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PROXIMATE AND PHYTOCHEMICAL EVALUATION OF A NON-CONVENTIONAL VEGETABLE- *BIDENS BITERNATA* (LOUR.) MERR & SHERIFF

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ABSTRACT
Non-conventional vegetables refer to the species which are not cultivated at large scale commercially and in times of scarcity of staple food, tribes, local communities use such plants as vegetable. *Bidens biternata* is a widespread weed occurring in moist and shady places of gardens, in farms, village, along the roadside, cultivated areas and along the bank of small channels. Though it is not a commercial vegetable, it occupies an important place among the food of village communities of South India and Western Ghats as wild leafy vegetable. All parts of *B. biternata* are used as ingredients in folk medicines, Present study deals with the analysis of proximate content and phytochemical from leaf of *B.biternata*. Results revealed that it has 82% moisture content, 13.8% of ash, Leaf powder shows high solubility in alkaline solvent than acid and water, Energy value found to be 99.8 Kcal/100gm. The phytochemical studies showed positive result for Alkaloids, phenolics, flavonoids, tannins, caumarins and cardenolins.

KEYWORDS: *Bidens biternata*, Phytochemical, Proximate value, wild vegetables.

INTRODUCTION
Bidens biternata (lour.) merr & sheriff belong to family Asteraceae. It is a widespread weed occurring in moist and shady places of gardens, in Farms, village, along the roadside, cultivated areas and along the bank of small channels.[3] It occupies an important place among the food of village communities and tribe of south India and Western Ghats as wild leafy vegetable.[19] Non-conventional vegetables refer to the species which are not cultivated at large scale commercially. In times of scarcity of staple food, tribes use this plant as a vegetable.[16] Methanol extracts from *B. biternata* have been identified to posses antibacterial and antifungal activities.[1] Its freeze dried extract of possess significant anti-diarrheal activity in *in-vivo* models of diarrhoea.[5] The genus *Bidens* has been used in traditional medicine as anti-inflammatory, anti-malarial, anti-allergic, anti-ulcer, anti-diabetic, anti-cancer and antibacterial agent.[6,9,10,11,14] Plant is used by tribes of Madhya Pradesh against snakebites.[4] Crude methanolic extract of leaves found to be capable providing protection to liver against CCl_4 induced hepatotoxicity.[12] Whole plant is useful in cold, ulcers, leprosy.[15]

Since the plant has significant medicinal properties and having good future prospective in nutrition as well for human being, it is important to study the edible part of the plant. The present study has focused on the evaluation of proximate content and phyto-chemicals from the leaf of *B.biternata*.

MATERIALS AND METHODS
Collection of plant material
B.biternata was collected from different areas of Nanded district of Maharashtra in period of August to October 2014. Collected plant leaves washed, shed dried and powdered. The powdered sample kept in airtight glass container. Plant identification was done at PG Department of Botany, N.E.S. Science College, Nanded using standard flora.[22]

Proximate analysis
Moisture content, ash value, solubility studies were done in proximate analysis using the AOAC standard methods.[2] Quantification of Carbohydrates, proteins and fats were done by standard prescribed methods.[7,8,13] Energy value was finally determined by the following equation[20]:
Energy value (Kcal/100g) = (4 X % Protein) + (9 X% Fat) + (4 X % Carbohydrate).

Phytochemical screening
Qualitative phytochemical analysis was performed for various phyto-compounds. Iridoid, Anthraquinones, Caumarins, Tannins, Alkaloids, Flavonoids, Polyoses, polyurenoids etc. as per standard procedure.[17,18]

RESULT AND DISCUSSION

Proximate analysis

Moisture content of *B.biternata* leaves was determined and it found to be 82%, the ash content was 13.8%, high solubility of sample were found in NaOH (17.31%) than HCl (7.9%), Hot water (8.18%) and Cold water (7.15%). Crude protein, crude Fat, crude fibre and carbohydrate of the leaves of *B. biternata are* evaluated. Leaves show high moisture content (82%) and this is within the reported range (80.5 to 92.3%) in some Indian green leafy vegetables. Ash content, which is an index of mineral contents in plants, is 13.8% of total dry weight (t.d.w). Crude protein content is 2.5% of total fresh sample. Adequate intake of dietary fibre can lower the serum cholesterol level, risk of coronary heart disease, hypertension, constipation, diabetes, colon and breast cancer, Crude fibre in this plant has evaluated and found to be 9.2% of t.d.w. Overall leaf of *B. biternata* has found to contain appreciable proximate values in comparison to a Commercial and popular leafy vegetable *T.foenum-graecum*, which having Protein 4.4%, Carbohydrates 1%, crude fibre and fat 1% respectively.[21]

Table 1: Proximate analysis of *B.biternata.*

Sr. no.	Proximate contents	Value in %
1	Moisture content	82
2	Total Ash	13.8
4	1% NaOH Solubility	17.31
5	1%HCl Solubility	7.9
6	Cold water Solubility	7.15
7	Hot water Solubility	8.18
8	Crude protein	2.5
9	Carbohydrates	7.6
10	Crude Fat	6.6
11	Crude fiber	9.2
12	Energy value	99.8

Qualitative phytochemical screening

The qualitative tests of *B.biternata* for various phyto-chemicals reveals positive for alkaloids, tannins, flavonoids, caumarins, phenolics, phlobatannins (Table 2). Presence of these phyto-chemicals supported medicinal importance of *B.biternata*. Phenolics, flavonoids highlight its nutraceutical and antioxidant properties.[23]

Table 2: Qualitative phytochemical analysis.

Sr. no.	Phytochemicals	*B.biternata* Leaves
1	Iridoids	-
2	Alkalloids	+++
3	Anthraqunones	-
4	Tannins	++
5	Flavonoids	++
6	Emodins	-
7	Aucumbins	-
8	Polyoses	-
9	Polyurenoids	-
10	Simple phenolics	+++
11	Caumarins	+++
12	Phlobatannins	-
13	Quinones	-
14	Saponins	+
15	Cardenolins	+++

CONCLUSION

In the light of this investigation *Bidens biternata* has found to contain nutrients in appreciable amount and the plant contains important phyto-compounds. Though this plant is considered as Weed plant, the present studies support its edible and ethno medicinal value. It highlights the importance of this as wild edibles and future generation food crop. These future food crops will definitely overcome the high burden of demand of commercial vegetable crops without compromising nutrients. More investigation and evaluation is needed in view of its nutraceutical properties.

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