawi and Yacout (1999). The distinction of *Kenana* feed diet may be due to it's uniformity as pellets of low moisture content and high palatability. Mohamed (2006) fed growing dromedary camels, of 2 years old, with two types of rations. The control group was offered complete diet at 3% (on dry basis) of camel body weight while the other group was fed a ration containing black cumin seed cake (35%), molasses (18%) and a mixture of different straws (45%). The results indicated that camels fed black cumin diet were superior in average weight gain compared with the control group (930 g vs. 886 g). However, the DM intake didn't differ significantly among the two diets (8.97kg vs. 8.95kg for control and black cumin, respectively). Similar results were further demonstrated by Bakkar *et al*. (1998) who investigated three types of diets and recorded that pelleted diet group had a higher gain (932g) than the other groups (803g and 767g).

Prediction and estimation of dromedary body weight are sometimes urgently needed particularly in the field where accurate weight determining devices are lacking. Prediction of body weight from body measurements has been tried in this experiment and the results were compared to those

obtained using a weighing bridge. The results showed that there was a highly significant correlation ($P<0.001$) between the body weight results obtained by the two methods (Fig. 4). Similar results were reported by Yacout *et al.* (2006). The latter researchers explained that the confidence was more reliable with chest circumference (CC) and abdominal girth (AG) measurements. It seems that both of (CC) and (AG) could be taken as indices to predict the body weights of dromedary camels.

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Table 1. **Ingredients and composition of the experimental diets.**

Diets/ Ingredients	Diet A (Kenana) (%)	Diet B (CSC) (%)	Diet C (GNC) (%)
Sorghum grain	N.A.	30	30
Molasses	N.A.	28	29
Cottonseed cake	N.A.	27	---
Groundnut cake	N.A.	----	21
Wheat bran	N.A.	9	8
Groundnut hulls	N.A.	3	10
Urea	N.A.	1	---
Limestone	N.A.	1	1
Salt	N.A.	1	1
Total	-	100	100
CP%	17	16.5	16
CF%	11.2	12.95	10.34
ME (MJ/kg DM)	10.5 MJ/kg	11.48 MJ/kg	10.93 MJ/kg

Table 2. **Effects of different dietary regimes on performance of growing camels.**

Diets Parameters	Diet 1 (Kenana)	Diet 2 (CSC)	Diet 3 (GNC)	SE
No. of camels	4	4	4	----
No. of weeks	10	10	10	----
Initial live weight (kg)	175.5+12.68	75.75	176.0	9.91
Final live weight (kg)	233.28	217.58	221.56	12.52
Average daily gain (kg)	0.815+0.34[a]	0.591b	0.678	0.867
Average daily dry matter intake (kg)	4.53+0.58[a]	3.99+0.52[b]	4.42+0.72[a]	0.13
Feed conversion efficiency	7.14+3.9[a]	9.98+6.8[b]	6.86+3.09[a]	1.11

ab values within the same rows are significantly different at level (P<0.05).

Fig. 1. Daily weight gains of experimental camels.

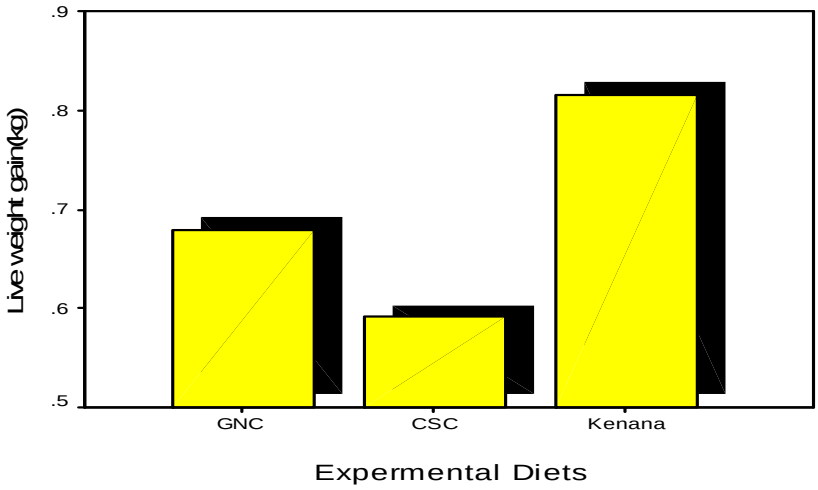


Fig. 2. Dry matter intake of experimental camels.

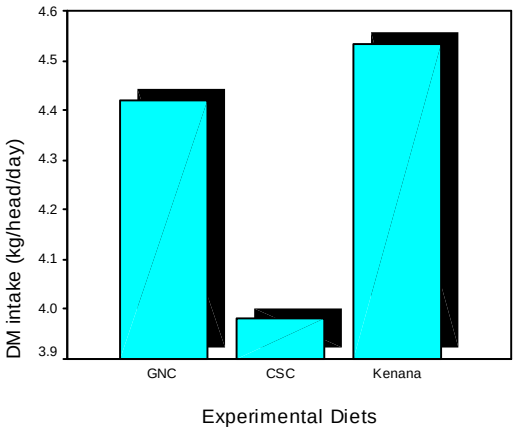


Fig. 3. Feed conversion efficiency of experimental camels.

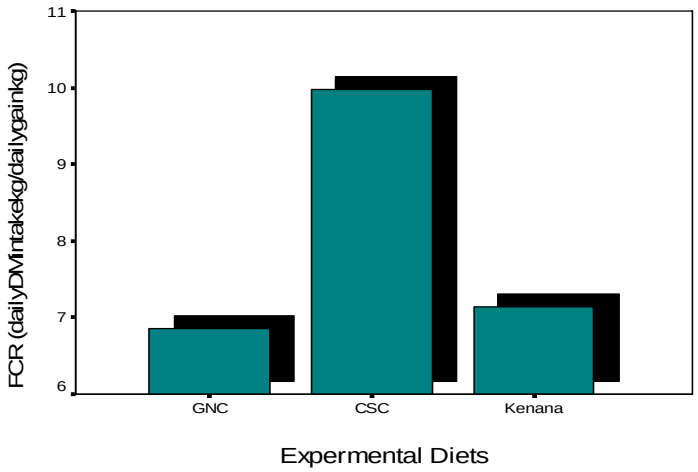
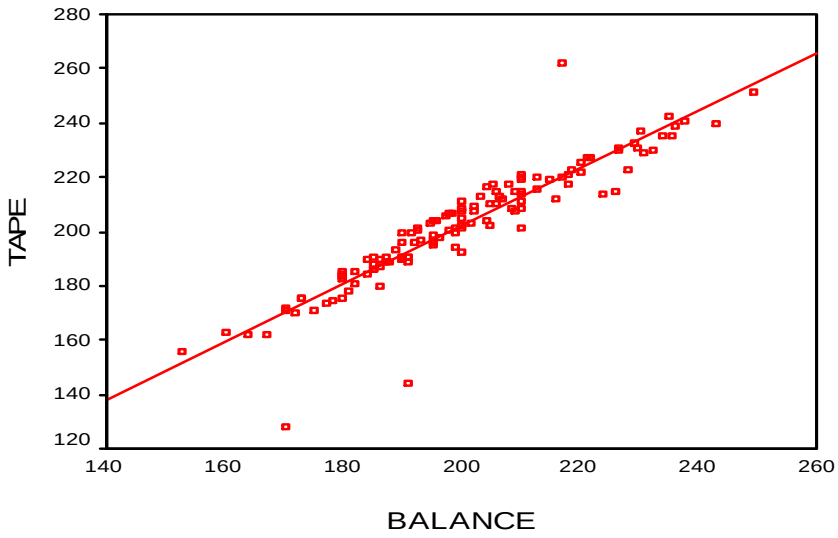


Fig. 4. Liner regression of relationship between live body weights and body measurement.



(y= a + bx)