EFFECT OF TUMBA CAKE(*CITRULLUS COLOCYNTHIS*) FEEDING ON PRODUCTION POTENTIAL OF GROWING HEIFERS

B.K. Mathur, J.P. Mittal and Shiv. Prasad

Division of Animal Studies,
Central Arid Zone Research Institute, Jodhpur-342 003, India

Introduction

To avoid competition between human and animals for conventional protein rich feeds in arid region of India, it is essential that the concentrate mixture of livestock should consist industrial byproducts and non-conventional feeds. The cost of concentrate mixtures can further be reduced by incorporation of byproducts of non-conventional feeds. The cost of concentrate mixtures can further be reduced by incorporation of byproducts of non-conventional feed in them as these by-products are almost waste for other purposes. Keeping this point in mind a study on evaluation of decilled Tumba cake on oil industry waste as a source of concentrate feed was initiated at Regional Research Station of Central Arid Zone Research Institute at Bikaner (28°0'N, 73°17'E) which represents true desert conditions in India.

Tumbs cake (*Citrullus colocynthis*) is a creeper plant which grows naturally in abundance in Rajasthan desert even with minimum possible water availability (lowest rainfall). The average size of its fruit is 10-12 cm in diameter which is greenish to golden yellow in colour with perpendicular strips. In its ripen form it looks like small musk mellon. The taste of this fruit is very bitter which makes it totally unpalatable to all kinds of animals. It is gaining slowly and slowly the commercial importance. Oil is extracted from the seeds of tumba for use in soap and chemical industries. The cake after oil extraction is a waste product which contain about 16 % of crude protein. Perhaps nothing is known, so far, about nutritive value of this cake in relation to livestock production in desert region. The results reported in this communication, probably are first of its kind.

Materials and Methods

A herd of 24 heifers, 12 each of Therparkar and Rathi breed, aging between 24-30 months, was maintained on sown pasture of *Lasiurus sindicus* with other perennials like *Cenchrus ciliaris, Cymbopogon jawarancusa, Daetyloctenium sindicum;* annuals like *Aristida funiculata, Cenchrus biflorus* and non-edibles like *Indigofera cordifolia.* The pasture also contained *Prosopis cineraria* trees and *Zizyphus nummularia* bushes. The daily grazing routine of heifer consisted of herding them to pasture, from 8.00 h to 15.00 h. The stocking rate was 1.5 ha/heifer. Water was provided to each heifer *ad libitum* before and after grazing. This herd was divided into 2 groups of equal number, control and treatment. Each group thus consisted 6 Tharparkar and 6 Rathi heifers. The heifers in control group were provided with concentrate pelleted feed of Rajasthan Cooperative Dairy Federation at the rate of 2.00 kg/animal/day. The heifers in treatment group received, 1.75 kg concentrate pelleted feed and 250 g of Tumba cake/head/day. Minimix and common salts were added to concentrate feed mixture at the rate of 1 and 2 per cent respectively. Each day this Tumba cake was soaked into 10 litres of water for 8 hours. Then the excess of water was drained off to remove its betterness, before mixing it with concentrate pellets. This trial was conducted for a period of 75 days from 1st May to 16th July 1987, which coincides with acute fodder shortage in desert region.

The proximate analysis of *Lasiurus sindicus* grass, pelleted cattle feed, and Tumba cake before and after soaking in water, was done according to A.O.A.C. (1975). Each experimental heifer was closely inspected every morning and evening, during entire experimental period, for general health and adverse effects of Tumba cake feeding. Body weight changes of individual heifer were recorded at fortnightly intervals regularly. The data collected were processed and analysed by Analysis of Variance Test (Snedecor and Cochran, 1967) for observing the effect of treatment and breed.

Results and Discussion

Table 1 provides data pertaining to proximate analysis of the ration given to the heifers during experimental period. It is evident from this table that crude protein and ether extract contents of Tumba cake were well above the pelleted feed and *Lasiurus* grass. The percentage of other ingradients is also satisfactory in this cake, except crude fibre percentage which was very high.

All the experimental heifers were in good state of health and no symptom of any toxicity was noticed during entire period of study. The average body weight gains of Tharparkar and Rathi heifers during experimental period are shown in table 2. Neither the treatment nor breed of the heifer had significant effect on average body weights and average daily gain in body weights. Slightly lower average daily gain in body weights of calves fed with Mahua cake, was obtained by Arora and Jain

TABLE 1. PROXIMATE ANALYSIS OF FEEDS ON AIR DRY BASIS (%)

Feed	Moisture	CP	EE	CF	NFE	Ash	AIA
Tumba cake	10.00	15.40	5.31	47.56	11.73	10.00	6.25
Tumba cake treated	10.00	18.80	6.70	50.40	7.45	6.65	2.90
Pelleted cattle feed	10.00	16.00	3.00	12.00	47.00	12.00	4.00
Sewan grass	10.00	9.57	1.55	32.55	40.49	5.9	2.72

TABLE 2. CHANGES IN BODY WEIGHTS OF ANIMALS DURING EXPERIMENTAL PERIOD (KG)

Animal group	Initial weight	Final weight	Average gain/ day
Control			
Tharparkar	143.5 ± 14.62	174.33 ± 17.53	0.40 ± 0.07
Rathi	231.17 ± 35.33	258.67 ± 33.56	0.357 ± 0.039
Treatment			
Tharparkar	150.5 ± 21.81	180.5 ± 16.59	0.390 ± 0.104
Rathi	218.5 ± 15.86	244.0 ± 13.66	0.331 ± 0.071

(1986). However, Shukla *et al.* (1985) and Badve *et al.* (1986) obtained slightly higher gain in calves when they were maintained on Babul chuni and Ambadi cake. No reference could be traced out in literature pertaining to the effect of Tumba cake feeding on production or growth rate of cattle.

It can be concluded from this short term trial that growing heifers can safely be fed about 250 g of Tumba cake every day (12.5 % of concentrate ration) after getting it thoroughly soaked with water to remove its betterness or toxin if any. This simple practice alone can result in 25-30 per cent saving of feed cost of cattle. Experiments on long term effects of Tumba cake feeding on all aspects of production of dairy cows are in progress to determine the maximum safe limit of mixing Tumba cake with concentrate mixtures.

Literature Cited

A.O.A.C. 1975. Official methods of analysis, 12th Ed. Association of Official Analytical Chemists, Washington, D.C.

Arora, N. and M.C. Jain. 1986. Use of Mahua cake in calves. Indian Journal of Animal Sciences 56:151-53.

Badve, V.C., B.S. Waghmare, M.L. Joshi and D.V. Rangnekar. 1986. Nutritive evaluation of ambadi cake for dairy calves. Indian Journal of Animal Sciences 56(5):562-67.

Shukla, P.C., P.M. Talpada, H.B. Desai, J.S. Patel and M.T. Valand. 1985. Utilization of Chuni of *babul (acacia nilotica)* seeds by calves. Indian Journal of Animal Sciences 55(12):1113 16.

Snedecor, G.W. and W.G. Cochran. 1967. Statistical methods. 6th Edn. Oxford and IBH Publishing Co., Calcutta.