

## CAMEL MEAT : PRESENT STATUS AND FUTURE PROSPECTS

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Camel is an important component of the desert ecosystem. The camel is likely to produce animal protein at comparatively low cost in the arid zones based on those feeds and fodder which remain generally unutilized by other domestic species either due to their size or food habits. Further, this species has great tolerance to adverse environmental conditions in the arid zones, for example, high temperature, high solar radiation, water scarcity, poor vegetation and sandy terrain. The camels, therefore, can be raised economically for meat in these ecologically constrained areas. The trends in its meat production, utilization and improvement are reviewed and future thrusts are indicated.

Camel meat is used for human consumption in several countries but not so commonly in India. The reluctance for camel meat is because it is rough, coarse fibred, watery and sweetish in taste. Consequently, very few scientific studies have been conducted in India to explore the potentials of camel meat production and popularisation. Studies elsewhere indicate that appearance, colour, texture and palatability of the camel meat is very similar to that of beef if the animals are slaughtered at the right age (Khatami, 1970; Mukasa-Mugerwa, 1981). Besides, the carcass from well fed camel has layer of good quality fat.

### Live weight

Average live weight is reported to be 554 kg for males and 514 kg for females in Somali dromedary (Congui, 1953) region and 554 kg for males and 309 for females in the Ogaden region (Dina and Klinteberg, 1977). Williamson and Payne (1978) observed average live weight of dromedary camels in the range of 454-590 kg. The average weight of Bikaneri breed at the National Research Centre on Camel, Bikaner in different age groups is presented in Table 1.

Ahmedieve (1966) reported average body weight of Bactrian camel as 477.2 kg at the age of 2 to 3 years. He opined that it is most economical to slaughter animals at this age. There is considerable variation in the live weights of mature dromedaries and Bactrian camels. This daily weight gain and average live weight greatly depend upon breed, its genetic potential, proper management and disease control. The average

potential daily weight gain of Bikaneri camel (dromedary) under improved management at the National Research Centre on Camel, Bikaner is shown in Table 1.

Table 1. The average body weight and daily weight gain of Bikaneri camels in different age groups.

Age group (years)	No. of observation	Av body wt (kg)	Daily wt gain (g)
0-1	18	170.2	437
1-2	15	259.8	472
2-3	11	323.0	461
3-4	14	371.5	497
4-5	15	496.1	645
5-6	8	572.9	552
6-7	13	594.4	472
7-8	6	631.9	720
8-9	6	613.1	473
9-10	2	610.2	407
10	33	639.0	333

The feeding schedule during the period consisted of fodder and feed on the following scale (Table 2).

Table 2. Feeding schedule of camels

Age groups	Fodder	Feed Concentrate Mix
0-6 months	2.5 kg	500 g
6-12 "	2.5 kg	500 g
1-2 years	5 kg	1.0 kg
2-3 years	8 kg	1.5 kg
Above 3 years	12 kg	2.5 kg
Studs	14 kg	3.0 kg

Wilson (1978) accounted the mean live weight, carcass weight and dressing percentage for males as  $447.9 \pm 84.10$ ,  $231.3 \pm 49.18$  and  $51.4 \pm 2.88$  kg and those of females as  $414.4 \pm 50.83$ ,  $196.3 \pm 24.94$  and  $47.4 \pm 3.25$  kg for Darfur camel in Sudan.

#### Dressing percentage

The killing out percentage of camel generally varies from 55 to 65%. According to Kuznetsov and Tretyakov (1972) the camel carcass consists of 52.8%- 76.6% meat, 0-4.8% fat and 15.9-38.1% bones. Average carcass weight of Iranian dromedary is reported to be 300-400 kg (Khetami, 1970) and that of Bactrian camel to be 650 kg. Bremaud (1969) gave average carcass weight of camels in northern Kenya as 286 kg.

In Darfur camels, males generally have a higher dressing percentage than females (Wilson, 1978). Table 3 provides dressing characteristics of camels compared to pastoral cattle as studied by Mukasa-Mugerwa (1981).

Table 3. Dressing percentage in camels and pastoral cattle (Source: Mukasa-Mugerwa, 1981)

Animal	Dressing percentage	References
Dromedary Camel	41.3 -- 55.9	Wilson (1978), Congiu (1953), Dina & Klinteberg (1977)
Bactrian Camel	52.7 — 76.6	Kuznetsov and Tretyakov (1972)
	56 — 70	Williamson and Payne (1978)
	48 — 50	Dahl & Hjort (1976)
Pastoral Cattle	45 — 50	Dahl & Hjort (1976)

Obviously dressing percentage of camel is higher than that of pastoral cattle.

The mean weight of appendages, as percentage of mean live weight, was calculated by Wilson (1978). He observed mean carcass weight ( $208 \pm 38.78$  kg) as  $60.7 \pm 2.09$  per cent of the live weight. Appendages included skined head, feet and hide with mean weight  $12.1 \pm 1.81$ ,  $14.6 \pm 2.25$  and  $34.8 \pm 6.11$  kg; respectively being  $3.6 \pm 0.32$ ,  $4.3 \pm 0.37$  and  $10.2 \pm 0.81$  per cent of live weight.

#### Meat quality

With the increase in age, an increase in the meat toughness and a reduction in the palatability and quality is reported (Dahl and Hjort, 1976). Ahmedieve (1966) opined that most economical and best age for slaughtering the camel was  $2\frac{1}{2}$  years. According to Rossetti and Congiu (1955) meat of camels was more prized than cattle in Somalia. Leupold (1968), Fischer (1975) and Knoess (1977) asserted that meat of young camel is comparable in taste and texture to beef. The sweet taste of camel meat has been attributed to glycogen. Nasr et al. (1965) reported a comparative study of camel meat and beef in respect of water, protein and fat contents.

There have been a number of studies on preservation of camel meat and its effects of quality. Hamman et al. (1962) reported effects on chemical composition. Heikal et al. (1973) and El-Magoli et al. (1973) reported effects of age and sex on composition of camel meat. Abdullah and Amin (1978) reported chemical composition, effect of proteolytic enzymes on chemical, physical and organoleptic characteristics of camel meat. Afifi (1972) made comparative studies on digestibility of beef, buffalo, camel and mutton fats. The antimicrobial and preservative studies were conducted by Al-Delaimy and Barakat (1971), El-Gharbawi et al. (1974) and Foda et al. (1976).

Some nomadic people consume blood of camels (Mukasa-Mugerwa, 1981). There is no indication as to exactly how much blood can be recovered from a single camel. However, Wilson (1978) reported that about 9.1% of the final carcass weight is lost in the form of blood and other body fluids. Congiu (1953) estimated that, on an average, approximately 12 kg liver and 15 to 20 kg fat from hump could be recorded from camels having 514-554 kg weight. Kulaeva (1964) studied meat characteristics of the Bactrian camel. He reported that meat resembled that of beef and contained about 73-76% protein and 1.9 to 5.19% of the dressed carcass was hump fat.

### Future prospects

The camel plays an important role in traditional transport as a beast of burden specially for short distances where there are still no roads in the arid and semi-arid zones. Emphasis has to be placed on exploiting the potential of camel as a source of meat and milk will require multidisciplinary research and developmental work on the economic maintenance of animals, development of camel meat technology, marketing and social awareness. Research on increasing growth rate in camel herds and augmenting reproductive performance are some of the areas where investigations are needed. With the development of consumer acceptance, marketing system would need to be developed to encourage the same. Simultaneous marketing of camel milk and milk products could also be investigated as a strategy for developing awareness of consumers towards camel by-products. Optimum utilization of infrastructure available in the traditional camel breeding areas improvement of range land management will form the case of a stratified camel production system.

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