

NUTRITIONAL COMPOSITON OF *ALHAGI PSEUDALHAGI* (M. BIEB) DESV.

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Alhagi pseudalhagi, leaves and fruits are rich in protein, relished by camels and goats. Higher amount of protein is present in fruit 7.297 mg/g fresh wt. whereas lowest in stem i.e., 3.824 mg/g fresh wt. Root contained the maximum carbohydrate 9.166 mg/g fresh wt. Thus, the plant contained high amount of protein and carbohydrate so it is considered good for feeding the livestock particularly camels and goats.

Keywords : *Alhagi pseudalhagi*; Carbohydrate; Crude fibre; Nutritional; Protein.

Livestock farming in Rajasthan is an important part of agricultural operation when there is a severe shortage of feed and fodder, livestock population is first to be affected. The geographical area covered by eleven districts lying in the Western arid zone of the state of Rajasthan constitutes almost 61% of the total area of the state. Only 38% of the state human population live in these districts nearly 232.18 million comprising 48.44 million cattle, 17.53 million buffaloes, 87.29 million sheeps, 64.65 million goats and 7.38 million camels. The percentage increase during the last 32 years in total livestock, cattle, buffaloes, sheep, goat and camel population has been 47.90, 138.50, 163.39, 194.93, 169.37, respectively. It is evident from these figures that in spite of heavy losses in this drought prone area in recent years; the population of livestock in this region is constantly increasing at a rapid rate. One study indicate that in year with less than 25% of the average rainfall as much as 20% of the livestock are wiped out and in

that year; with less than 50% rainfall the livestock population is reduced by about 10%. The genus *Alhagi pseudalhagi* (M. Bieb.) Desv. belongs to family-Papilionaceae of the order Rosales in the Bentham and Hooker's system of classification. The genus *Alhagi* has five species all over the world out of which only one species reported in India. i.e., *Alhagi pseudalhagi*. The present investigation was under taken to look into the scope of vegetation to be used for the livestock as a source of fodder, so that the vegetation available could be utilized for the livestock to overcome the scarcity of nutrients and edible biomass in general.

For the estimation of chlorophyll, protein, carbohydrate and starch, fresh plant material of *Alhagi pseudalhagi* was collected monthly from the study area, Multipurpose School, Sri Ganganagar. Plants were collected in the polythene bags during morning hours and the collected plant material were withdrawn as root, stem,

Table 1. Nutritional composition of different plant parts of *Alhagi pseudalhagi*.

Plant Parts	Chlorophyll mg/g fresh wt.	Lipid mg/g fresh wt.	Protein mg/g fresh wt.	Carbohydrate mg/g fresh wt.	Crude fibre % (dry wt.)
Root	-	0.016	6.174	9.166	53.803
Stem	-	0.056	3.824	4.209	69.301
Leaf	0.695	0.103	5.660	9.020	50.010
Fruit	-	0.089	7.297	5.540	41.100

NB : Values shown in table are on average basis.

leaves, flowers and fruits, then soil particles were removed. For estimation of crude fibre, the plant parts were dried at 60°C for 72 hours and were separately powdered and stored in small polythene bags. Chlorophyll content was estimated following the method of Arnon¹, total soluble sugar by Dubois *et al.*², protein by Lowry's³, lipid by Folch *et al.*⁴ and crude fibre by A.O.A.C.⁵ methods.

Results of the nutritive status of *Alhagi pseudalhagi* are given in Table 1. Three replicates were taken for each determination. Phytochemical studies showed that *Alhagi pseudalhagi* contained maximum amount of lipid in leaf, protein in fruit, carbohydrate in root and crude fibre in stem. Leaf chlorophyll was also estimated. From the observed value it was inferred that the fruits are comparatively rich in protein content than the rest of plant parts whereas the leaves contained comparatively high amount of carbohydrate.

Highest amount of chlorophylls have been reported in young leaves of certain Monocots⁶ and Dicots⁷. Aruga and Monsi⁸ observed 300 mg/g dry wt. chlorophylls for desert plants of Japan. Naaber⁹ reported that chlorophyll content of leaves varied from 0.7 to 4.9 mg/g dry wt. in the species of south west Ryzylkum desert. The maximum amount of chlorophyll was observed in species of the families Gramineae, Compositae and Leguminosae. Sen and Ray¹⁰ reported 2.46 per cent crude fat content in *Panicum antidotale*. Purohit and Mathur¹¹ demonstrated 1.97 per cent crude fat content in *Panicum turgidum*. Bishay and Gomaa¹² analyzed seed oils of several species including *Cassia acutifolia*, *Cassia obovata*, *Trigonella foenum-graecum*, *Colchicum autumnale* and *citrullus colocynthis*. The oils of the first three species appeared to have edible value whereas those of other two species containing a high percentage of linoleic acid, could be used in the paint industry. Luthra and Matta¹³ analyzed the seed protein of the family Rosaceae. The protein characteristics of

Rosaceae seeds show interesting relationships with the seed proteins of legumes and cereals. The high protein in all the species points toward closeness of Rosaceae with Leguminosae. Behera and Patnaik¹⁴ analyzed the protein in *Eclipta alba*. Both in leaf and flower the distribution of protein amino acid is 50% more than their respective soluble amino acids and amide, the protein value of the leaf is nearly 66.6% greater than the flower. Duhan, Kherjri beans (*Prosopis cineraria*), Pinju (*Capparis decidua*) and kachari (*Cucumis spp.*) contain considerable amount of protein (15-18%). Kachari was rich in fat (13%), Bhakhari (*Tribullus terrestris*), Gullar (*Ficus glomerata*) and Peehl (*Salvadora oleoides*), Santhi (*Boerhavia diffusa*), Khejri beans, Pinju and Lehsora (*Cordia dichotoma*) were noticeable. Nag¹⁵ recorded high carbohydrate content in respect of sugar in the shoots of *Allamanda nerifolia* (114 mg/g), *Tabernaemontana divaricata* (100 mg/g), *Wrightia tinctoria* (100 mg/g) of the Apocynaceae and in *Cryptostegia grandiflora*, *Calotropis procera* (94 mg/g in both) of the Asclepiadaceae. Nawab Singh *et al.*¹⁶ estimated the chemical composition and nutritive value of *Albizia lebbek* and *Leucaena leucocephala* pods. The *Albizia lebbek* pods contained 42.09 per cent crude fibre whereas *Leucaena leucocephala* pods contained 44.09 per cent crude fibre. The conclusion which may be drawn after assessing the present work is that leaf of *Alhagi pseudalhagi* may be used as a good fodder for livestock because of its virtue of high protein and carbohydrate contents.

It has been safely concluded that *Alhagi pseudalhagi* is highly nutrient, containing enough amount of nutrients to support the livestock. It is particularly rich in protein and carbohydrate and is considered good for feeding the livestock.

References

1. Arnon D I 1949, *Plant Physiol* 24 1
2. Dubois M, Gilles K A, Hamilton J K, Robers P A and Smith F 1956, *Anal. Chem.* 28 350

3. Lowry O H, Rosenbrough N J, Farr A L, and Randall RJ 1951, *J. Biol. Biochem.* 193 265
4. Folch J, Lees M and Sloane-Stanley G H 1957, *J. Biol. Chem.* 226 497
5. A. O. A. C. 1995, *Official method of analysis of A.O.A.C. International*, Washington, D.C., USA, 16th ed. Vol. I & II. Cunniff, P. A. (Ed.)
6. Lal K M, Subbo M S and De P 1952, *Proc. Nat. Inst. India* 18 603
7. Siroval C, Bonnier C, and Verlinder J P 1957, *Physiol. Plant.* 10 697
8. Aruga Y and Monsi M 1963, *Plant and Cell Physiol.* 4 29
9. Naaber L Kh. 1972, *Pigment content in the leaves of desert plants. Eco-physiological foundation of ecosystem productivity in Arid Zone*, International Symposium USSR.
10. Sen K C, Revised by Ray S N 1964, *Nutritive values of Indian Cattle Feeds and the feeding of animals. Bulletin No. 25 I.C.A.R New Delhi.*
11. Purohit G R and Mathur C S 1970, *Ann. Arid. Zone.* 9 261
12. Bishay D W and Gomma C S 1976, *Egyptian Journal of Pharmaceutical Sciences* 17(3) 249
13. Luthra R and Matta N K 1990, *J. Indian bot. Soc.* 69 321
14. Behera N K and Patnaik K K 1977, *J. Indian bot. Soc.* 56 308
15. Nag T N 1986, *Indian arid zone plant tissue cultures- a source of pharmacologically important metabolites. VI. IAPTC Minneapolis 3rd to 8th August.* Abstracts. pp 115
16. Nawab Singh, Sharma K and Ogra J L 1989, *Indian J. Anim. Nutri.* 6(3) 259