

Mineral content and proximate analysis in the leaves of native medicinal plant, *Alternanthera sessilis* from Barhitakli of Akola district.

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ABSTRACT

In the present era also 60% of medicine has plant base and many people still uses herbal/ Ayurvedic medicine which are originated form plants. *Alternanthera sessilis*, Family: Amaranthaceae is a very nutritive and mineral rich plant. So the plant was selected and from Barshitakli area and its critical screening for nutritive such as Moisture content, Total ash content, water soluble content, Acid insoluble content, water soluble extractive value, alcohol soluble extractive value, Carbohydrate, protein, Crude fat, crude fiber, and calorific value was done also detection and composition of mineral content such as Sodium, calcium, potassium, phosphorus, Magnesium, Zinc, Iron, Copper, Manganese, and chromium was done. It was found that the plant was rich in nutritive and mineral content.

Keywords: *Alternanthera sessilis*, Family: Amaranthaceae, proximate analysis Barshitakli

INTRODUCTION

In the present era also 60% of medicine has plant base and many people still uses herbal/ Ayurvedic medicine which are originated form plants. Medicinal plants have been a rich source of biologically potent chemical compounds and play an important role in disease treatment (Jain SK 1965 and 1998). Numerous of these ayurvedic plant-based medicines are being incorporated through regulations keen on typical health systems. The plant grows preferably in wet soil, seasonally waterlogged roadside depressions, lakes, marshes, irrigation canals, rice field levees and in waterways, up to 1,250 m altitude. *Alternanthera sessilis*, Family: Amaranthaceae is a many-branched, perennial, sometimes annual, herb. It can be erect or prostrate, rooting at the nodes. The stems are greenish, pink to purplish, ribbed, up to 1 m, mostly glabrous except for tufts of white hairs in the branch and leaf axils. The young stems have a line of hairs down each side.

The leaves are simple, opposite, subsessile, entire, linear-lanceolate to obovate-spathulate. The inflorescences are sessile, in the leaf axils, often in clusters; they are whitish and non-spiny (Naik et al., 1998). the plant is often used in traditional medicine for skin diseases, cuts and wounds, eye ailments and anti-snake bite (Subhashini et al., 2010).

Barshitakli Tahesil in Akola District is placed in Maharashtra State of India. This location is very rich of flora and fauna having various types' medicinal plants as it is present in the ranges of *Katerpura Wildlife sanctuary and Sohal Wildlife sanctuary*. Many researchers from the Akola district and Maharashtra state are working on the taxonomical study of the plants and curative property devoid of any scientific support and pharmacological evidences since last decades. As leaves of *Alternanthera sessilis* are employed for the treatments of various diseases. This plant has possession of distinctiveness in medicinal, pharmaceutical and chemical sciences (Pareek, 1995). Due to antioxidant, anti-microbial, anti-diarrhea, anti-diabetic, anti-inflammatory, hepatoprotective, hypercholesterolemic, antiviral, diuretic, carminative properties. Researchers in this area undergone enormous work on natural product, especially on proximate, phytochemical, physiochemical and spectroscopic analysis of various plants and as a part of research work. Present work is taken for study the nutritional value as well as mineral content of *Alternanthera sessilis*. Results of mineral content and proximate analysis are useful for the assessment of the potency of that drug over and above for deciding the dose of that drug during treatment to a patient.

These results can be furthermore valuable for foreseeing drug activity as well as drug effects before its applications. Hence mineral content and proximate analysis in leaves of *Alternanthera sessilis*, Family: *Amaranthaceae* leaves sample have been investigated.

MATERIAL AND METHODS

Sample & study area:

Samples were collected from Barshitakli coordinates 20°32'22.9"N 77°04'30.9"E Sub-Division for Revenue of the Akola district Tahsil at 30mi from the district Akola.

This location is 15km away from Katepurna Wildlife sanctuary.

Collection of plant material

Initially, site was selected for the sample collection on the basis of its location and people employed the plant for disease cure. The total leaves were collected from same region coordinates 20°32'22.9"N 77°04'30.9"E. The collection of samples was done in between 5th February 2020 to 10th February 2020. The leaves of *Alternanthera sessilis*, Family: *Amaranthaceae* were separated by scissor and allowed for shed dried. They were dried at room conditions. The leaves were pulverized in grinding mill having a screen of 5 mm diameter hole to achieve particle size 40-50 mesh. This fine powder was treated as a sample powder for various analyses. All chemicals used are of A.R. grade

Proximate Analysis:

Moisture, ash carbohydrate, protein, fat and crude fiber were estimated by using standard methods of AOAC, 1995.

Moisture content

was estimated as difference in the weight between fresh leaves and leaves kept in hot air oven at 100°C for overnight.

2gm of powder in weighed silica crucible was incinerated slowly by raising temperature in muffle furnace at 450°C for 4 to 5 hrs. the sample was made carbon free. It was cooled and weighed. The procedure was repeated until a constant weight was obtained and percentage of total ash was calculated.

The ash was washed from the crucible into 100ml beaker using 25 ml of water and boiled for 5 minutes and filtered through ash less filter paper. The residue was washed in hot water and the difference in ash was total water-soluble ash.

Acid insoluble ash was determined by boiling ash in 25ml conc. HCL for 5 minutes. The insoluble ash was collected and weighed.

5 gm of powder was macerated in stopper conical flask with 5 ml of 5% chloroform for 24 hrs with continuously shaking for 6 hrs and left undisturbed for 18 hrs. the

obtained filtrate was evaporated in over at 105°C. the procedure was repeated until constant weight was obtained. Percentage of water soluble extractive values was calculated.

Same procedure except 5% chloroform, 90% of ethanol was used and Alcohol soluble extractive value was calculated.

The Atwater method of energy calculations was used to determine the following values (Sally *et al.*, 1997; Merrill and Watt, 1973). The protein estimation was carried out by Lowry's method (Lawory *et al.*, 1951) and values were expressed in percentage. The crude fat was estimated by ether extraction method by Soxhlet apparatus by using 5 gm of powered at 70° C. further crude fiber was obtained from digestion of samples free from fat using 1.25% of Sulphuric acid and sodium hydroxide solution respectively and crude fiber value was calculated as percentage.

The percentage of carbohydrate was determined by subtracting the total ash content, crude protein, crude fiber and crude fat from the sample.

For mineral content 0.5gm of sample was placed in muffle furnace in crucible and heated at temperature of 580° C for 3 hrs after sample was digested with Nitric acid at high temperature, 4ml of Perchloric acid and 1ml of Sulphuric acid until became clear solution. Content was then taken

in to 50ml volumetric flask and made level of 50 ml by adding distilled water. The final solution was used to estimation of minerals such as Cu, Fe, Na, K, Zn, Mn, Mg, Cr, P and Ca with the help of Atomic absorption spectroscopy by Ecrements and Burell 1973 method.

Each experiment was done in triplicate and value mentioned as mean also Statistical analysis was done by using formulae in book Biostatistical analysis (Mungikar, 2003)

RESULTS AND DISCUSSION

Proximate analysis plays crucial role in identification of plant and its quality while preparation of drug in industry. Results of proximate analysis are useful for the assessment of the potency of that drug over and above for deciding the dose of that drug during treatment to a patient. (Suradkar and Waghmare, 2020) The data of various physicochemical parameters of *A. sessilis* were presented in table No 1.

Alternanthera sessilis leaves showed 75.40 ± 0.3606 % moisture which proves the succulent nature of plant. The total ash, water soluble ash and Acidic insoluble ash content was recorded 8.27 ± 0.1528 , 1.73 ± 0.1528 and 3.37 ± 0.2517 respectively. The Water-soluble extractive value and Alcohol soluble extractive value were 9.07 ± 0.1528 16.00 ± 1.7321 recorded.

Table 1: proximate analysis of the leaves of *Alternanthera sessilis*

Sr. No.	Parameters	Percentage (%)
1	Moisture content	75.40 ± 0.3606
2	Total ash	8.27 ± 0.1528
3	Water soluble ash	1.73 ± 0.1528
4	Acidic insoluble ash	3.37 ± 0.2517
5	Water soluble extractive value	9.07 ± 0.1528
6	Alcohol soluble extractive value	16.00 ± 1.7321
7	Protein	31.00 ± 3.6056
8	Crude fat	3.75 ± 0.0361
9	Crude fiber	8.72 ± 0.0321
10	Carbohydrate	70.67 ± 1.5275
11	Calorific value	724.33 ± 2.0415

±Values are Standard deviation (SD)

Table 2: Mineral content of the leaves of *Alternanthera sessilis*.

Sr. No.	Minerals	Mg/100gm	
1	Sodium	283.11	±3.4699
2	potassium	4452.67	±5.6862
3	Calcium	510.24	±0.2307
4	phosphorus	49.40	±0.2646
5	Magnesium	75.33	±0.5774
6	Zinc	8.37	±0.2517
7	Iron	9.47	±0.0529
8	Copper	1.53	±0.2309
9	Manganese	6.72	±0.2804
10	Chromium	61.33	±2.0817

±Values are Standard deviation (SD)

The composition of Protein, crude fat, crude fiber and carbohydrate were 31 ± 3.6056 , 3.75 ± 0.0361 and 8.72 ± 0.0321 recorded respectively. the calorific value was 724.33 shown with Standard deviation of ± 2.0415 . The curative properties of plant leaves lie in macro and micronutrients presents in it and structural and functional properties were get changed according to them. Table 2 shows all macronutrients and mineral composition in *Alternanthera sessilis*. Sodium was found 283.11 ± 3.4699 and Potassium was found 4452.67 ± 5.6862 while calcium, phosphorus and magnesium were recorded 510.24 ± 0.2307 , 49.40 ± 0.2646 and 75.33 ± 0.5774 respectively. Zinc was 8.37 ± 0.2517 , Iron was 9.47 ± 0.0529 , copper was 1.53 ± 0.2309 , Manganese was 6.72 ± 0.2804 and Chromium was 61.33 ± 2.0817 recorded in *Alternanthera sessilis* leaves.

Sodium and potassium were important to maintain the ionic balance and helps to reduce hypertension (Tapan seal, 2011) Calcium helps to keep bone teeth strong and rigidity. As the minerals Mn, Zn, Mg, Cu, Fe, Na, K, Ca and traces of chromium present in recommended amounts, *A. sessile* might be beneficial for diabetic patients (Acho et al., 2014).

CONCLUSIONS

Alternanthera sessilis is annual herb possess good nutritive as well as mineral content. So, it can be serving as good fodder for cattle. In some places leaves and tender

tops were also used to make curry. It will help to reduce malnutrition. The plant is also used as a mixture of medicinal preparations as it contains many micro and macronutrients to cure hepatitis, bronchitis, asthma and lung troubles. Presence of nutritive value and mineral content in adequate amount make this plant beneficial.

Conflicts of interest: The authors stated that no conflicts of interest.

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