

Chemical composition of commonly used feeds and fodders available in Ladakh

G MONDAL¹ and M S MIR²

Regional Agricultural Research Sub-Station, SKUAST-K, Kargil, Jammu & Kashmir 194 103 India

Received: 9 January 2007; Accepted: 18 August 2007

Key words: Chemical evaluation, Feeds, Fodders, Ladakh, Tree leaves

Ladakh is a cold arid region of Jammu & Kashmir, faces a long winter and the average height is 2700–5500 m amsl (APR 2006). The region is covered with thick snow 5–7 months each year during which agriculture is not possible hence people depend on vegetable grown in trenches and polygreenhouses and meat supply from adjoining states through air route or local stock. Survey showed that around 8.0 q of sheep, goat and poultry is slaughtered alone in Kargil city. As the animals stall fed during long winter and no green fodders are available farmers depend on alfalfa hay and/or oats-and wheat-straw for the animal feeding. During summer, mountain grazing is practised where hilly grasses and tree leaves are the main source of animal feed. While, during winter only stall feeding is practised and alfalfa hay, wheat and barley straw is given to animals with occasional use of grains. Farmers fed the animals not according to their requirement rather the availability of the feeds. Now-a-days crossbreeding programme is taking place in the region and milk production has increased but production traits can not be fully exploited till nutrient supply is sufficient. Keeping this in view proximate principles and cell wall fractions of commonly available feeds, fodder and tree leaves evaluated available in Ladakh region.

A survey was conducted to observe the feed ingredients used for the animals in nearby areas of Kargil city from the farmers and these were collected, and the sun dried samples were ground to estimate proximate principles and fibre fractions. Grains, viz. oat, wheat, barley and bulk wheat; and fodders/tree leaves, viz. alfalfa, apple, chenopodium, buck wheat, iris, mulberry, pea, poplar, red clover, cicer, sarsing; whole plant (leaves and stem with some grains) small millet, foxtail millet and bulk wheat straws/ other feeds viz., wheat straw, barley straw and mustard siliqua were collected from farmers and pooled and analyzed in triplicate for chemical composition (AOAC 1984) and fibre fractions (Goering and Van Soest 1970) and mean was taken.

Chemical composition and fibre fraction of all the feeds, fodders and tree leaves are presented in the Table 1. Alfalfa

hay which is the main fodder for animals in the region have 18.12% crude protein (CP), 2.29% ether extract (EE), 25.31% crude fibre (CF), 34.31% nitrogen free extract (NFE) and 9.72% total ash. The hay contains 40.99% neutral detergent fibre (NDF) and 30.77% acid detergent fibre (ADF) and hence the hemicellulose content is 10.22%. As the farmers used to take two cuts from April to September and stored for the stall feeding period during winter, it is possible to take 3 cuts, but in that case first cut may not be so mature which will lead to weight loss. Among tree leaves mulberry had highest CP (20.74%) followed by iris (17.68%), pea (15.19%) and red clover (15.08%). Lowest value observed in cicer (8.32%) and others range from 11 to 14%. Tree leaves are used in the summer but may be used for feeding in the winter months along with alfalfa hay or grains so as to supply the protein to the animals for maintenance of the animal these are useful, if stored along with hay. CF was highest in cicer (35.21%) and lowest in pea (16.84%), followed by apple (19.65%). Other tree leaves had the value 23–30% CF. Soluble carbohydrate or NFE higher quantity (>35%) observed in apple, *Chenopodium* sp., buck wheat, pea, sarsing, poplar, red clover whereas 31–35% observed in cicer, mulberry and iris. Total ash content was higher quantity (>10%) in *Chenopodium* sp., mulberry, buck wheat and sarsing and rest of the tree leaves had 8–10%. Hemicellulose content varied greatly in the tree leaves and its lowest value observed in cicer (4.62%) followed by pea (10.58%) and highest value observed in apple (33.90%) followed by iris (22.80%).

Whole plants (leaves and stem with some grains of inferior quality), viz. foxtail millet, small millet and buck wheat which are often given to the animals in onset of winter/ end of summer is also tested for chemical evaluation. All three have high CP (12–14%), EE–2 to 4%, CF– 23 to 31%, total ash–7 to 11% and NFE was 35–40%. Hemicellulose was highest in foxtail millet and lowest in buck wheat. Though these are not regular supplements but during harvesting the grains, as wastage materials feeds, these are available and used by the farmers.

Three major grains were collected, viz. wheat, barley and

Present address: ¹Junior Scientist, ²Senior Scientist and I/C.

Table 1. Chemical composition of the feeds, fodders and tree leaves

Ingredients	OM	CP	EE	CF	NFE	NDF	ADF	Hemi-cellulose	Ash
Hay and tree leaves									
Alfalfa	90.28	18.12	2.29	25.31	34.31	40.99	30.77	10.22	9.72
Apple	90.82	10.41	2.12	19.65	48.72	60.29	26.39	33.90	9.18
<i>Chenopodium</i>	85.94	13.66	3.29	20.68	38.15	46.82	31.33	15.49	14.06
Buck wheat	89.53	13.76	2.11	23.64	38.27	40.41	28.06	12.35	10.47
Iris	91.47	17.68	3.35	23.51	34.29	53.62	30.82	22.80	8.53
Mulberry	88.48	20.74	2.52	21.72	33.37	31.34	19.31	12.09	11.52
Pea	91.07	20.19	2.69	16.84	40.81	38.38	27.8	10.58	8.93
Poplar	90.28	11.45	4.90	20.62	42.67	45.59	25.51	20.08	9.72
Red clover	90.76	15.08	1.59	23.64	39.76	42.95	24.13	18.82	9.24
Cicer	91.26	8.32	2.61	35.21	33.91	48.67	44.06	4.62	8.74
Sarsing	88.53	12.62	3.83	23.34	36.47	29.68	42.36	13.32	11.47
Plants with inferior grains									
Foxtail millet	91.52	12.62	3.40	28.65	35.10	80.25	41.28	38.97	8.48
Small millet	93.06	13.75	2.68	30.56	35.43	67.85	38.57	29.28	6.94
Buck wheat	92.62	12.49	8.57	24.61	35.95	28.62	16.12	12.50	7.38
Grains									
Oats	93.13	6.19	2.61	5.21	71.29	16.75	4.51	12.24	6.91
Wheat	93.35	8.12	2.39	6.33	65.76	15.25	5.73	9.52	6.51
Barley	95.38	7.05	2.51	4.61	70.03	15.36	4.61	10.75	4.31
Other feeds									
Wheat straw	90.42	3.32	0.8	43.75	32.05	83.53	55.84	27.69	9.58
Barley straw	91.85	2.28	1.12	47.72	29.93	78.39	53.15	25.24	8.15
Mustard siliqua	86.87	14.25	2.92	35.62	23.55	46.19	30.21	15.98	13.13

OM, Organic matter; CP, Crude protein; EE-ether extract; CF, crude fibre; NFE, nitrogen free extract; NDF, neutral detergent fibre; ADF, acid detergent fibre.

oat, which are grown in the region and estimated for chemical composition. People want to grow those varieties which yield more biomass than the grain. Among the grains taken for this study and CP observed 6–8%, EE was varied from 2 to 4%. CF content was 4–6%. Soluble carbohydrate (NFE) was higher in all 3 cereals. Although all the grains shown to have 9–13% hemicellulose.

Straws from wheat and barley and mustard siliqua which were collected from the farmers estimated for its composition and used for the large ruminants along with alfalfa hay. These are with low nutritive value. Mustard siliqua had highest CP (14.25%) and NFE–23.55%, total ash was 13.13%. Hemicellulose in the feed was 15.98%, though its use is limited to farmers growing mustard.

The road is open for 5–6 months and during winter agriculture is not possible, animal husbandry has immense importance in the day-to-day life of the people starting from milk, meat as food and wool, hair or skin etc for other domestic use. People rear crossbred cattle, zo/ zomo (crosses of cow and yak bull), tor/ tormo (crosses of zomo and bull), gar/ garmo (crosses of zomo and yak bull), local cattle, yak, ass/ mule in different purposes in the region. Zo, tor and gar are sterile and used for drought purposes along with ass or mule whereas cow, zomo or garmo etc are used for milk

production. Though in last few years milk production has been increased and vaccination programme or disease control programme launched by the Government Departments, it is important to make aware the farmers about nutritional management, requirement of nutrients for different breed and physiological state etc. The region has no oilcakes for use in the animal feed, though one feed mill has been set up at Sankoo block (Kargil district) but the raw materials are being procured from adjoining states. This results in increased cost of production. So, production of cereals like maize as fodder and grain, oilseeds like mustard, groundnut etc has to be increase to improve the productivity of animals. But most important is to evaluate/ calculate the requirement of the animals with reference to the place as in high altitude production traits altered to some extent. Though some work has been conducted in north-eastern states but its application in this high altitude is to be re-examined and farmers should be communicated through extension work.

SUMMARY

Feeds (20) were taken for chemical evaluation and fibre fractions in Ladakh, a cold arid region of Jammu & Kashmir. Highest crude protein (CP) was observed in

mulberry followed by pea, alfalfa and iris, whereas, lowest in cicer. Crude fibre (CF) was highest in cicer and lowest in sarsing. Hemicellulose was highest in iris and lowest in cicer. Whole plant (leaves and stem with some grains), small millet, foxtail millet and bulk wheat, and straws/ other feeds, viz. wheat straw, barley straw and mustard siliqua were also evaluated for its chemical composition. Among these whole plants as well as mustard siliqua had higher CP and straws

were the lowest.

REFERENCES

- AOAC. 1984. *Official Methods of Analysis*. 14th edn. Association of Official Analytical Chemists, USDA, Washington, DC.
- APR. 2006 *Annual Progress Report*. Krishi Vigyan Kendra, SKUAST-K, Kargil.
- Goering H K and VanSoest P J. 1970 *Forage Fibre Analysis*. ARS, USDA Handbook No.379, Washington, DC.