



## Nutritive Evaluation of Feeds and Fodder fed to the Animals in Haridwar District of Uttarakhand\*

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**Abstract-** An investigation was conducted in two tehsils, namely Roorkee and Laksar of Haridwar district (Plain region) of Uttarakhand, to find out the existing livestock feeding practices and macro nutrients status in feeds and fodder fed to the animals. Thirty farmers under three major categories on land holding basis i.e landless (0 acre), small (2-5 acres) and large (>5 acres) from each tehsil were selected. A benchmark survey was conducted through common questionnaire in order to collect the information regarding farmer's land holding and livestock holding as well as feeding pattern of the animals along with mineral mixture and salt supplementation. The samples of feeds and fodder offered to the animals were collected from each tehsil and chemically analyzed for proximate principles as per AOAC (1995). The farmers residing in the target area were mostly dependent on locally available cereal grain as concentrate feeding to the livestock but some farmers were also using purchased concentrates like pellet, complete feed block, gram *chunni* etc. for feeding their livestock. It was observed that the main feed resources were soybean cake, mustard cake, *Lahi* grain, gram *chunni*, wheat bran, complete feed block and pellet which were used by the farmers to feed their livestock in the target area. Wheat straw was the basal roughage used during all seasons along with available green fodders to their animals. The CP was found highest in cowpea green of Roorkee Tehsil followed by sorghum green of Laksar Tehsil and maize green of Roorkee Tehsil and the corresponding values were  $23.41 \pm 0.69$ ,  $9.49 \pm 1.03$  and  $8.97 \pm 0.12$  per cent, respectively. The EE was highest in sorghum green ( $2.31 \pm 0.32$  percent) followed by cowpea green ( $2.10 \pm 0.10$  percent) of Laksar and Roorkee Tehsils, respectively. CF content was high in wheat straw i.e.  $39.69 \pm 1.02$  and  $36.86 \pm 0.79$  per cent in Laksar and Roorkee tehsils, respectively. The CP content (%) was highest in soybean cake ( $41.77 \pm 0.10$ ) followed by mustard cake ( $37.13 \pm 0.44$ ), *Lahi* grain ( $20.11 \pm 0.25$ ), complete feed block ( $16.22 \pm 0.04$ ), wheat bran ( $16.42 \pm 0.23$ ), concentrate pellet ( $13.12 \pm 0.11$ ) and gram *chunni* ( $13.12 \pm 0.11$ ) of Roorkee Tehsil. Similarly, in Laksar Tehsil CP content (%) was highest in mustard cake ( $36.61 \pm 1.10$ ) followed by *Lahi* grain ( $19.57 \pm 0.49$ ), pellet ( $14.50 \pm 0.04$ ), wheat bran ( $15.95 \pm 0.85$ ) and gram *chunni* ( $12.63 \pm 0.03$ ). NFE was highest in wheat bran ( $68.27 \pm 1.43$  per cent) from Roorkee Tehsil. Similarly AIA was highest ( $6.74 \pm 0.17$  per cent) in commercial pellet while lowest in soybean cake ( $0.06 \pm 0.00$  per cent) in Roorkee Tehsil. NFE was highest in wheat bran ( $68.27 \pm 1.43$  per cent) from Laksar Tehsil. Similarly AIA was highest ( $6.66 \pm 0.02$  per cent) in commercial pellet while lowest in soybean cake ( $0.06 \pm 0.00$  per cent) in Roorkee Tehsil. The scarcity of greens and high cost of concentrates, the use of improved quality of unconventional feeds with supplementation of mineral mixture may be recommended to improve the nutritional status of the animals.

### Introduction

Livestock play an important part in contributing to the State economy but the animal production attributes to larger number of animals, rather than higher productivity per animal. This is mostly due to imbalanced feeding practices is carried out by the farmers

of Uttarakhand state because feeding has a crucial role in any livestock development and also for optimum expression of genetic potential of livestock. For better production from the animals, it is always prudent to feed them with optimum

quantities of different macro as well as micro-nutrients to exploit their maximum productivity potentials. Under the tropical Indian condition, the metabolic and/or deficiency diseases in animals are quite common which are mainly due to non-availability of balanced diet and also deficiency of specific nutrients. The availability of nutrients is dependent on feeds and fodder consumed by the animals which is again affected by the season, cropping pattern, land holding capacity of farmers etc (Pantgne *et al.*, 2002). Therefore, the present investigation was carried out to assess the existing feeding pattern and nutritional availability for livestock from different feed resources in plain region (District Haridwar) of Uttarakhand.

### **MATERIALS AND METHODS**

An investigation was conducted in two tehsils, namely Roorkee and Laksar in Haridwar district of Uttarakhand, to find out the macro nutrients status in feeds and fodder and existing feeding practices adopted by the farmers for their animals of the selected areas. Thirty farmers under three major categories on land holding basis i.e landless (0 acre), small (2-5 acres) and large (>5 acres) from each tehsil were selected. A benchmark survey was conducted through common questionnaire in order to collect the information regarding farmer's land holding and livestock holding as well as feeding pattern of the animals along with mineral mixture and salt supplementation. The samples of feeds and fodder offered to the animals were collected from each village and chemically analyzed for proximate principles as per AOAC (1995). The data obtained were analyzed for mean and standard error as per standard procedure (Snedecor and Cochran, 1994).

### **Results and Discussion**

Land holding, livestock holding and family size were the main factors influencing the nutritional status of the animals. Increased feed resources with increased land holding capacity of the farmers, increases the livestock population. Main crops cultivated during *Kharif* season are paddy (*Oryza sativa*), maize (*Zea mays*), sorghum (*Sorghum bicolor*), cowpea (*Vigna sinensis*), *lahi* grain (*Brassica. campestris var.toria*) etc. while

during *rabi* season wheat (*Triticum vulgare*) , berseem (*Trifolium alexandrinum*) etc.

### **Existing feeding pattern through different feeds and fodder**

Most of the livestock are stall fed but they are also allowed for grazing in range land in the target area. Same observation is also found by Verma, 2001 in this region. The farmers residing in the target area were mostly dependent on locally available cereal grain as concentrate feeding to the livestock but some farmers were also using purchased concentrates like pellet (pashuahar), complete feed block, gram *chunni* etc. for feeding their livestock. It was observed that the main feed resources were soybean cake, mustard cake, *Lahi* grain, gram *chunni*, wheat bran, wheat grain, gram, complete feed block and pellet which were used by the farmers to feed their livestock in the target area. Wheat straw was the common dry fodder and 100 per cent of the farmers fed their livestock as basal roughage throughout the year as compared to paddy straw. The paddy straw are mostly used for animal house construction as well as for bedding materials. Likewise, some farmers also fed maize green, sorghum green and cowpea green in different seasons to their livestock according to their availability in both the tehils. The ratio of green fodders in the basal diet was more during rainy season as compared to other seasons. It may be due to more availability of green fodders during rainy season.

### **Mineral mixture and salt supplementation**

The proportion of farmers giving mineral mixture to their livestock was less as compared to salt supplementation in the selected areas of Tarai region. 50 per cent farmers were observed to give mineral mixture and 100 per cent farmers provide common salt to the animals of the target area. Livestock of 40-50 per cent farmers of the target area were found with different reproductive problems, which may be ascribed due to lack of minerals, leading to delayed oestrus and failure in maturation of ovarian follicles. Similar findings were reported by Lall *et al.* (2001), who observed that high plane of nutrition, with proper mineral supplementation improved the oestrus conditions in animals.

### **Chemical composition of feeds and fodders**

The samples of feed and fodder fed to livestock by the farmers in selected area were collected and analysed for their nutrient composition and have been presented in Tables. 1 and 2. The locally available roughages like wheat straw, cowpea green, sorghum green and maize green were used for feeding to their livestock. The CP was found highest in cowpea green of Roorkee Tehsil followed by sorghum green of Laksar Tehsil and maize green of Roorkee Tehsil and the corresponding values were  $23.41 \pm 0.69$ ,  $9.49 \pm 1.03$  and  $8.97 \pm 0.12$  per cent, respectively. The CP content of wheat straw was  $3.33 \pm 0.07$  and  $3.27 \pm 0.17$  per cent from Roorkee and Laksar Tehsils, respectively. The findings were found to be in close agreement with those reported by Mudgal *et al.* (2003). The EE was highest in sorghum green ( $2.31 \pm 0.32$  percent) followed by cowpea green ( $2.10 \pm 0.10$  percent) of Laksar and Roorkee Tehsils, respectively. CF content was high in wheat straw i.e.  $39.69 \pm 1.02$  and  $36.86 \pm 0.79$  per cent in Laksar and Roorkee Tehsils respectively. Ash content was highest in cowpea ( $16.91 \pm 0.23$  percent) whereas lowest in wheat straw ( $7.70 \pm 1.25$  percent) of Tehsil Roorkee and Laksar, respectively. In roughages, acid insoluble Ash (AIA) was highest in sorghum green ( $6.16 \pm 2.08$ ) of Laksar Tehsil. Thus the CP, EE and ash contents were higher in green fodder than in wheat straw, whereas, DM and CF content was less in green fodder, compared to wheat straw. Variation may be due to different stage of maturity of the plants. Chemical composition of concentrate mixture showed that the, maximum CP content (%) was in soybean cake ( $41.71 \pm 0.10$ ) followed by mustard cake ( $37.13 \pm 0.44$ ), *Lahi* grain ( $20.11 \pm 0.25$ ), complete feed block ( $16.22 \pm 0.04$ ), wheat bran ( $16.42 \pm 0.23$ ), concentrate pellet ( $13.22 \pm 0.03$ ) and gram *chunni* ( $13.12 \pm 0.11$ ) of Roorkee Tehsil. Likewise, in Tehsil Laksar CP content (%) was highest in mustard cake ( $36.61 \pm 1.10$ ) followed by *Lahi* grain ( $19.57 \pm 0.49$ ), pellet ( $14.51 \pm 0.44$ ), wheat bran ( $15.95 \pm 0.85$ ) and gram *chunni* ( $12.63 \pm 0.03$ ). EE was highest in *Lahi* grain and the corresponding values were  $13.52 \pm 0.75$  and

$11.67 \pm 0.56$  per cent in the Tehsil, Roorkee and Laksar, respectively. Similarly CF content was also highest in gram *chunni* ( $39.0 \pm 0.65$  and  $39.65 \pm 0.10$  per cent) followed by *Lahi* grain ( $21.17 \pm 0.71$ ,  $20.68 \pm 1.40$  per cent) in Tehsils Roorkee and Laksar, respectively. NFE was highest in wheat bran ( $68.27 \pm 1.43$  per cent) from Laksar Tehsil. Similarly AIA was highest ( $6.66 \pm 0.02$  per cent) in commercial pellet while lowest in soybean cake ( $0.06 \pm 0.00$  per cent) in Roorkee Tehsil. It can be concluded that soybean cake, mustard cake and *lahi* are rich sources of CP as well as EE and found to be better ingredients to be included in animals ration to increase the production as well as reproductive efficiency.

#### Acknowledgment

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Table 1- Nutritive value of Roughage fodder (% on DM basis) fed the livestock of Haridwar district of Uttarakhand

Roughage fodder	Selected Areas	DM	OM	CP	EE	CF	NFE	Ash	AIA
<b>Wheat straw (60)</b>	Roorkee	95.73±0.48	90.96 ±0.96	3.33 ±0.07	0.95 ±0.06	36.86±0.79	49.8 ±1.19	9.04 ±0.96	4.13 ±0.13
	Laksar	91.7 ±1.56	92.30±1.25	3.27±0.17	1.05±0.11	39.69±1.02	48.30±1.79	7.70±1.25	4.32±0.37
	Overall	93.97±1.02	91.63±1.11	3.30±0.12	1.00±0.09	38.27±0.91	49.06±1.49	8.37±1.11	4.22±0.25
<b>Cowpea green (40)</b>	Roorkee	18.22±0.67	83.09 ±0.23	23.41 ±0.69	2.10 ±0.10	22.54±0.60	35.0 ±1.08	16.9 ±0.23	5.37 ±0.18
	Laksar	-	-	-	-	-	-	-	-
	Overall	18.22 ±0.67	83.09 ±0.23	23.41±0.69	2.10±0.10	22.54±0.60	35.04±1.08	16.91±0.23	5.37±0.18
<b>Maize green (40)</b>	Roorkee	15.07±0.04	88.16±0.03	8.86±0.02	1.56±0.00	27.01±0.07	50.73±0.12	11.84±0.03	3.16±0.01
	Laksar	-	-	-	-	-	-	-	-
	Overall	15.07±0.04	88.16±0.03	8.86±0.02	1.56±0.00	27.01±0.07	50.73±0.12	11.84±0.03	3.16±0.01
<b>Sorghum green (40)</b>	Roorkee	-	-	-	-	-	-	-	-
	Laksar	18.22±0.70	88.09±2.54	9.49±1.03	2.31±0.32	26.98±2.18	49.31±4.56	11.91±2.54	6.16±2.08
	Overall	18.22±0.70	88.09±2.54	9.49±1.03	2.31±0.32	26.98±2.18	49.31±4.56	11.91±2.54	6.16±2.08

Figures in parentheses indicate the number of samples analyzed.

Table 2- Nutritive value of Concentrate feeds (% on DM basis) fed the livestock of Haridwar district of Uttarakhand

Concentrate feeds	Selected Areas	DM	OM	CP	EE	CF	NFE	Ash	AIA
<b>Soybean cake (40)</b>	Roorkee	85.49±0.21	93.11±0.02	41.77±0.10	9.47±0.02	5.97±0.01	35.89±0.16	6.89±0.02	0.06±0.00
	Laksar	-	-	-	-	-	-	-	-
	Overall	85.49±0.21	93.11±0.02	41.77±0.10	9.47±0.02	5.97±0.01	35.89±0.16	6.89±0.02	0.06±0.00
<b>Mustard cake (40)</b>	Roorkee	92.15±1.52	91.09 ±0.34	37.13 ±0.44	9.60 ±0.22	9.10 ±0.19	35.19±0.47	8.91 ±0.34	1.11 ±0.10
	Laksar	91.78±3.80	92.33±0.49	36.61±1.10	9.44±0.33	9.36±0.94	36.93±1.25	7.67±0.49	1.02±0.11
	Overall	91.96±2.66	91.71±0.42	36.87±0.77	9.52±0.28	9.23±0.57	36.06±0.86	8.29±0.42	1.07±0.11
<b>Pellet (40)</b>	Roorkee	87.51±0.22	83.67±0.04	13.22±0.03	2.30±0.01	14.94±0.04	53.20±0.12	16.33±0.04	6.66±0.02
	Laksar	88.94±0.22	84.40±0.04	14.51±0.04	2.35±0.01	14.38±0.04	53.16±0.12	15.60±0.04	5.84±0.01
	Overall	88.23±0.22	84.04±0.04	13.87±0.04	2.31±0.01	14.66±0.04	53.18±0.12	15.97±0.04	6.25±0.02
<b>Lahi grain (40)</b>	Roorkee	93.61 ±0.24	87.85 ±0.14	20.11 ±0.25	13.52 ±0.75	21.17±0.71	33.0 ±1.24	12.1 ±0.14	5.99 ±0.10
	Laksar	90.07±0.44	87.36±0.53	19.57±0.49	11.67±0.56	20.68±1.40	35.44±1.85	12.64±0.53	6.33±0.48
	Overall	91.84±0.34	87.61±0.34	19.84±0.37	12.60±0.66	20.93±1.01	34.22±1.55	12.37±0.34	6.16±0.29
<b>Complete feed block (10)</b>	Roorkee	87.60±0.22	88.96±0.03	16.22±0.04	2.15±0.01	16.12±0.04	54.47±0.11	11.04±0.03	4.14±0.01
	Laksar	-	-	-	-	-	-	-	-
	Overall	87.60±0.22	88.96±0.03	16.22±0.04	2.15±0.01	16.12±0.04	54.47±0.11	11.04±0.03	4.14±0.01
<b>Wheat bran (40)</b>	Roorkee	93.17 ±0.45	94.96 ±0.22	16.42 ±0.23	3.34 ±0.12	7.55 ±0.45	67.6 ±0.66	5.04 ±0.22	0.12 ±0.03
	Laksar	93.85±1.33	95.26±0.66	15.95±0.85	3.09±0.26	7.95±0.43	68.27±1.43	4.74±0.66	0.08±0.02
	Overall	93.57±0.89	95.11±0.45	16.19±0.54	3.22±0.19	7.75±0.44	67.94±1.05	4.89±0.44	0.10±0.02
<b>Gram chunni (40)</b>	Roorkee	93.35±0.57	95.57±0.12	13.12±0.11	1.44±0.08	39.00±0.65	42.01±0.68	4.43±0.12	0.47±0.03
	Laksar	91.41±0.23	94.81±0.01	12.63±0.03	1.60±0.00	39.65±0.10	40.93±0.15	5.19±0.01	0.40±0.00
	Overall	92.38±0.40	95.19±0.07	12.88±0.07	1.52±0.04	39.33±0.38	41.47±0.42	4.81±0.07	0.44±0.02

Figures in parentheses indicate the number of samples analyzed.