



# Economical Feeding of Goat and Sheep Utilizing Non-conventional Resources of Arid Region



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## Goat

A study was conducted on Marwari goats during summer, to find the acceptability and palatability of *Prosopis juliflora* pod powder (PJPP). The goats were divided into two groups viz group I control and group II treatment with 5 animals in each. Animals of each group were offered weighed quantity of roughage 5.25 kg (3.750 kg masoor straw + 1.5 kg *Zyzyphus* spp. Leaves) and 1.25 kg concentrate on as such basis (consisting of 35% ground Bajra, 40% Tumba seed cake and 25% groundnut cake. For the treatment group, 35% Bajra in concentrate was replaced by PJPP husk making ration near about isonitrogenous and iso-chloric. The chemical composition and cost of feed ingredients are given in Table 1. Trial was carried out for 4 weeks. Milk yield was recorded daily during the trial to see the effect of PJPP on late lactation milk yield. Blood samples were taken during the period of pre and post experiment of goat for health status and all data were analysed statistically.

**Table 1. Chemical composition and cost of feed ingredients.**

Feed ingredient	CP (%)	EE (%)	CF (%)	NFE (%)	Ash (%)	Approx cost / kg (Rs)
<i>Prosopis juliflora</i> pod husk	7.92	3.0	19.63	61.56	7.87	5.0
Tumba ( <i>Citrullus colocynthis</i> ) seed cake	16.9	3.95	42.0	25.95	11.2	7.50
Masoor ( <i>Lens esculenta</i> ) straw	5.02	1.62	43.1	41.5	8.76	3.25
Bajra ( <i>Pennisetum typhoides</i> ) grain	9.4	5.5	1.7	78.9	3.5	8.25
Pala ( <i>Zizyphus nummularia</i> )	14.20	4.30	15.70	57.10	8.60	5.50

Developed process of preparing cheaper concentrate ration by inclusion of *Prosopis juliflora* pods for livestock



The effect of utilizing *Prosopis juliflora* pods powder at 35% level in concentrate mixture of late lactating goats on various parameters were studied.

### Effect on Body weight, DMI and Water intake

Weekly body wt. data were recorded and body wt. gain or loss was assessed (Table 2). On an average, the animals of both groups of goats gained the body weight, however, the difference between both the groups were non significant.

**Table 2. Average weekly live weight (kg), body weight gain DMI (kg) and water intake (L) /100 kg body weight/ day of Marwari goat.**

Period (in weeks)	Control		Treatment		Control		Treatment	
	Average body wt. gain (kg)	% increase in body wt.	Average body wt. gain (kg)	% increase in body wt	DMI	Water intake	DMI	Water intake
0	30.82±2.16	-	28.36±2.29	-	-	-	-	-
1	30.92±2.13	0.32	28.20±2.44	-0.56	2.93±0.63	3.89±0.21	3.26±0.03	4.72±0.29
2	30.93±1.73	0.33	29.40±2.81	3.66	3.05±0.02	6.09±1.30	3.37±0.018	6.99±1.82
3	31.32±1.12	1.62	29.24±2.81	3.10	3.06±0.03	5.95±0.97	3.21±0.024	6.70±0.44
4	31.90±1.83	3.50	29.48±2.51	3.95	2.82±0.02	5.74±0.57	3.06±0.03	5.26±0.45
Av daily wt. gain (g)	38.57		40.00		-	-	-	-

Periodical dry matter intake and water intake / 100 kg body wt. /day of goat were presented (Table 2). The DMI and water intake in goat was high in treatment as compared to control group animals.

### Effect on Milk yield and Blood constituents

The average milk yield did not show statistically significant differences between control and treatment group. Performance in terms of late lactating goats of treatment group compared to that of control was not affected by the presence of *Prosopis juliflora* pod powder in the concentrate supplementation.



**Cheaper concentrate supplementation to goats for increasing production.**

The pre and post-experimental mean value  $\pm$  SE of the blood parameters analyzed for goat (control and treatment group) are given in Table 3. The haemoglobin (Hb) values observed lower in pre-experiment in treatment group of goat than the post-experiment. The Hb value was observed high for goat in both groups. Glucose and albumin were high at post-experiment. There was no significant difference in blood parameters between control and treatment group. Thus, it could be concluded that *Prosopis juliflora* pods could be used up to 35% in the concentrates of goats.

**Table 3: Group wise per day milk yield (litre) of goats in late lactation**

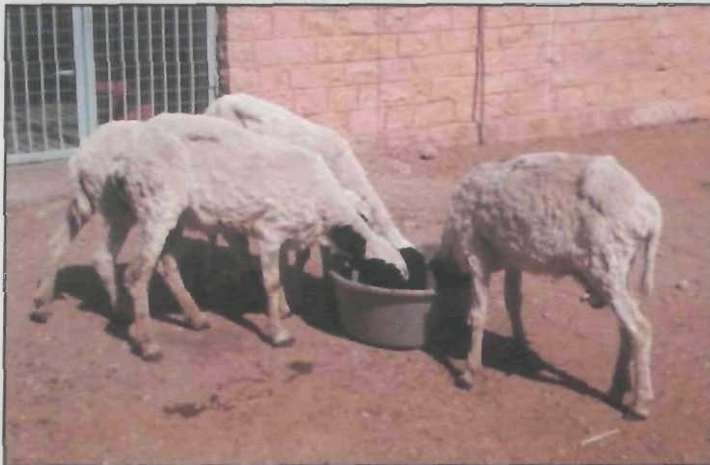
Group	Week			
	1	2	3	4
Control	2.864±0.061	2.662±0.031	2.590±0.0325	2.202±0.0114
Treatment	2.934±0.057	2.58±0.092	2.405±0.0325	2.148±0.0158

**Table 4: Mean ± SE values of different blood constituents of Marwari goat**

Group Parameter	Whole blood	Plasma			
	Haemoglobin (g/dl)	Glucose (mg/dl)	Urea (mg/dl)	Total Protein (g/dl)	Albumin (g/dl)
<b>Control group</b>					
Pre experiment	9.00±0.84	29.73±2.96	45.18±2.44	7.61±0.96	2.79±0.83
Post experiment	9.88±0.51	26.25±2.45	32.26±1.55	8.74±0.81	4.92±0.65
<b>Treatment group</b>					
Pre experiment	9.00±0.61	32.94±3.93	50.51±2.55	8.02±0.84	3.33±1.17
Post experiment	10.12±0.73	27.28±2.78	36.56±1.75	8.57±0.72	4.73±0.69

## Sheep

Marwari breed ewes, similar in age group and of comparable body weight, maintained on grazing were used in the experiment. The experimental animals were dewormed with albendazole before starting the feeding trial. The experimental animals were divided into 2 groups of 4 in each group. 4 animals were maintained on grazing termed as control and this group was sent out for four hours grazing on *Cenchrus* dominated pasture (Table 5), whereas remaining 4 were stall fed forming the treatment group.



**Sheep fed on cheaper concentrate supplementation for reducing cost of production.**

The treatment group animals were offered concentrate mixture @ 250 g/animal/day comprised of PJPH and Tumba seed cake (TSC) in 1:1 ratio. Vitamin-mineral mixture @ 2 per cent was added to the concentrate mixture. Treatment group was offered weighed quantity of lentil (*Lens esculenta*) straw *ad libitum* as roughage and left over was collected the next day morning to estimate the daily feed intake of

individual animals. Measured quantity of water was offered *ad libitum* to experimental animals and next day morning, water left out in the bucket was recorded. Feeding trial was conducted for a period of 30 days. Body weights of the animals of both groups were recorded at weekly interval. The chemical composition and cost of experimental feed ingredients are given in Table 1. The haematological studies of the cellular constituent viz., haemoglobin content (Hb) and the biochemical constituents of blood, viz., blood glucose, blood urea, total serum proteins, serum albumin and serum globulin were estimated before feeding and watering in the morning, at the beginning of the experiment and thereafter at the end of feeding trial. Blood was collected by jugular vein puncture and various constituents were analysed during pre experimental period and at the end of feeding trial to judge the effect of experimental ration on the physiological condition and the health of the animals.

**Table 5. Grass/shrub/tree species and content of nutrients in the grazing area available to control group.**

Species	Common name	CP	EE	CF	NFE	Total ash
<i>Cenchrus ciliaris</i>	Dhaman	4.90	1.20	31.30	53.81	8.79
<i>Zizyphus nummularia</i>	Bordi	14.20	4.30	15.70	57.10	8.60
<i>Prosopis cineraria</i>	Khejri	15.29	4.52	17.52	54.09	5.11
<i>Tecomella unduleta flowers</i>	Rohida	11.90	9.70	10.50	59.30	8.60
<i>Corchorus spp</i>	Cham kash	7.76	2.38	32.13	4.04	-
<i>Prosopis juliflora</i> pods	Vilayati babool	11.35	4.10	18.30	60.20	6.10
<i>Acacia tortilis</i>	Israili babool	12.3	1.80	22.40	57.90	5.60

## Effect on Body weight, DMI and Water intake

Effect of feeding *Prosopis juliflora* pod husk at 50 per cent level in concentrate mixture on live weight gain in sheep was worked out. (Table 6). The average initial live weights of control and treatment groups were 25.30±1.80 and 25.50±1.50 kg, while the final weight of animals was 26.30±1.77 and 27.40±1.52 kg, respectively. Live weight gain was significantly higher (67.90 g) in the animals of treatment group than the control group (43.48 g). Average daily feed and water intakes /100 kg body weight (b.w.)/day in sheep of control group have been presented in Table 7.

**Table 6. Comparative body weight changes in sheep maintained on grazing v/s stall fed supplemented with *Prosopis juliflora* pod husk and Tumba seed cake concentrate.**

Day	Control group		Treatment group	
	Body weight (kg)	% increase in body weight	Body weight (kg)	% increase in body weight
0	25.30±1.80	-	25.50±1.50	-
7	25.62±1.68	1.26	26.30±1.75	3.13
14	25.55±1.71	0.98	27.70±1.75	8.62
21	25.80±1.53	1.97	27.25±1.76	6.86
28	26.30±1.77	4.43	27.40±1.52	7.45
Average daily wt. gain (g)	43.48		67.90	

**Table 7. Feed and water intake in sheep maintained on grazing v/s stall fed alone and supplemented with *Prosopis juliflora* pods husk and Tumba seed cake concentrate ration.**

Weekly mean	Daily dry matter intake	Daily water intake	
	Kg/100 kg b.w./day of treatment group	Lit./100 kg b.w./day of control group	Lit./100 kg b.w./day of treatment group
I	3.25±0.12	12.59±0.84	13.00±0.79
II	3.05±0.07	9.79±1.81	10.43±1.72
III	3.14±0.06	10.84±2.22	11.66±1.58
IV	3.15±0.03	11.01±1.20	11.61±0.68
Average	3.15±0.07	11.05±1.48	11.67±1.29

The DMI/ day of treatment group on an average were 3.15±0.07 kg/100 kg live weight. The water intake in sheep of both the groups was more or less equal during experimental period, and there were 11.05±1.48 and 11.67±1.29 litre/100 kg body weight/ day of control and treatment group, respectively. However, these values were considerably high during first week of experiment. It may be attributed to relatively high ambient temperature during first week of the study conducted in arid zone.

### Effect on Blood constituents

Concentration of different blood metabolized is presented in Table 8. The effect of treatment on Hb was statistically non significant. Blood glucose level in both the group ewes was on lower side but was within normal range. All the blood parameters were in normal range.

**Table 8. Blood metabolites in sheep maintained on grazing v/s stall fed supplemented with *Prosopis juliflora* pods husk and Tumba seed cake concentrate.**

Parameter	Whole blood haemoglobin (g dl <sup>-1</sup> )	Plasma					
		Glucose (mg dl <sup>-1</sup> )	Urea (mg dl <sup>-1</sup> )	Total protein (g dl <sup>-1</sup> )	Albumin (g dl <sup>-1</sup> )	Globulin (g dl <sup>-1</sup> )	
Control	Initial	9.52±0.64	31.92±2.05	41.80±1.11	8.39±0.71	3.61±0.55	4.789±0.16
	Final	9.98±0.25	34.45±2.87	31.42±0.77	8.45±0.22	5.76±0.56	2.69±0.36
Treatment	Initial	9.20±0.89	32.33±1.35	49.51±1.15	8.50±0.60	2.52±0.75	4.98±0.15
	Final	10.35±0.16	36.25±3.59	25.14±0.82	8.49±0.13	5.56±0.06	2.93±0.07

The major nitrogenous biochemical constituents of blood were closely associated with protein metabolism viz., blood urea, total serum proteins, serum albumin and serum globulin estimated at zero days and last day of feeding trial. Blood urea was significantly ( $p < 0.05$ ) low in treatment group indicating early utilization of protein. Total serum protein level was statistically comparable in both groups. The albumin level increased significantly in the ewes of both groups at the end of the experiment, indicating better health of the animals.

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