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Research Article

NUTRITIONAL EVALUATION OF TOP FIVE FODDER TREE LEAVES OF MIMOSACEAE FAMILY OF ARID REGION OF RAJASTHAN

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ABSTRACT
The aim of present research was to record out the nutritional evaluation of different fodder tree leaves of arid region of Rajasthan. Arid Zones are characterized by sparse and highly variable precipitation, extreme variation of diurnal and annual temperature and high evaporation. Top 5 tree leaves of Mimosaceae family, i.e *Acacia nilotica, Acacia tortilis, Prosopis cineraria, Prosopis chilensis* and *Albizia lebbeck* were identified and analyzed for proximate analysis, i.e; CP (Crude Protein), CF (Crude Fiber), Ash, EE (Ether Extract), NFE (Nitrogen Free Extract), OM (Organic Matter), TC (Total Carbohydrates). The CP, CF, ash, EE contents of the foliages varied from 12.5-19.2, 11.6-24.2, 6.4-9.5 and 3.4-6.9% on percent of DM, respectively.

***Keywords*:** *Nutritional Evaluation, Fodder Tree Leaves, Mimosaceae*

INTRODUCTION:

The current status of animal protein deficiency in developing world is caused by lack of forage. Fodder trees have always played a role in feeding livestock. Fodder trees are increasingly recognized as important components of animal feeding, especially as suppliers of protein. In difficult environmental conditions, where the available grazing is not sufficient to meet the maintenance requirements of animals for part of the year, the contribution from trees is significant. Tree fodders contain high levels of crude protein and minerals and many show high levels of digestibility. They are readily accepted by livestock and presumably because of their deep-root systems, they continue to produce well into the dry season. However, anti nutritive factors can be a problem in some species (Paterson *et al*., 1998).

The synthesis and quantity of primary metabolites may be affected by variation in climatic conditions. The area under present investigation is the part of Rajasthan desert, and characterized by extreme of temperature, high wind velocity, low relative humidity, low precipitation and high evapotranspiration during different seasons of the year. The metabolic activities and quantity of metabolic products in plants have to be changed for adjustment in order to grow and survive in such hospitable conditions.

The amount of proteins is usually reported as crude proteins which is the measure of the true proteins containing a number of amino acids and nitrogen of non-protein nitrogenous compounds multiplied by a corrections factor, usually 6.25 (Cook *et al.,* 1962). Since, crude proteins content is significantly correlated to digestible protein content, determining of the crude proteins level of a plant can give a reasonable reliable indication of its feed value (Sullivan, 1962.) The fuel value in fats is much higher than proteins and carbohydrates. The carbohydrates of forage are partitioned into crude fibres and nitrogen free extracts. The division is based on the assumption that crude fibres, which include the cell wall and woody fibres are less digestible and nitrogen free extracts where the starch and sugars are main ingredients, are more digestible.

The present study was undertaken to explore nutrient contents of 5 fodder tree leaves of Mimosaceae family available in the arid region of Rajasthan. The experimental foliage species were selected because they are abundantly available and highly preferred by ruminants in its natural habitat and because farmers strongly believe that these foliage species are highly nutritious.

MATERIALS AND METHODS

Sample collection: Most dominant fodder tree leaves in the region, which is being used for feeding ruminants locally, were *Acacia nilotica, Acacia tortilis, Albizzia lebbeck, Prosopis cineraria and*

Prosopis chilensis. The green leaves were rinsed in distilled water to remove dust and stored in filter paper bags at room temperature. Samples were dried on an oven, having exhaust fan at 100°C for 10 minutes. So, as to inactivate the enzymes followed by 60°C till a constant weight was obtained (Martin *et al.*, 1987). The dried plants were powdered separately and stored in a small polythene container at room temperature. These samples were analyzed chemically.

Chemical analysis: Crude Protein (CP), Crude Fiber (CF), Ether Extract (EE) and ash of the samples were determined according to AOAC (1990). Crude protein was estimated by micro kjeldhal method. Oven dried sample was digested with H_2SO_4 in the presence of catalyst mixture containing K_2SO_4 and $CuSO_4$. A known aliquate of the diluted sample was distilled in the presence of 10 ml of 2% boric acid solution and titrated against standard 0.1 N H_2SO_4. The percent of nitrogen was calculated for the estimation of CP. The ether extract in a sample was determined by extracting with diethyl ether at 60°C in soxhlet's apparatus. For crude fiber, sample was reflexed first with 1.25% H_2SO_4 and subsequently with 1.25% NaOH for 30 min each to dissolve acid and alkali soluble component present in it. The residue containing CF was dried to a constant weight and the dried residue was ignited in muffle furnace, loss of weight on ignition was calculated to express it as CF. for ash, sample was ignited in muffle furnace at 550°C to burn all the organic matter and leftover was weighed as ash.

Nitrogen-free extract: Nitrogen-free extract was determined on dry matter basis as:

% NFE = 100 - (%CP + %CF + %EE + %ash)

Total Organic matters: The total organic matter was calculated by the following formula:-

%OM = %CP + %EE + %CF + %NFE

Total Carbohydrates: The total carbohydrate was calculated by the following formula:-

%TC = %CF + %NFE

RESULTS AND DISCUSSION

The CP contents of fodder trees varied from 12.5–19.2% (Table.1). The highest CP value was observed for *Acacia tortilis* followed by *Prosopis cineraria*, *Prosopis chilensis*, *Acacia nilotica*, and *Albizia lebbeck* respectively. Nutritive contents have been quantitatively estimated from some important fodder plants of Rajasthan desert by some research workers (Sen and Ray, 1964; Mathur and Karwasra, 1967; Mathur and Purohit, 1979; Bohra, 1980). Purohit (1987) evaluated the nutritive value of some grasses, herbs, shrubs and trees of arid zone and observed the amounts of crude proteins and mineral contents were comparatively lower in grasses than tree leaves which contained up to 14-15% crude proteins. Distel *et al*. (2005) reported that CP contents in different forage species declined with time.

Table 1: Proximate composition (on % dry matter basis) of fodder tree leaves of Mimosaceae family

Fodder tree leaves	CP	CF	EE	Ash	NFE	OM	TC
Acacia nilotica	13.7	21.2	5.8	6.4	52.9	93.6	74.1
Acacia tortilis	19.2	11.6	6.1	8.7	54.4	91.3	66.0
Albizia lebbeck	12.5	24.2	3.6	9.5	50.2	90.5	79.4
Prosopis chilensis	14.3	19.2	6.9	8.9	48.65	91.1	67.85
Prosopis cineraria	15.8	19.5	3.4	8.2	53.1	91.8	72.6

CP = Crude Protein, CF =Crude Fiber, EE = Ether Extract, NFE = Nitrogen Free Extract, OM = Organic Matter, TC = Total Carbohydrate

CP contents of all the species of this study were higher than 10%, sufficient for medium level of production from ruminants (Subba, 1999). Subba (1999) has reported that a higher proportion of the CP in the fodder tree leaves is actually in the form available to ruminants. The fodder tree leaves like etc. are higher preferred by the farmers for their palatability and performance of the animal. The crude fibre contents varied from 11.6–24.2. The highest fibre content value was for *Albizia lebbeck*, followed by

Acacia nilotica, Prosopis cineraria and *Prosopis chilensis* respectively. The lowest value was observed for *Acacia tortilis*. The ether extract varied from 3.4–6.9%. The highest ash value was for *Prosopis chilensis* followed by *Acacia tortilis, Acacia nilotica* and *Albezia lebbeck.* The lowest value was observed for *Prosopis cineraria.* The ash contents varied from 6.4–9.5%. The highest ash value was for *Albezia lebbeck* followed by *Prosopis chilensis, Acacia tortilis* and *Prosopis cineraria.* The lowest value was observed for *Acacia nilotica.*

The NFE contents of fodder trees varied from 48.65-54.4%. The highest NFE value was observed for *Acacia tortilis* followed by *Prosopis cineraria, Acacia nilotica* and *Albizia lebbeck respectively.* The lowest value was observed for *Prosopis chilensis.* The OM contents of fodder trees varied from 90.5–93.6%. The highest OM value was observed for *Acacia nilotica* followed by *Prosopis cineraria, Acacia tortilis* and *Prosopis chilensis respectively.* The lowest value was observed for *Albizia lebbeck.* The TC contents of fodder trees varied from 66.0-74.1%. The highest TC value was observed for *Albizia lebbeck* followed by *Acacia nilotica, Prosopis cineraria and Prosopis chilensis respectively.* The lowest value was observed for *Acacia tortilis.*

Conclusion

Our current investigations on nutritional evaluation of foliages have revealed that these plants are good source of nutrients and can be used as substrates deficit in either of these nutrients for livestock grazing in this region.

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