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Original Research Article

Study of future food crop *Bidens biternata* (Lour.) Merr and Sheriff - A nutraceutical aproach

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Abstract

Unexploited vegetables refer to the plant species which are not cultivated at large scale commercially but 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 and cultivated areas. Though it is not used commercially, it occupies an important place among the food of village communities of Western Ghats as wild leafy vegetable. All parts of *B. biternata* are used as ingredients in folk medicines, present study deals with the estimation of Nutraceuticals and some essential nutrients from its leaves. Results revealed that it has remarkable percentage of Alkaloids, Flavonoids and Phenolics. High concentration of Calcium, Magnesium and Iron were found in leaf extract.
Key Words: *Bidens biternata*, Nutraceutical, Unexploited vegetable.

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INTRODUCTION

Unexploited vegetables refer to the species which are not cultivated at large scale commercially but tribes use these plant as a vegetable (Sukumaran *et al* 2012). *Bidens biternata* (lour.) merr and sheriff commonly called *Kata* in regional languge 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 (Bhatt *et al* 2012) It occupies an important place among the food of village communities and tribe of Western Ghats as vegetable (Ratheesh *et al* 2012). It shows to possess antibacterial and antifungal activities (Ahmed et. al. 2016), anti-diarrheal activity (Dennis *et al* 2016). It has been used in traditional medicine as anti-inflammatory, anti-malarial, anti-allergic, anti-ulcer, anti-diabetic, anti-cancer and antibacterial agent (Durre et.al 2011, Maicon *et al* 2008, Masako and Yoshiyuki 2006, Parimalakrishnan *et al* 2006, Sandra *et al* 2000). Whole plant is useful in cold, ulcers, leprosy (Shipra *et al* 2015). Nutraceutical the term coined in 1979 by Stephan De Felice. It is designed as a food or parts of food that provide medical or health benefits, including the prevention and treatment of disease (De Felice 1992). Nutraceutical may range from isolated nutrients, dietary supplements, herbal products and processed products. Nutraceutical play important role in physiological benefits and provide protection against the diseases (Rajsekaran *et al* 2008). The major nutraceutical ingredients in plant are alkaloids, phenolic compounds mainly Flavonoids (Tapas *et al* 2008, Marathe and Umate 2016). They have shown regulatory activity of hormones such as transport, metabolism and action of thyroid hormones (Ashok *et al*2010). The human beings require mineral elements within certain concentrations for growth and good health. Analyzing the elemental composition in vegetables, fruits and their product is therefore very important for understanding their nutraceutical value. 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

Alkaloids, Flavonoids, Total phenols and essential mineral elements 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 (Naik 1998)

Determination of Alkaloids: Five grams of ground sample was weighed into a 250 ml beaker, and 200 ml of 20% acetic acid in ethanol was added and was covered to stand for 4 h. This was filtered and the extract was concentrated using a water bath to evaporate one-quarter of the original volume. The concentrated ammonium solution was added drop-wise to the extract until the precipitation was completed. The entire solution was allowed to settle and the precipitate was collected by filtration, after which it was weighed (Harborne 2012).

Determination of Phenolics: Two grams of the sample were defatted with 100 ml of diethyl ether using a Soxhlet apparatus for 2 h. The fat free sample was boiled with a 50 ml of ether for 14 minutes. 5 ml of the extract was pipette into a 50 ml flask, and then 10 ml of distilled water was added. 2 ml of ammonium hydroxide solution and 5 ml of concentrated ethyl alcohol were also added. The sample was made up to mark and left to react for 30 min for colour development. The absorbance of the solution was read using visible spectrophotometer at 505 nm wavelength (Thimmaiah 1999).

Determination of Flavonoids: 5 grams of the ground plant sample was weighed in a 250 ml titration flask, and 100 ml of the 80% aqueous methanol was added at room temperature and shaken for 4 h in an electric shaker. The entire solution was filtered through Whatman filter paper no. 1 and again, this process was repeated. The filtrate as a whole was later transferred into a crucible and evaporated to dryness over a water bath and weighed (Boham and Kocipai-Abyazan 1974).

Estimation of Essential mineral elements: Plant sample was hydrolysed by strong acid and analysed with ICP-AES. All spectrometric measurements were performed with ICP spectrometer (Arcos from M/S Spectro Germany). The software used was smart analyser vision 5.01.0921. The detector is Charge Couple Device (CCD). ICP-AES method provide accurate elemental food composition data (Miller-Ihli 1996).

RESULT AND DISCUSSION

Estimation of Total Phenols, Alkaloids and Flavonoids: Phenolics, Alkaloids, Flavonoids are the major nutraceutical and antioxidative ingredients in plant. *B.biternata* found that appreciable amount of Alkalois(34mg/gm), Phenolics(4 mg/gm) and Flavonoids (152 mg/gm). They are natural antioxidants and shown regulatory activity of hormones such as transport, metabolism (Amin Mir 2016). Presences of these phyto-compounds highlight its Nutraceutical value. The presence of phytoconstituents make the plant useful for treating different ailments and have a potential of providing useful drugs of human use.

Table 1: Estimation of Phenolics, Alkalloids and Flavonoids

Sr. No.	Phyto-constitute	Concentration(mg/gm)
1	Phenolics	4
2	Alkalloids	34
3	Flavonoids	152

Estimation of essential elements: Various essential elements of biological importance in human metabolism were found to be present (Table 2 and Chart-I). Most of essential elements which have active role in metabolic reaction in human body are present in good concentration. Calcium is an important mineral element for cell signalling, strong bones, teeth, maintains proper blood pressure and also for blood clotting. Its deficiency can lead to very serious problems like arthritis in old aged peoples. calcium concentration were estimated as highest than other elements 24563.60ppm which is followed by potassium (23017.80ppm), Magnesium (8615.23ppm), Iron an one of important minerals in defending anaemia related problems was found to be 710.778 ppm which is healthier for human consumption. Sodium concentration was found to be 88.70 ppm.

Table 2: Quantitative elemental analysis

Sr. No.	Elements	Concentration in ppm
1	Ca	24563.60
2	Fe	710.778
3	K	23017.80
4	Mg	8615.23
5	Na	88.70

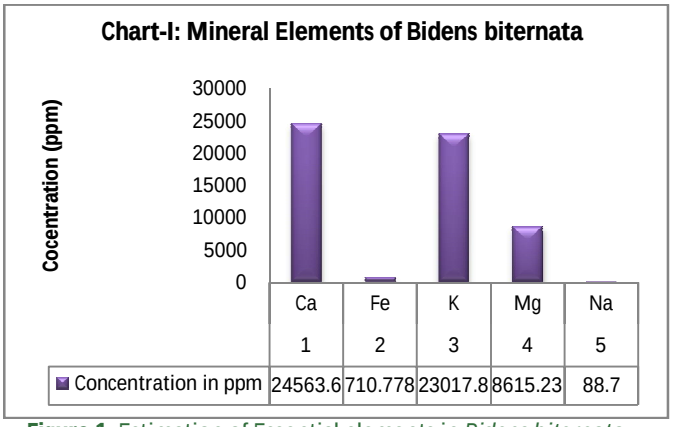

Figure 1: Estimation of Essential elements in *Bidens biternata*

CONCLUSION

Bidens biternata has been found to contain nutrients and phytochemicals. Presence of important phytochemicals in appreciable amount highlights its nutraceutical and antioxidant properties. The plant contains essential elements in remarkable concentration for healthy consumption and hence can consider encouraging its use as mineral supplement. The present work supports its edible use and having good future prospective in nutrition.

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