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Proximate composition of commonly available feed and fodder at ARC-CSWRI, Bikaner

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Abstract
A preliminary investigation was carried out to evaluate the proximate principles of commonly available feed and fodders (*Cenchrus setigerous, Lasiurus sindicus, Cenchrus biflorus Andropogan laniger, Tribulus terrestris, Heteropogon contortus, Calligonum polygonoides Aristidia funiculate, Aeruato mentosa, Capparis deciduas* and *Zizyphus numularia*). These fodder plants were collected from ARC-CSWRI, Bikaner (Rajasthan) and proximate composition was estimated as per the specifications of AOAC (2005). The results of study showed the proximate values of the feeds available in that region which were in range between 4.16-12.94% crude protein, 1.01-2.11% ether extract, 9.21-35.12% crude fiber 47.15-71.61% nitrogen free extract and 4.67-17.67% total ash. This study would be helpful to develop the data base of fodder available in arid region of Bikaner (Rajasthan), which may be a supportive tool for fodder policy decision regarding community pastureland development.

Keywords: Arid zone, fodder, proximate principles, pastureland development

Introduction
The overall contribution of livestock sector in total GDP is nearly 4.1% during 2012-13 (Anonymous, 2012) [1]. Livestock resources in India especially small ruminants like goat and sheep provide an important role in economy of our country. There is great importance of small ruminants in developing countries because they are a major source of livelihood for small farmers and landless labourer in rural communities and they provide economic sustenance because of low initial investment and ease of rearing (Tembley, 1998) [2]. They are a mean of asset retention and also help to absorb unemployed family labour. The vast biodiversity of small ruminants in India is represented by 42 breeds of sheep and 26 recognized breeds of goat (NBAGR, 2016) [3]. The total sheep population in present scenario is 65.06 million in India, which is around 12.71% of the total livestock population but with, decline of about 9.07% over census 2007 (Anonymous, 2012) [1]. Farmers rear sheep mainly in extensive management system using common property resources. Fodder availability in community grazing land is usually the primary and most economical source of nutrients for sheep and goats but they are declining rapidly due to heavy stocking or poor regeneration. The major factor responsible for deteriorating sheep production in the country is shrinkage of grazing resources. Grazing resources in the arid zone are over exploited; consequently there is decrease in biomass yield (Shankar *et al.,* 1988) [4]. The acute fodder shortage is due to extensive cropping, fragmentation of land holdings, intensive cultivation and shrinking of pastures and grazing lands. The available grazing lands hardly produce 300-400 kg/ha fodder. The availability of green fodder is restricted to monsoon and post monsoon months only and during rest of the period, livestock graze on dry grasses and crop residues available in fallow and wastelands and other grazing lands. The gap between the demand and supply will continue to widen if appropriate strategies are not initiated to enhance forage production substantially. Small ruminants are preferred to large ruminants in arid and semi-arid regions of Rajasthan due to crop failure and recurrent drought (Mohan and Sagar 2010) [5] and because of their higher reproductive rate, small size and zero input system of rearing. Sheep play an important role in areas where it is difficult to rear other livestock. Small ruminant production in Rajasthan is constrained by low plane of nutrition because fodder scarcity is high in arid zone of Rajasthan. Therefore, present study was planned to evaluate the proximate principles of commonly available fodders in ARC-CSWRI to recommend for their incorporation for community grazing land.

2. Materials and Methods

The samples were collected during the autumn season of year 2016 from the ARC-CSWRI campus of Bikaner during the research trial. The proximate analysis was conducted at department of animal nutrition, college of veterinary and animal science, RAJUVAS, Bikaner. Samples of fodder were analyzed for proximate constituents as per AOAC (2005) [6].

3. Results and Discussion

The proximate composition of common fodders available in ARC-CSWRI, Bikaner for crude protein(CP), ether extract (EE), crude fibre (CF), nitrogen free extract (NFE) and Total Ash (TA) are on % dry matter basis are depicted in Table 1. Crude protein content ranges between 4.16-12.94% in all fodders. Highest crude protein was observed in *Zizyphus numularia* (12.94%) while lowest was in *Aristidia funiculate* (4.16%). Ether extract content ranges between 1.01-2.11% with maximum value observed in *Cenchrus biflorus* (2.11%) and minimum value in *Heteropogon contortus* (1.01%). Crude fiber content ranges between 9.21-35.12%. Highest crude fibre was observed in *Heteropogon contortus* (35.12%) while lowest was in *Capparis deciduas* (9.21%). Nitrogen free extract content ranges between 47.15-71.61% with maximum value observed in *Capparis deciduas* (71.61%) and minimum value in *Cenchrus setigerous* (47.15%). Total ash content ranges between 4.67-17.67% with maximum value observed in *Calligonum polygonoides* (17.67%) and minimum value in *Capparis deciduas* (Ker) (4.67%).

In arid and semiarid regions of our country approximate 45-50% land is utilized for grazing purpose and the main source of grazing for sheep are common property resources (CPR). They are an important part of community assets in dry areas (Singh *et al*., 2005) [7] but due to variable factors the quality of CPR is declining rapidly which causes nutritional stress in sheep and it results in low productivity.

Table 1: Proximate composition of common feed and fodders available at ARC-CSWRI, Bikaner (Rajasthan)

Botanical name (local/common name)	CP	EE	CF	NFE	TA
Cenchrus setigerous (Dhaman)	7.91	1.29	34.12	47.15	9.53
Lasiurus sindicus (Sewen)	7.55	1.91	33.21	48.86	8.47
Cenchrus biflorus (Bhurat)	10.73	2.11	21.67	56.38	9.11
Andropogan laniger (Bur)	6.50	1.25	31.88	53.94	6.43
Tribulus terrestris (Gokhru)	11.22	1.76	24.39	48.52	14.11
Heteropogon contortus (Jherniya Grass)	5.99	1.01	35.12	47.6	10.28
Calligonum polygonoides (Phog)	8.47	2.09	18.26	53.51	17.67
Aristidia funiculate (Lamphdi)	4.16	1.33	34.89	50.72	8.90
Aeruato mentosa (Buhi)	6.11	1.21	18.21	64.29	10.18
Capparis deciduas (Ker)	12.59	1.92	9.21	71.61	4.67
Zizyphus numularia (Jharberi)	12.94	1.42	22.54	54.43	8.67

4. Conclusion

The variation in CP, EE, CF and TA values in fodder plants observed in the study comparison to earlier reports might be due to difference in locality, altitude, environmental conditions, and season of collection and stage of fodder growth. Inadequate availability of good quality feed and fodder due to shrinkage of CPR is the major limitation in further development of the sheep farming. Rajasthan has vast tract of grazing land, most of which has become degraded due to urbanization and deforestation. Fodder availability may be increased by regeneration of community grazing land by incorporating such type of nutrient rich feed and fodder analyzed under study. This study will be helpful in formulating mitigating strategy of nutritional crisis which is the hour of need to optimize productivity in sheep husbandry.

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