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Nutritive value of some medicinally important species of Lamiaceae from Dibrugarh, Assam, India

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ABSTRACT

Lamiaceae family members are used as vegetable food and therefore, the nutritional status of the plant samples were determined to get an idea about their food value using standard laboratory methods. All the samples are found to have nutritional value above 300cal/kg. The ash, moisture, fat, protein and carbohydrate content of the plants vary from plant to plant. Inflorescence of *Pogostemon auricularius* (L.) Hassk. recorded highest (444.20cal/kg) nutritive value than other tested plants. The selected plants have nutritional value but are not equally used as food inspite of their medicinal importance. Thus, this kind of study may provide information about the nutritional quality of these plants and some of them can be used as supplementary source of human food. The plants may have nutritional value but they are still not considered as 'functional food' and are not well experimented. Perhaps these plants may contain some anti-nutritional factor which affects their nutritional value.

Key words : *Lamiaceae, Vegetable, Nutritive, Functional, Food*

Introduction

In India, Lamiaceae members are used traditionally in various diseases due to their medicinal properties (Sankar *et al.,* 1994; Singh and Majumdar, 1997; Umadevi and Ganasundari, 1999; Prakash and Gupta, 2000; Mediratta *et al.,* 2002). The members also possess antioxidant activity which is related to the phenolic compounds present in the plants (Ivanova *et al*., 2005; Katalinic *et al.,* 2006; Perez-Perez *et al*., 2006). Various other workers determined the fat, ash, moisture, carbohydrate, protein content and nutritive value of Lamiaceae members (Edeoga *et al*., 2006; Kavitha *et al.,* 2009; Idris *et al*., 2011; Khomdram *et al*., 2011; Koche *et al*., 2011; Mlitan *et al*., 2014; Tomescu *et al*., 2015).

Besides having medicinal properties, the plants from Lamiaceae family are also considered as vegetable food. The food value of these plants were not determined from the present study area. The commonly used and commonly available plants of Lamiaceae family from the study area were- *Anisomeles indica* (L) Kuntze, *Leonurus sibiricus* L., *Leucas aspera* (Willd.) Link., *Melissa officinalis* L., *Mentha arvensis* L., *Mentha viridis* (L.)L., *Ocimum americanum* L., *Ocimum basilicum* L., *Ocimum gratissimum* L., *Ocimum sanctum* L., *Pogostemon auricularius* (L.) Hassk., *Pogostemon benghalensis* (Burms.f.)Kuntze, *Perilla frutescens* (L.)Britton, *Teucrium tomentosum* Lam. and *Teucrium quadrifarium* Buch.-Ham. The selected plants have medicinal value but their nutritional values have to be determined.

Materials and Methods

Samples were collected from Dibrugarh district of Assam at their full bloomed stage. The collected

flowering branches were brought to the laboratory. Different parts were separated and cleaned properly and washed under running water to remove dust and other debris. The materials were air dried at room temperature. The stems were sliced before allowed to dry. After removal of surface water, the materials were wrapped with brown paper and allow sundry for complete dryness (less than 1-2% moisture content). The materials were grounded to fine powder using mortar and pestle and then in electric grinder. The fine powder was kept in air tight bottles for further analysis.

Some of the plants of Lamiaceae are used as vegetables and therefore, nutritive value was determined to have an idea about the nutritional status of the plants used as human food in addition to their medicinal importance. Analysis of the plant parts was done using standard laboratory methods.

Determination of moisture content

Moisture content was determined by the method described by AOAC (1990). 3 g of powdered sample was weighed in flat bottom disc and kept for 24 hrs in a hot air over at + 80 °C and finally weighed. The loss weight was regarded as a measure of moisture content.

$$\% \text{ of Moisture} = \frac{\text{Wet. wt.} - \text{Dry Wt.}}{\text{Wet Wt.}} \times 100$$

Determination of ash content

Ash content was determined by the method described by AOAC (1990). 5 g of powdered sample was weighed in oven dried silica crucible. The crucible was heated first over a low flame till the material completely charred, followed by heating in a muffle furnace for 3 hours at 300^0 C. It was cooled in desicator and weighted. To ensure completion of ashing, it was heated again in the furnace for half an hour, cooled and weight. This was repeated consequently till the weight become constant wt.

$$\% \text{ of Ash} = \frac{Wt.of\,As}{Wt.\ of\ Sample} \times 100$$

Determination of fat content

Fat content was determined by the method described by AOAC (1990). 5 g of moisture free powdered sample was extracted with petroleum ether in a soxhlet extractor, heating the flask for about 6 hrs till a drop taken from dripping left no greasy stain on filter paper. After boiling with petroleum ether, the residual petroleum ether was filtered using whatman no. 40 filter paper and filtrate was evaporated in a pre weighed beaker. Increase in weight of beaker gave crude fat.

$$\% \text{ of fat} = \frac{Weig\,toft\,eFat}{Weig\,toft\,eSample} \times 100$$

Determination of protein content

Protein content was determined by the method following Lowry *et al.*(1951)

Determination of carbohydrate content

Carbohydrate content was determined by using the formula as described by Indrayan *et al*. (2005)

% of carbohydrate = 100 – (% of ash + % of Moisture + % of fat + % of Protein)

Determination of nutritive value

The nutritive value of the plant parts were determined by the method described by Indrayan *et al.* (2005)

Nutritive value = 4x percentage of protein + 9x Percentage of fat + 4x Percentage of carbohydrate.

Nutritive value was expressed in Cal/ Kg of powder

Statistical Analysis

All the experiments were done in triplicate and mean and SD was calculated and are presented in ± form.

Results and Discussion

Some of the plants under this study are used as vegetable food and therefore, the nutritional status of the plant samples was also determined to get an idea about their food value. Nutritive value of different parts of the plant are presented from Table 1 to 16. Study recorded that the nutritive value of different parts of the plants ranges from 331.51-444.20 cal/kg within the selected members of Lamiaceae.

In *A. indica*, ash and fat content were recorded higher in mature leaves (5.60±0.21% and 4.70±0.36% respectively) than other parts of the plant. Moisture and protein content were recorded highest in stem of the plant (10.81±1.01% and 0.065±0.00%). Nutritive value of inflorescence (383.21cal/kg) was recorded higher than leaves and stem.

In *L. sibiricus* nutritive value of was recorded

higher in stem (378.40cal/kg) of the plant. Ash, moisture and fat content were recorded higher in mature leaves (4.70±0.00%, 8.00±0.11% and 3.70±0.98% respectively), than other parts of the plant.

Nutritive value of was recorded higher in young leaves (367.42cal/kg) of *L. aspera* than other parts of the plant. Ash content was recorded higher in flower (4.52±0.90%) than other parts of the plant. Carbohydrate content of different parts was ranges from 79.12% to 86.82%.

Ash content (%) of *M. officinalis* ranges from 2.60% to 3.90%, moisture content (%) ranges from 6.00% to 8.66%, fat content (%) ranges from 2.18% to 9.90%, protein content (%) ranges from 0.019% to 0.079% and carbohydrate content (%) ranges from 81.15% to 89.19%. Nutritive value of inflorescence was recorded highest (413.87cal/kg) than other parts of the plant. Tomescu *et al.* (2015) recorded moisture (%), protein (%), ash (%) and carbohydrate (%) content of *M. officinalis* as 9.64±0.98%, 7.54±0.18%, 8.44±0.24% and 68.18%.

Nutritive value of *M. arvensis* ranges from 359.27cal/kg to 394.36cal/kg in different parts of the plant. Moisture (11.20±2.00%) and protein (0.072±0.04%) content were recorded higher in young leaves; ash content (4.80±0.33%) in mature leaves; fat content (7.40±0.57%) in inflorescence and carbohydrate content (85.80±1.00%) in stem of the plant.

Nutritive value was recorded higher in young leaves (348.88cal/kg) of *M. viridis.* Ash, moisture and fat content of the plant recorded higher in leaves than the stem of the plant.

In *O. americanum* protein content was recorded as 0.067%, 0.088%, 0.018%, 0.011% and 0.011% in young and mature leaves, young and mature inflorescence and stem respectively. Nutritive value was recorded highest in mature inflorescence (376.26cal/kg) than other parts of the plant. Khomdram *et al.* (2011) recorded that crude protein and total soluble protein content of the plant were 157.50mg/g and 31.60 mg/g.

In *O. basilicum* moisture content (14.60±0.99%) and fat content (5.00±0.00%) were recorded higher in inflorescence and ash content is higher (5.95±1.04%) in young leaves. Nutritive value was recorded highest in stem of the plant (376.43cal/kg). Tomescu *et al.* (2015) recorded moisture (%), protein (%), ash (%) and carbohydrate (%) content of *O. basilicum* as 6.48±0.33%, 4.81±0.59%, 9.05±0.43% and 74.02%.

In *O. gratissimum*, ash content ranges from 2.30±0.03% in stem to 5.49±0.05% in young leaves. Moisture content ranges from 6.06±0.67% in stem to 15.06±0.02% in young inflorescence. Fat content ranges from 0.90±0.85% in mature inflorescence to 4.60±0.05% in mature leaves. Protein content were recorded as 0.013% in young inflorescence and stem respectively and 0.016% in young leaves and mature leaves and inflorescence respectively. Nutritive value was recorded highest (371.56cal/kg) in stem

Table 1. Nutritive value of different parts of Anisomeles indica (L.)Kuntze

Sample ↓	Ash(%)	Moisture (%)	Fat (%)	Protein (%)	Carbohydrate (%)	Nutritive value (cal/Kg)
Young leaf	4.74±1.00	4.78±0.01	3.40±0.11	0.011±0.01	87.56	376.43
Mature leaf	5.60±0.21	5.06±1.03	4.70±0.36	0.012±0.09	84.63	380.86
Inflorescence	4.86±0.43	4.89±0.14	4.56±0.76	0.051±0.02	85.49	383.21
Stem	4.49±0.00	10.81±1.01	3.01±0.01	0.065±0.00	81.63	353.87

'±' indicates standard deviation of triplicate.

Table 2. Nutritive value of different parts of *Leonurus sibiricus* L.

Sample ↓	Ash(%)	Moisture (%)	Fat (%)	Protein (%)	Carbohydrate (%)	Nutritive value (cal/Kg)
Young leaf	4.23±0.09	7.20±0.00	3.14±0.01	0.012±0.00	85.24	369.99
Mature leaf	4.70±0.00	8.00±0.11	3.70±0.98	0.011±0.90	83.58	367.66
Inflorescence	3.34±0.01	5.80±0.00	2.10±1.00	0.098±0.00	88.66	373.94
Stem	2.00±0.07	4.90±0.99	1.20±1.00	0.081±0.01	91.81	378.40

'±' indicates standard deviation of triplicate.

Table 3. Nutritive value of different parts of Leucas aspera (Willd.)Link.

Sample ↓	Ash(%)	Moisture(%)	Fat(%)	Protein(%)	Carbohydrate(%)	Nutritive value (cal/Kg)
Young leaf	4.32±0.00	8.70±0.45	3.90±0.00	0.024±0.02	83.06	367.42
Mature leaf	3.23±0.22	8.73±0.09	1.20±0.00	0.021±0.00	86.82	358.16
Inflorescence	4.31±0.45	12.40±0.00	4.15±0.99	0.017±0.11	79.12	353.91
Flower	4.52±0.90	10.33±0.12	1.70±0.67	0.011±0.90	83.43	349.09
Stem	4.37±0.67	12.63±0.11	1.02±0.56	0.011±0.00	81.96	337.09

'±' indicates standard deviation of triplicate.

Table 4. Nutritive value of different parts of *Melissa officinalis* L.

Sample ↓	Ash(%)	Moisture (%)	Fat (%)	Protein (%)	Carbohydrate (%)	Nutritive Value (cal/Kg)
Young leaf	3.43±0.03	8.04±1.01	3.56±0.24	0.079±0.01	84.89	371.91
Mature leaf	3.90±0.30	8.66±0.11	3.18±0.10	0.066±0.10	84.19	365.64
Inflorescence	2.90±1.00	6.00±0.41	9.90±0.22	0.043±0.14	81.15	413.87
Stem	2.60±0.22	6.01±0.11	2.18±0.99	0.019±0.10	89.19	376.45

'±' indicates standard deviation of triplicate.

Table 5. Nutritive value of different parts of *Mentha arvensis* L.

Sample ↓	Ash(%)	Moisture (%)	Fat (%)	Protein (%)	Carbohydrate (%)	Nutritive value (cal/Kg)
Young leaf	4.75±0.04	11.20±2.00	5.69±0.04	0.072±0.04	78.28±0.05	364.65
Mature leaf	4.80±0.33	10.60±0.03	4.47±0.59	0.069±0.90	80.06±0.08	360.75
Inflorescence	2.10±0.98	8.56±0.23	7.40±0.57	0.032±0.04	81.90±1.02	394.36
Stem	3.70±0.00	9.11±0.58	2.10±1.00	0.014±0.00	85.80±1.00	359.27

'±' indicates standard deviation of triplicate.

Table 6. Nutritive value of different parts of *Mentha viridis* L.

Sample ↓	Ash(%)	Moisture (%)	Fat (%)	Protein (%)	Carbohydrate (%)	Nutritive value (cal/Kg)
Young leaf	3.21±0.05	11.57±0.01	1.60±0.00	0.010±0.01	83.61	348.88
Mature leaf	2.74±1.99	15.17±0.44	0.63±0.05	0.010±1.00	71.45	331.51
Stem	1.09±1.00	12.70±0.67	0.20±0.09	0.089±0.00	85.12	342.64

'±' indicates standard deviation of triplicate.

Table 7. Nutritive value of different parts of *Ocimum americanum* L.

Sample ↓	Ash(%)	Moisture (%)	Fat (%)	Protein (%)	Carbohydrate (%)	Nutritive value (cal/Kg)
Young leaf	4.80±1.90	10.93±0.00	1.75±0.03	0.067±0.00	82.45	345.83
Mature leaf	3.11±0.00	10.40±0.90	3.00±1.43	0.088±0.05	83.40	360.96
Young Inflorescence	4.93±0.56	10.13±0.54	7.30±0.06	0.018±0.86	77.62	376.26
MatureInflorescence	5.85±0.87	9.77±1.00	3.40±0.03	0.011±0.99	80.96	354.52
Stem	5.71±0.05	11.37±0.00	2.10±0.50	0.011±1.00	80.80	342.17

'±' indicates standard deviation of triplicate.

of the plant. In various hybrid of *O. gratissimum*, crude protein was recorded in a range from 91.90 to 179.40mg/g (Edeoga *et al*. 2006). Idris *et al.* (2011) recorded that leaves and stem contains moisture (%), ash (%), crude protein (%) and carbohydrate (%) as 82.60±0.01%, 82.60±0.11%; 13.67±0.13%, 13.67±0.02%; 3.33±0.07%, 1.65±0.02% and 64.98±0.01%, 62.03±0.04% respectively. The calorific value of leaves and stem were 343.08±0.01 (Kcal/100 g) and 278.42±0.011 (Kcal/100 g) respectively. Mlitan *et al.*(2014) recorded that *O. gratissimum* collected from Zaroge state of Libya contains protein (%), moisture (%), fat (%), ash (%) and carbohydrate (%) content as 9.10%, 10.60%, 10.80%, 14.30% and 50.35% respectively.

In *O. sanctum* highest percentage of ash

Table 8. Nutritive value of different parts of *Ocimum basilicum* **L.**

Sample ↓	Ash (%)	Moisture (%)	Fat (%)	Protein (%)	Carbohydrate (%)	Nutritive value (cal/Kg)
Young leaf	5.95±1.04	2.70±1.00	0.70±0.04	0.020±0.00	90.63	368.90
Mature leaf	5.43±0.09	3.90±0.01	1.30±0.09	0.010±0.00	89.36	369.18
Inflorescence	5.33±0.03	14.60±0.99	5.00±0.00	0.012±0.00	75.06	345.28
Stem	4.13±0.00	3.09±1.00	1.00±0.09	0.062±0.40	91.79	376.43

'±' indicates standard deviation of triplicate.

Table 9. Nutritive value of different parts of *Ocimum gratissimum* L.

Sample ↓	Ash(%)	Moisture (%)	Fat (%)	Protein (%)	Carbohydrate (%)	Nutritive value (cal/Kg)
Young leaf	5.49±0.05	7.55±1.03	3.10±0.48	0.016±1.00	83.84	363.33
Mature leaf	4.25±0.57	8.96±0.00	4.60±0.05	0.016±0.03	82.17	370.16
Young Inflorescence	4.23±0.02	15.06±0.02	1.80±0.56	0.013±0.09	78.89	331.84
Mature inflorescence	4.59±0.09	8.16±0.54	0.90±0.85	0.016±0.04	86.34	353.50
Stem	2.30±0.03	6.06±0.67	1.00±0.00	0.013±0.03	90.62	371.56

'±' indicates standard deviation of triplicate.

Table 10. Nutritive value of different parts of *Ocimum sanctum* L.

Sample ↓	Ash(%)	Moisture(%)	Fat(%)	Protein(%)	Carbohydrate (%)	Nutritive value (cal/Kg)
Young leaf	4.62±1.00	7.73±1.07	3.80±0.03	0.014±0.00	83.83	369.58
Mature leaf	3.36±0.03	7.57±0.05	4.00±0.00	0.020±0.09	85.05	376.28
Inflorescence	3.89±0.08	6.40±0.00	3.40±1.03	0.038±0.00	86.27	375.83
Stem	4.77±1.00	10.43±0.04	2.00±2.01	0.013±2.01	82.79	349.21

'±' indicates standard deviation of triplicate.

Table 11. Nutritive value of different parts of *Pogostemon auricularius* (L.)Hassk.

Sample ↓	Ash(%)	Moisture (%)	Fat(%)	Protein (%)	Carbohydrate (%)	Nutritive value (cal/Kg)
Young leaf	4.93±0.08	7.50±0.03	3.40±0.98	0.015±0.09	84.16	367.10
Mature leaf	5.82±0.73	7.60±0.99	4.60±0.11	0.015±0.39	81.97	369.32
Inflorescence	2.65±0.89	0.80±1.00	11.60±0.29	0.010±2.00	84.94	444.20
Stem	1.90±1.00	0.65±1.00	2.01±0.09	0.085±1.02	95.63	399.85

'±' indicates standard deviation of triplicate.

(4.77±1.00%) and moisture (10.43±0.04%) were recorded by stem of the plant. Higher fat content and higher nutritive value was recorded by mature leaves (4.00±0.00% and 376.28cal/kg respectively). The carbohydrate content of the plant parts ranges from 82.79% to 86.27% of the plant. The young and mature leaves recorded carbohydrate content as 83.83% and 85.05% respectively. Koche *et al.* (2011) recorded that leaves of *O. sanctum* have carbohydrate content as 77.75%. They also recorded percentage composition of protein, carbohydrate, moisture and ash content of stem and leaves as 9.25 and 12.30; 68.05 and 77.70; 88.30 and 83.55; 20.15 and 18.35 respectively.

Nutritive value of different parts of *P. auricularius* was ranges from 367.10cal/kg to 444.20cal/kg. Highest nutritive value was recorded by the inflorescence (444.20cal/kg) of the plant. Ash and moisture content were recorded highest in mature leaves (5.82±0.73% and 7.60±0.99% respectively).

The nutritive value of different parts of *P. benghalensis* ranges from 343.20cal/kg to 384.86cal/kg. Young and mature leaves, inflorescence and stem of recorded carbohydrate content as 87.86%, 80.59%, 78.98% and 83.54% respectively. Protein content as recorded in different parts was 0.029%, 0.015%, 0.018% and 0.015% respectively. Khomdram *et al.* (2011) recorded that total sugar content in *P. benghalensis* was 10.90mg/gm. They also recorded crude protein and total soluble protein as 43.74mg/g and 17.60mg/g.

Nutritive value of *P. frutescence* was recorded higher in mature leaves (395.52cal/kg). Moisture content of mature leaves (0.67±0.05%) and inflorescence (0.49±0.89%) was comparatively lower than young leaves and stem of the plant.

In *S. officinalis* ash content (6.04±0.44%) and moisture content (14.27±1.84%) were recorded higher in

Table 12. Nutritive value of different parts of *Pogostemon benghalensis* (Burm.f)Kuntze

Sample ↓	Ash(%)	Moisture (%)	Fat(%)	Protein (%)	Carbohydrate (%)	Nutritive value (cal/Kg)
Young leaf	3.38±1.00	5.03±0.04	3.70±0.00	0.029±0.00	87.86	384.86
Mature leaf	4.66±1.09	6.00±0.00	4.55±0.40	0.015±0.98	80.59	363.39
Inflorescence	4.62±0.99	8.16±1.09	4.16±0.09	0.018±0.00	78.98	353.44
Stem	5.08±0.01	10.37±1.00	1.00±0.04	0.015±0.09	83.54	343.20

'±' indicates standard deviation of triplicate.

Table 13. Nutritive value of different parts of *Perilla frutescence* (L.)Britton

Sample ↓	Ash(%)	Moisture(%)	Fat(%)	Protein(%)	Carbohydrate (%)	Nutritive value (cal/Kg)
Young leaf	5.64±1.00	3.60±0.04	3.00±0.01	0.036±0.01	87.73	378.03
Mature leaf	4.70±0.43	0.67±0.05	3.40±0.04	0.030±0.54	91.20	395.52
Inflorescence	5.24±0.05	0.49±0.89	1.00±0.55	0.028±0.00	93.24	382.07
Stem	5.56±0.67	1.17±0.09	0.50±0.00	0.017±0.05	92.75	375.57

'±' indicates standard deviation of triplicate.

Table 14. Nutritive value of different parts of *Salvia officinalis* L.

Sample ↓	Ash(%)	Moisture (%)	Fat (%)	Protein (%)	Carbohydrate (%)	Nutritive value (cal/Kg)
Young leaf	4.44±1.00	13.80±0.03	2.90±1.00	0.091±0.02	78.77	341.54
Mature leaf	5.04±0.03	13.20±0.01	5.40±1.03	0.010±0.08	76.35	354.04
Inflorescence	4.95±0.99	11.07±1.09	2.30±0.02	0.098±1.00	81.58	347.42
Stem	6.04±0.44	14.27±1.84	0.98±0.04	0.013±0.09	78.69	323.65

'±' indicates standard deviation of triplicate.

Table 15. Nutritive value of different parts of *Teucrium tomentosum* Lam.

Sample ↓	Ash(%)	Moisture (%)	Fat (%)	Protein (%)	Carbohydrate (%)	Nutritive value (cal/Kg)
Young leaf	2.68±0.01	3.67±1.44	1.46±0.01	0.011±0.03	92.18	381.91
Mature leaf	2.56±0.09	4.00±0.01	1.10±0.02	0.023±0.09	92.32	379.25
Inflorescence	2.01±0.22	2.14±1.00	1.34±1.00	0.012±0.30	94.49	390.06
Stem	1.56±0.01	1.67±0.88	0.57±0.99	0.019±0.08	96.18	389.94

'±' indicates standard deviation of triplicate.

Table 16. Nutritive value of different parts of *Teucrium quadrifarium* Buch.-Ham.

Sample ↓	Ash(%)	Moisture (%)	Fat(%)	Protein (%)	Carbohydrate (%)	Nutritive value (cal/Kg)
Young leaf	3.01±0.11	4.23±0.01	1.47±0.55	0.099±0.09	91.19	378.39
Mature leaf	2.11±0.01	4.44±0.34	1.59±0.03	0.022±0.02	91.83	381.72
Inflorescence	1.70±0.22	2.10±0.01	2.00±0.09	0.022±0.22	94.17	394.79
Stem	0.79±0.00	1.10±0.01	1.20±0.12	0.015±0.01	96.89	398.44

'±' indicates standard deviation of triplicate.

stem of *S. officinalis*. Fat content (5.40±1.03%) is recorded higher in mature leaves. Protein content (0.09±1.00%) and carbohydrate content (81.58%) are higher in inflorescence than other parts of the plant. Nutritive value of the parts ranges from 323.65 cal/kg to 354.04cal/kg. Tomescu *et al*. (2015) recorded proximate composition of *S. officinalis* found significant results. Moisture (%), protein (%), ash (%) and carbohydrate (%) content of *S. officinalis* were recorded as 6.77±0.51%, 6.77±1.02%, 9.60±0.5% and 67.89% respectively.

Protein content of *T. quadrifarium* was recorded from 0.015% to 0.099 % in different parts. *T. tomentosum* recorded protein content from 0.011% to 0.023% in different parts of the plant. In both the plants, carbohydrate content was recorded highest in stem of the plants (96.18% and 96.89% respectively). In *Teucrium* spp. protein content was recorded from 64.7 to 438 mg/g by Juan *et al*. (2004)

Some of the plants under this study are used as vegetable food and therefore, the nutritional status of the plant samples was also determined to get an idea about their food value. All the samples are found to have nutritional value above 300cal/100 g. The ash, moisture, fat, protein and carbohydrate content vary from plant to plant. For this reason, perhaps all the selected plants are not equally used as food inspite of their importance as medicinal resource. The commonly used plants as vegetables are *Mentha*, *Perilla, Leucas* etc. The study of Khomdram *et al.* (2011) provides information on nutritive value of some selected plants of Lamiaceae collected from Manipur. Carbohydrate, soluble amino acid and protein were recorded in variable quantities in their samples. Thus, this kind of study may provide information about the nutritional quality of these plants and some of them can be used as supplementary source of human food. The plants may have nutritional value but they are still not considered as 'functional food' and are not well experimented. Perhaps these plants may contain some anti-nutritional factor as reported by Vasconcelos and Oliveira (2004); Mattila *et al.* (2018). Gemede and Ratta (2014) explained that the presence of cyanogenic glycosides, protease inhibitors, lectins, tannins, alkaloids and saponins in the plants in higher quantities may cause anti-nutritional effect.

The present study may provide information about the nutritional quality of these selected plants and some of them can be used as supplementary source of human food. The plants have nutritional value but they are still not considered as 'functional food'. The anti-nutritional factors from these plants have to determine for their use as food in future.

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