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Camel dairying: An Indian perspective

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Camel in Indian context is considered as an integral part of desert eco-system and existence of camel in other parts of this country is largely not known where it is sustaining mainly due to its milk (Mehta and Sahani 2004). Camel milk is being utilized to a great extent in the south and south-eastern districts of Rajasthan and adjacent Madhya Pradesh. Mewari breed of camel is prevalent in these regions. The breed is adapted to the hilly terrains of *Arawali* hills of south Rajasthan and is one among the four major breeds of camel in India (Rathore 1986, Khanna *et al*.2004, Mehta *et al*. 2007). The camel milk is three-time richer in vitamin C (Farah *et al*. 1992) and rich in iron, zinc, copper, sodium, magnesium, manganese and potassium (Sawaya *et al*. 1984, Abu-Lehia 1987) and low in lactose (Elamin and Wilcox 1992) as compared to the cattle milk. Recently much attention has been paid on the utilization of the inherent properties of camel milk for human health (Gorakhmal *et al*. 2000, 2001, Sahani *et al*. 2005) but the milk production potential of the species remains largely unexplored. This study was therefore focused to document the actual production and sale of camel milk in this country, to discuss the shift of selection criteria from draught to milk and to explore the possible contribution of breeding camels for milk production in *in situ* conservation of the species.

The data about the sale of camel milk was collected from 61 camel breeders of Udaipur, Rajsamand, Chittorgarh, Bharatpur and Alwar districts of Rajasthan, and Neemuch and Mandsour districts of Madhya Pradesh. The livestock census figures (Livestock Census, GOI 2003) were utilized for extrapolating the number of females in milk and the production of camel milk, utilizing percentage at the district level. The milk production data of the state (Anonymous 2005) and different countries (FAOSTAT data 2005) were collected, analysed and discussed.

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Mewari Camel Model: Milk production, sale, livelihood and conservation: The status of production and sale of camel milk in the selected districts of the western Rajasthan and adjacent Madhya Pradesh are presented in Table 1. On an average about 8.69, 14 and 5 q of camel milk is sold daily in the Udaipur, Chittorgarh, and Neemuch and Mandsour districts, respectively. The data so collected revealed that of the total camels kept by the breeders, 30-35% are lactating females and about 3.3 litres of milk per female is sold in the market. The prevailing rate of camel milk in these districts is Rs 7-8/litre. This statistics estimates that about 21 562 females are in milk at a time, producing about 70 675 litre milk/day which amounts to 23 080 thousand litre/annum (Livestock Census 2003). The per day revenue generated out of the sale of camel milk has been estimated to be Rs 526 343. The contribution of camel milk in comparison to the total milk produced by cattle, buffalo and goat was estimated to be 0.97% or roughly about 1% (Anonymous 2005). This figure appears very meager but has great meaning in terms of livelihood and conservation of genetic resources. Apart from feeding its own calf and the family members of the camel breeders, on one hand it is providing livelihood to about 3 218 families maintaining approximately 22 526 members (Mehta and Sahani 2004) with average annual income of about Rs 60 000 and on the other hand it is sustaining 56 360 camels in its natural habitat and helping us to fulfill our national commitment of conservation of domestic animal diversity.

Adoption of Mewari camel model

Due to the inherent properties of the camel milk (Sawaya *et al*. 1984, Abu-Lehia 1987, Elamin and Wilcox 1992, Farah *et al*. 1992, Gorakhmal *et al*. 2000, 2001, Sahani *et al*. 2005), the utility and social acceptability of the camel milk and its products is expected to increase further. The Mewari camel model has served the purpose of nutritional and financial security and has conserved the sizable population of the breed *in situ*. If the Mewari camel model is adopted, it is expected that at any time about 166 830 females will be in- milk producing about 550 539 litres of milk/day amounting to 201

Table 1. Status of production and sale of camel milk in selected districts of India

State	Districts	Camel owners(n)	Total camels	Females in milk	Milk sold		Average cost (Rs/litre)
					litre/day	litre/female	
Rajasthan	Udaipur	36	839	260	869	3.32	7.03
	Chittorgarh	20	1180	434	1400	3.61	7.85
Madhya Pradesh	Neemuch and Mandsour	5	570	172	500	3.10	7.20
	Pooled	61	2589	866	2769	3.39	7.31

thousand tonnes/annum in Rajasthan (Livestock Census 2003). The milk collection is expected to increase by about 8-time its present level and the share of camel milk in the total milk produced in the state may reach to 2.5%. The production would further enhance if selective breeding accompanied by proper nutrition and better management are adopted. Thus, the camel milk may act as a chief criterion for sustenance of camel populations of different breeds in their respective tracts in present era of diminishing draught utility of the species.

World scenario

The world production of camel milk has been estimated to be 5.4 million tonnes /year. The milk production statistics revealed that Somalia produces 870 thousand tonnes and ranks first in the camel milk production followed by Saudi Arabia, Sudan, Mali, UAE, Kenya, Chad and Mauritania with 90, 82.25, 55.20, 39.35, 25.20, 22.05 and 22 thousand tonnes, respectively (FAOSTAT data 2005). This study estimates that India with annual camel milk production of 23.08 thousand tonnes ranks at number 7, though the fact remains that it has not so far been considered as a camel milk consuming country. The world has 19.32 million camels. Somalia is the country with the highest population of 6.2 million (m) camels (Somali Livestock Statistics 1989) followed by Sudan 3.3 m, Mauritania 1.3 m, Kenya 0.83 m, Pakistan 0.8 m and Chad 0.74 m. India ranks seventh with a population of about 0.635 m camels (FAOSTAT data 2005). The above data indicate that the production and sale of camel milk is not directly related with its availability but with the scarcity of the other species milk, chiefly the cattle milk.

In contrast to the world scenario, the selling of camel milk presents a contrasting feature in India. In most of the camel rearing countries, the camel milk has been considered as a source of energy food to meet the nutritional requirement of people inhabiting the hot and arid desert, whereas in India the camel milk is consumed in the non-desert districts e.g. Udaipur, Chittorgarh, Rajsamand, Alwar, Neemuch, Mandsour and nearby districts where only a small proportion of the population exists. The fact remains that the population of camel is more in desert districts. This situation is probably due to the fact that some of the best milch breeds of cattle e.g. Tharparker (Nivsarkar *et al*. 2000) inhabit the *Thar* desert of this country leading to significant contribution in the production of milk of this country. In contrast, no milch breed of cattle inhabits the breeding tract of Mewari camel. The per capita per day availability of milk (cattle plus buffalo and goat) for the entire state has been worked out to be 390 ml as against the availability in the lowest ranking districts, viz. 154 ml in Kota, 215 ml in Dungarpur, 246 ml in Baran, 255 ml in Udaipur and Rajsamand, 261 ml in Banswara and 275 ml in Chittorgarh. The average of these deficient districts comes to 237 ml which is approximately 40 % less than the state average.

Future thrusts

It has been felt that the demand for camel milk is increasing on one hand while the population of the camel is decreasing at a significant rate on the other hand. The draught utility of all the draught species has gone down to the extent that animal driven carts and implements have almost disappeared from the public life in developed and even developing counties. The only way left to conserve the camel is to search its alternate uses and the milk can be the one due to its therapeutic and nutritive properties. The Bikaneri, Jaisalmeri and Kachchhi breed respectively produce 4.19±0.11 kg, 3.72±0.17 kg and 3.94±0.13 kg (Sahani *et al*. 1998). The Mewari females produce 5-7 kg milk /day (Mehta *et al*. 2007). The figures suggest that there exist enough scope for the improvement of milk production potential of the species. The focus of selecting and breeding camels may now be shifted to enhancement of milk production potential which may conserve the species apart from providing nutritional and financial security to the poor camel keepers.

SUMMARY

An investigation in Rajasthan and adjoining Madhya Pradesh was carried out to assess the present status of production and sale of camel milk in India. The statistics revealed that about 21562 females are in milk at a time, producing about 23 080 thousand litre/annum. The camel milk is providing livelihood to about 3 218 families with average annual income of about Rs 60 000 and sustaining 56 360 camels in its natural habitat. If the above model is adopted, it is expected that at any time about 166 830 females will be in-milk producing about 201 thousand tonnes/year in Rajasthan. The milk collection is expected to increase by

about 8-time its present level and the share of camel milk in the total milk produced in the state may reach to 2.5%. This may act as a main criterion for sustenance of camel breeds in the present era of diminishing draught utility.

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