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# Chemical composition and *in-vitro* nutrient digestibility of *Saura* (*Streblus asper* Lour.) fodder tree leaves of Assam

**Gautomi Dutta, Robin Bhuyan, Bibeka Nanda Saikia, Adib Haque and Shantanu Tamuly**

**Abstract**
An experiment was conducted to study the nutrient composition and *in-vitro* nutrient digestibility of *Saura* (*Streblus asper* Lour.) fodder tree leaves 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 *Saura* (*Streblus asper* Lour.) leaves in plain region was 16.85% and in hill region was 16.58% irrespective of the season and in summer it was 17.13% and 16.30% in winter irrespective of the region. The average IVDMD of *Saura* (*Streblus asper* Lour.) tree leaves was found to be 68.44% and 61.58% in plains and hills region respectively irrespective of the season which was significantly higher in the plain region whereas the IVDMD was 66.19% and 63.83% respectively for summer and winter. The average IVOMD was found to be 74.26% and 73.12% in plains and hills respectively irrespective of the season whereas it was 74.23% and 73.15% in summer and winter respectively irrespective of the region. From the chemical composition and nutrient digestibility, it was observed *Saura* (*Streblus asper* Lour.) 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

## 1. Introduction
According to planning commission report, GOI (11$^{th}$ 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.

## 2. Material and Methods
The *Saura* (*Streblus asper* Lour.) 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) [1]. Calcium and phosphorus content was estimated by the modified method of Talapatra *et al*. (1940) [12]. *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].

## 3. 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 reason except NFE, TA and calcium. The results of the present study are in good agreement with the reported results of Borah (1976) [2]; Borah and Deka (2008) [3]; Paengkaum *et al.* (2011) [7, 8]; Nabi *et al.* (2017) [6]; Parissi *et al*. (2018) [9].

The Statistical analysis for IVDMD and IVOMD has been presented in table 2. It revealed that significant difference ($P<0.05$) between the season was observed in respect of IVDMD. However, non-significant difference observed for IVOMD between seasons. When the region was concerned significant difference ($P<0.01$) was observed in respect of IVDMD between in the region of the same seasons. However, non-significant difference was observed in IVOMD between regions in the same seasons. The results of the present experiment was in accordance with the findings of *Sultan et al.* (2008) [11]; Fasae *et al.* (2010) [5].

**Table 1:** Mean Value and Statistical Significance for Proximate Analysis of *Saura* (*Streblus Asper* Lour.) Leaves at Different Regions and Seasons (% on DM basis)

| Parameters | Region | Season | | Overall mean |
|---|---|---|---|---|
| | | Summer | Winter | |
| DM | Plains | $32.97^{A}$ ±0.33 | $34.57^{B}$ ±0.32 | 33.77±0.41 |
| | Hills | $33.02^{A}$ ±0.06 | $34.84^{B}$ ±0.09 | 33.93±0.40 |
| | Overall mean | $32.99^{A}$ ±0.15 | $34.70^{B}$ ±0.16 | |
| CP | Plains | $17.30^{Aa}$ ±0.02 | $16.40^{Ba}$ ±0.05 | $16.85^{a}$±0.20 |
| | Hills | $16.96^{Ab}$ ±0.04 | $16.20^{Bb}$ ±0.05 | $16.58^{b}$±0.17 |
| | Overall mean | $17.13^{A}$ ±0.07 | $16.30^{B}$ ±0.05 | |
| CF | Plains | $20.06^{Aa}$ ±0.12 | $22.92^{Ba}$ ±0.13 | $21.49^{a}$±0.64 |
| | Hills | $20.50^{Ab}$ ±0.25 | $23.93^{Bb}$ ±0.03 | $22.21^{b}$±0.77 |
| | Overall mean | $20.28^{A}$ ±0.15 | $23.42^{B}$±0.23 | |
| EE | Plains | $2.32^{A}$ ±0.06 | $3.50^{Ba}$ ±0.07 | 2.91±0.26 |
| | Hills | $1.66^{A}$ ±0.50 | $2.56^{Bb}$ ±0.12 | 2.11±0.30 |
| | Overall mean | $1.99^{A}$ ±0.27 | $3.02^{B}$ ±0.22 | |
| NFE | Plains | $46.30^{A}$ ±0.64 | $41.52^{B}$ ±0.14 | 43.91±1.10 |
| | Hills | $45.73^{A}$ ±0.69 | $40.71^{B}$ ±0.17 | 43.22±1.16 |
| | Overall mean | $46.01^{A}$ ±0.44 | $41.12^{B}$ ±0.20 | |
| TA | Plains | $14.00^{A}$±0.57 | $15.65^{B}$±0.05 | 14.82±0.45 |
| | Hills | $15.15^{A}$±0.15 | $16.60^{B}$±0.05 | 15.87±0.33 |
| | Overall mean | $14.57^{A}$±0.37 | $16.12^{B}$±0.21 | |
| Ca | Plains | 1.84±0.36 | 1.88±0.05 | 1.86±0.16 |
| | Hills | 1.95±0.17 | 2.03±0.23 | 1.99±0.13 |
| | Overall mean | 1.89±0.18 | 1.96±0.11 | |
| P | Plains | $0.17^{a}$ ±0.01 | $0.13^{a}$ ±0.01 | $0.15^{a}$±0.01 |
| | Hills | $0.25^{Ab}$ ±0.02 | $0.18^{Bb}$ ±0.01 | $0.22^{b}$±0.01 |
| | Overall mean | $0.21^{A}$ ±0.01 | $0.16^{B}$ ±0.01 | |

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 *Saura* (*Streblus Asper* Lour.) Leaves At Their Statistical Significance at Different Regions and Seasons (% on DM Basis)

| Parameters | Region | Season | | Overall mean |
|---|---|---|---|---|
| | | Summer | Winter | |
| IVDMD | Plains | $69.55^{a}$±1.60 | $67.33^{a}$±0.57 | $68.44^{a}$±0.90 |
| | Hills | $62.83^{b}$±0.28 | $60.33^{b}$±0.51 | $61.58^{b}$±0.61 |
| | Overall mean | 66.19±1.66 | 63.83±1.60 | |
| IVOMD | Plains | 74.89±1.60 | 73.63±1.18 | 74.26±1.05 |
| | Hills | 73.58±0.31 | 72.67±0.25 | 73.12±0.27 |
| | Overall mean | 74.23±0.92 | 73.15±0.58 | |

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.

## 4. Conclusion

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

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