Development and Evaluation of *Prosopis juliflora* Pods Mixed Cheap and Balanced Feed for Lactating Cattle

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Livestock keepers in developed countries having organized dairy farms prepare feed concentrate for their animals by engaging labour, electricity and machines etc., unlike in India, such procedures are not followed, since they are not able to meet the cost involved with each step of feed preparation process and ultimately feed becomes highly costly and effecting cost benefit ratio (B: C) and net returns to the farmer.

Keeping this in view, a simple technology was followed for the preparation of a scientifically formulated cheap and balanced concentrate feed mixture utilizing locally available ground feed ingredients viz. *Prosopis juliflora* pods, Tumba (*Citrullus colocynthis*) seed cake, Guar (*Cyamopsis tetragonaloba*) Korma, Til (*Sesamum indicum*) seed cake, Wheat bran, Maize grain, common salt, mineral mixture etc. as per requirement and mixing them properly with a spade and filling them in gunny bags for storage. Farmers accept this process technology very easily since it is feasible at livestock owner's doorstep.

Mixing feed ingredients

Cheap and balanced concentrate mixture

To evaluate and understand palatability, acceptability, digestibility and effect on production by feeding of *Prosopis juliflora* pods (upto 25%) containing cheaper concentrate mixture, an experimental feeding trial was initiated on Tharparkar cattle, at Research cum Demonstration Unit, KVK, CAZRI, Jodhpur.

Feed evaluation

Twelve (12) lactating Tharparkar cattle were randomly divided into three groups of 4 each forming (T1); (T2) and (T3) groups. T1 group cattle were maintained on standard palleted concentrate feeding during morning and evening as per requirement with six (6) hours grazing on *Cenchrus ciliaris* dominated pasture and water *ad libitum*. T2 and T3 groups cattle were fed as per requirement with cheaper balanced concentrate mixture having 20% crude protein and 73% Total Digestible Nutrient (TDN), however, in T3 group concentrate mixture was partially replaced by ground *Prosopis juliflora* pods. The pods were ground using a grinder. Concentrate mixtures of T2 and T3 groups were isonitrogenous and isocaloric. These lactating animals were provided with concentrate as per their maintenance and production requirement.

The major observations recorded were monthly body weights, daily concentrate feed intake, blood parameters-haematological and biochemical, daily milk yield with quality analysis at weekly interval for fat and SNF and health check by veterinarian.

Feeding concentrate mixture

Live body weight changes

All the experimental animals were weighed in morning before feeding on day zero and thereafter at fortnightly interval, in addition to

daily examination for health by veterinarian. The initial live body weights (kg) of T1, T2 and T3 group were 330.6 ± 15.32, 384.75 ± 29.51, 352.75 ± 16.45 and final were 315.58±10.96, 369.26±14.11, 344.0 ± 30.51 respectively. Most of the animals in all the three groups had parturition in-between November 2009 to March 2010; however, they maintained their live body weights and their body weights are comparable among the groups during the given period of time.

Monthly Body weight changes in experimental lactating Tharparkar cattle fed on Concentrate Mixture Containing *Prosopis juliflora* Pods

Cattle Group		May	June	July	Aug	Sep	Oct
T-1	AV	330.6	320.4	330.9	310.71	302.98	323.43
	SE	15.32	15.05	18.60	24.63	21.65	18.24
T-2	AV	384.75	367.25	381	367.96	360.63	398.20
	SE	29.51	26.75	26.74	21.24	19.81	21.97
T-3	AV	351.00	347.06	369.25	369.85	360.45	385.67
	SE	13.77	15.36	16.12	13.54	11.77	10.63

Cattle groups	Months					
		Nov	Dec	Jan	Feb	March
T -1	AV	319.43	324.67	345.86	317.51	315.58
	SE	19.58	23.70	26.99	20.56	10.96
T -2	AV	392.20	368.33	370.72	366.17	369.26
	SE	25.36	14.24	13.59	11.70	14.11
T-3	AV	370.67	378.33	398.63	382.8	344
	SE	13.67	20.32	11.97	18.19	30.51

Feed, water intake and digestibility

Digestibility trial was conducted for T2 and T3 groups' animals after the year long feeding trial. The data of dry matter consumption of all the animals in the feeding trails were pooled and palatability scores were calculated as dry matter intake (DMI) which was noted as 2.85 and 3.0 kg/100 kg body weight for control and treatment groups

respectively. The average water intake/animal/day of TI and T2 were 45.0± 0.38 and 44.0 ± 0.77 litres respectively. The study showed non significant difference of water intake between the groups. The digestibility coefficient of nutrients was comparable between the groups.

Milk yield and quality

The average milk yield of T1, T2 and T3 groups were calculated and was 19 % higher in T3 than T2 and differs significantly. During the experiment calving interval of animals of T1 and T2 had non significant difference, while T3 had significantly longer calving interval than T1 and T2 groups. The fat and SNF% of milk of all the groups that is T1, T2 and T3 showed no significant difference in quality. The fat percentage in T1, T2 and T3 ranged from 3.13 ± 0.23 to 4.58±0.13; 3.4± 0.01 to 5.8±0.97; 3.08±0.32 to 4.80±0.12 respectively whereas SNF% ranged from 7.96±0.15 to 9.76±0.19; 7.71±0.75 to 9.90±0.07; 7.93±0.15 to 9.73±0.14 in T1, T2 and T3 groups, respectively. They varied with the stages of production and season.

Blood Parameters:

To study the effect of *Prosopis juliflora* feeding on the body function and health and diseases, quantitative estimation of blood parameters was done. During the feeding experiment, blood was collected at monthly intervals from all experimental animals in the morning before offering feed from the neck region by jugular vein puncture. Immediately blood was taken to laboratory for hematological analysis i.e. haemoglobin (gm %) and then plasma was separated for biochemical parameters like glucose, total protein, albumin, blood urea nitrogen, cholesterol, creatinine, calcium and inorganic phosphorus. All these blood parameters were in normal range and showed non significant difference between T1, T2 and T3 groups. The result of the blood study showed that animals had normal body function with no change in blood chemistry and lactating Tharparkar cattle maintained normal health.

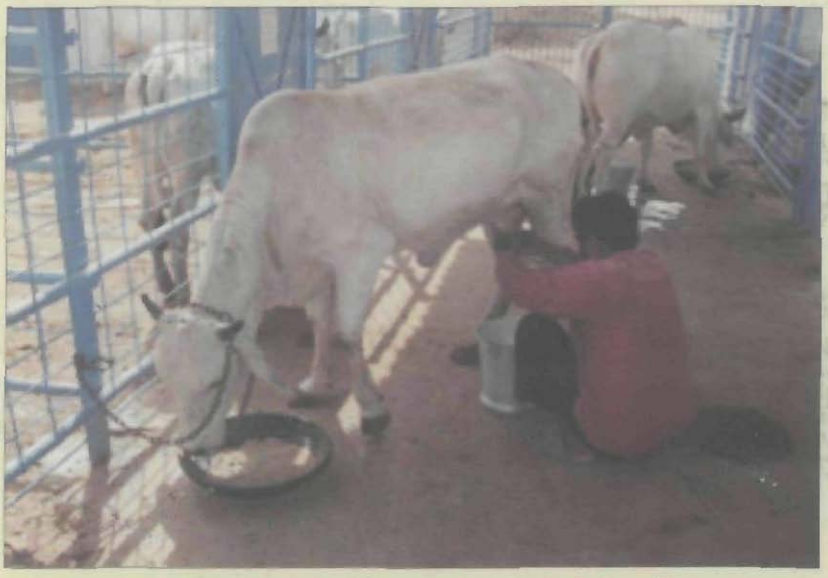
Reproduction and Production Status:

Utilizing this cheaper concentrate mixture a long term feeding trial was conducted on lactating Tharparkar cattle. Animals conceived timely and carried normal pregnancy, which finally terminated into

normal calving and the calves were of good health and live body weight. It was noticed that expulsion of placenta after parturition in all the three groups of animals ranged between 3 to 6 hrs. The milk yield of cattle fed on *Prosopis juliflora* pods containing concentrate mixture was significantly increased and had higher palatability score with extended calving interval. The results showed that inclusion of *Prosopis juliflora* pods in concentrate mixture had no adverse effect on health, reproduction and production.

Summary

Thus, cheaper concentrate ration reduces cost of milk production and showed comparable digestibility of this ration with fairly good nutritive value. Results revealed that this process technology of hand mixing feed ingredients involving minimum labour and electricity/energy inputs utilizing *Prosopis juliflora* pods along with another local resource for protein –Tumba (*Citrullus colocynthis*) seed cake for the formulation of low cost ration is quite feasible at livestock owners' doorstep to economize cattle production



Measuring Milk of lactating Tharparkar cattle fed on Concentrate Mixture Containing *Prosopis juliflora* Pods

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