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Chemical composition and *in-vitro* nutrient digestibility of dimoru (*Ficus glomerata*) fodder tree leaves of Assam

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Abstract

An experiment was conducted to study the nutrient composition and *in-vitro* nutrient digestibility of *Dimoru (Ficus glomerata)* fodder tree leaf of Assam. The nutrient composition and *in-vitro* nutrient digestibility were studied in two different seasons i.e. summer and winter and at two different regions i.e. plains and hills. The average CP content of *Dimoru (Ficus glomerata)* leaves in plain region was 14.00% and in hills region was 13.32% irrespective of the season and in summer it was 13.95% and 13.37% in winter irrespective of the region. The average IVDMD of *Dimoru (Ficus glomerata)* leaves was 70.69% and 68.83% for plains and hills respectively whereas the IVDMD was 73.83% and 65.70% in summer and winter respectively irrespective of the region which was significantly higher in the summer season. The average IVOMD was found to be 76.35% and 78.00% in plains and hills respectively irrespective of the season whereas it was 79.56% and 74.79% in summer and winter respectively irrespective of the region which was significantly higher in the summer season. From the chemical composition and nutrient digestibility, it was observed that *Dimoru (Ficus glomerata)* fodder leaves have both nutritional value and can be fed to the livestock during fodder shortage and scarcity period.

Keywords: *In vitro*, CP, IVDMD, IVOMD

Introduction

According to planning commission report, GOI (11th five year plan) there is a deficit of 62.76% green fodder, 23.46% dry fodder and 30% concentrate for feeding the large livestock population of our country. Hence, the fodder tree leaves play an important role in reducing the gap between green feed availability and requirement. Fodder tree leaves are also regarded as the primary source of green material during the lean period or during natural calamities particularly during a flood. However, knowledge of the comparative nutritive value is necessary for including the tree leaves in livestock feeding. The feeding of tree leaves as a supplement or as basal diet is not a new practice. Tree leaves have traditionally been fed as a supplement to the small ruminants and herbivore monogastric animals. They have long been considered important for nutrition of animals, particularly in those areas with pronounced dry season and severe winter they provide a supplement of green feed when grass and other herbaceous material are dry and they provide the only source of protein and energy during drought, when all other feed is unavailable. Significant traditional knowledge already exists pertaining for utilization of tree leaves as feed resources for ruminants. Though the chemical composition of many tree leaves are known but the nutritive value of many tree leaves are yet to explore. The *in-vitro* nutrient digestibility technique is quite precise and accurate. The *in-vitro* nutrient digestibility method was modified by DE BOEVER and his co-workers. Keeping in view above facts, an attempt has been made to study the chemical composition and *in-vitro* nutrient digestibility.

Material and Methods

The *Dimoru (Ficus glomerata)* tree leaves were collected in summer and winter season and also from plain and hill region of Assam. The three samples from each season i.e. summer and winter and each region i.e. plains and hills were analyzed for chemical composition and *in-vitro* nutrient digestibility. Hence there were altogether 12 samples. After collection of the samples it was dried and kept overnight in the hot air oven to estimate the parameter content.

The dried samples were ground properly and used for chemical analysis. The proximate analysis of the fodder tree leaves were estimated by the method described in AOAC (2005) [2]. Calcium and phosphorus content was estimated by the modified method of Talapatra *et al.* (1940) [9]. *In-vitro* dry matter and organic matter digestibility of fodder tree leaf was estimated by the enzymatic technique of De Boever *et al.* (1985) [4].

Results and Discussion

The mean values of proximate analysis and their statistical significance have been presented in the Table 1. Statistical analysis revealed that there were significant difference ($P < 0.01$) in all the chemical compositions between summer and winter in both plain and hill region. Significance was also

observed between regions in the same season in respect of OM, CP, NFE and TA. Non-significant difference was observed for CF and EE between regions in the same season. The results of the present study are in good agreement with the reported results of Borah and Deka (2008) [3]; Adebisi and Oyeleke *et al.* (2009) [1]; Samanta *et al.* (2015) [7].

The Statistical analysis for IVDMD and IVOMD has been presented in table 2. It revealed that there was significant difference ($P < 0.01$) in respect of IVDMD and IVOMD between the season. When the region was concerned it was observed that significant difference ($P < 0.05$) observed for both IVDMD and IVOMD between regions in the same season. The results of the present experiment was in accordance with the findings of Rosales (1996) [6]; Elseed *et al.* (2002) [5]; Samanta *et al.* (2015) [7].

Table 1: Mean value and statistical significance for proximate analysis of *Dimoru (Ficus Glomerata)* leaves at different regions and seasons (% on DM basis)

Parameters	Region	Season		Overall mean
		Summer	Winter	
DM	Plains	28.17 ^A ±0.98	30.50 ^B ±0.28	29.34±0.69
	Hills	28.24 ^A ±0.93	30.90 ^B ±0.15	29.57±0.72
	Overall mean	28.21 ^A ±0.60	30.70 ^B ±0.17	
CP	Plains	14.40 ^{Aa} ±0.08	13.61 ^{Bb} ±0.09	14.00 ^a ±0.18
	Hills	13.50 ^b ±0.21	13.13±0.25	13.32 ^b ±0.69
	Overall mean	13.95 ^A ±0.22	13.37 ^B ±0.66	
CF	Plains	12.50 ^A ±0.10	16.43 ^B ±0.23	14.47±0.88
	Hills	12.67 ^A ±0.16	16.52 ^B ±0.25	14.60±0.87
	Overall mean	12.59 ^A ±0.09	16.48 ^B ±0.15	
EE	Plains	2.42 ^A ±0.21	2.92 ^B ±0.04	2.67±0.14
	Hills	2.24±0.14	2.52±0.09	2.38±0.09
	Overall mean	2.33±0.12	2.72±0.10	
NFE	Plains	57.42 ^{Aa} ±0.12	52.67 ^{Ba} ±0.24	55.05 ^a ±1.06
	Hills	57.37 ^{Ab} ±0.49	48.97 ^{Bb} ±0.69	53.17 ^b ±1.91
	Overall mean	57.39 ^A ±0.22	50.82 ^B ±0.89	
TA	Plains	13.25 ^{Aa} ±0.14	14.36 ^{Ba} ±0.13	13.80 ^a ±0.26
	Hills	14.20 ^{Ab} ±0.11	15.45 ^{Bb} ±0.08	14.83 ^b ±0.28
	Overall mean	13.72 ^A ±0.22	14.90 ^B ±0.25	
Ca	Plains	1.83 ^{Aa} ±0.24	3.61 ^B ±0.25	2.72 ^a ±0.42
	Hills	3.40 ^b ±0.26	3.66±0.20	3.53 ^b ±0.16
	Overall mean	2.61 ^A ±0.38	3.64 ^B ±0.14	
P	Plains	0.27 ^a ±0.01	0.20 ^a ±0.02	0.23 ^a ±0.02
	Hills	0.52 ^b ±0.07	0.48 ^b ±0.01	0.50 ^b ±0.03
	Overall mean	0.39±0.06	0.34±0.06	

Mean and overall mean in a row bearing different superscript (capital letter) differ significantly.

Mean and overall mean in a column bearing different superscript (small letter) differ significantly.

Table 2: Mean value of *in-vitro* dry matter and organic matter digestibility of *Dimoru (Ficus Glomerata)* leaves at their statistical significance at different regions and seasons (% on DM basis)

Parameters	Region	Season		Overall mean
		Summer	Winter	
IVDMD	Plains	73.33 ^A ±0.88	68.07 ^{Ba} ±0.57	70.69±1.26
	Hills	74.33 ^A ±0.58	63.33 ^{Bb} ±0.57	68.83±2.48
	Overall mean	73.83 ^A ±0.52	65.70 ^B ±1.11	
IVOMD	Plains	77.44 ^{Aa} ±0.29	75.26 ^B ±0.63	76.35±0.57
	Hills	81.67 ^{Bb} ±0.64	74.33 ^B ±0.67	78.00±1.69
	Overall mean	79.56 ^A ±0.99	74.79 ^B ±0.46	

Mean and overall mean in a row bearing different superscript (capital letter) differ significantly.

Mean and overall mean in a column bearing different superscript (small letter) differ significantly.

Conclusion

The results of the present study indicated that *Dimoru (Ficus glomerata)* tree leaves may be a potential leaf for livestock feed as it contain appreciable amount of proteins. The leaves

of *Dimoru (Ficus glomerata)* tree can be compared with other good quality feed for animals. The *in-vitro* digestibility also indicates that the nutrients are well digested by the animals without any adverse effect. Considering the chemical composition and *in vitro* digestibility of nutrients this leaves can be regarded as a good quality feed for the animals and safely being used in ration formulation for ruminant animals.

References

1. Adebisi GA, Oyeleke GA. Studies on *Ficus Carpensis* (Fruit and Leaf): Proximate and mineral compositions. Int. J. Chem. Sci. 2009; 7(3):1761-1765.
2. AOAC. Official methods of analysis, 18th edn., Association of Official Analytical Chemist. USDA, Washington, DC, 2005.
3. Borah J, Deka K. Nutritional evaluation of forage preferred by wild elephants in the Rani Range Forest, Assam, India. Gajaha. 2008; 28:41-43.
4. DeBover JL, Cottyn BG, Buysee FX, Wanman FW, Vanacker JM. The use of an enzymatic technique to

- predict digestibility, metabolisable and net energy of forages. *Anim. Feed Sci. Technol.* 1985; 14:203-214.
5. Elseed AMAF, Amin EA, Khadiga, Ati AA, Sekine J, Hishinuma M *et al.* Nutritive value of fodder trees in Sudan. *Asian-Aust. J. Anim. Sci.* 2002; 15(6):844-850.
 6. Rosales M. *In-vitro* assessment of the nutritive value of mixtures of leaves from tropical fodder trees. Ph.D. Thesis, University of Oxford, 1996.
 7. Samanta AK, Das BK, Pawar S. Nutritional evaluation of some promising top foliages of Aizawl district of Mizoram. *International Journal of Research.* 2015; 2(4):496-501.
 8. Snedecor GW, Cochran WG. *Statistical Methods*, Oxford and IBH Publications, New Delhi, 1994.
 9. Talapatra SK, Ray SC, Sen KC. Estimation of phosphorus, chlorine, calcium, magnesium, sodium and potassium in foodstuffs. *Indian J Vet Sci Anim Husb.* 1940; 10:243-246.