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Nutritional assessment of some selected wild edible plants as a good source of mineral

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ABSTRACT

Wild edible plants play an important role in human diet. The objective of the study was to evaluate nutrional composition of wild edible plants viz. Ensete Superbum (Roxb.) Cheesuran, Gmelina arborea Roxb, Oroxylum indicum (L.),Vent, Bauhinia recemosa Lam. Caryota urens L, Smilax zeylanica L, Woodfordia fruticosa (L.) Kurz, Commelina benghalensis L, Garcinia indica (Du Petit-Thou.) Choisy, Zanthoxylum rhetsa (Roxb.) DC. The amount of calcium is found to be higher in all plants followed by nitrogen, sodium, potassium and phosphorus etc, whereas the amount of iron is higher than copper, zinc and manganese etc in all plants.

Key word: Mineral analysis, wild edible plants.

INTRODUCTION

Living organism requires a continuous supply of large number of substances from food to complete their life cycle. This supply is called as nutrition. The mineral nutrition is an important aspect and it play pivoted role in human life for healthy growth. Such type of mineral is easily available in wild edible plants. Along with several organic compounds, it is now well to cure diseases as well as minerals are not providing energy, but they play important role in many activities in the body (Malhotra, 1998). About 14 elements are essential to human health such as N, P, K, Ca, Mg, Na, Cu, Fe, Zn, Mn, Co, Si, Br, Cr etc. The deficiency of such element creates some health problems. Human bodies daily need more than 100 mg of major minerals (N, P, K, Ca, Mg, Na) and less than 100 mg of minor minerals (Cu, Fe, Zn, Mn, Co, Br, Si) (Rajangam *et al.*, 2001; Aslam *et al*., 2005). The study was undertaken to determine the nutritional content of ten plants.

MATERIALS AND METHODS

Material: Plants of *Ensete Superbum* (Roxb.) Cheesuran, *Gmelina arborea* Roxb, *Oroxylum indicum* (L.),Vent, *Bauhinia recemosa* Lam. *Caryota urens* L, *Smilax zeylanica* L, *Woodfordia fruticosa* (L.) Kurz, *Commelina benghalensis* L, *Garcinia indica* (Du Petit-Thou.) Choisy , *Zanthoxylum rhetsa* (Roxb.) DC. were collected from various localities of Kolhapur district. Samples were washed to remove dirt and dried at room temperature. Samples were then transferred to grinding machine to make powder and these dried powder was then used for acid digestion.

i) Preparation of acid digests:

The acid digestion method of Toth *et al*. (1948) has been followed for the analysis of inorganic constituents. Fresh sample of each plants were washed with water. Blotted to dry and then kept in oven at 60^0C till a constant weight was obtained. The oven dried plant material was randomly mixed and powdered. Five hundred mg oven dried

powder of wild edible plants was transferred to 150 ml clean borosil beaker and to that 10 ml concentrated HNO_3 were added. It was covered with watch glass and kept for an hour till the primary reactions subsided. Then, it was then heated on hot plate till all the material was completely dissolved. It was allowed to cool to room temperature and then 10 ml of Perchloric acid (60%) was added to it and mixed thoroughly. Then, it was then heated strongly on the hot plate until the solution became colourless and reduced to about 2-3 ml. While heating, the solution was not allowed to dry. After cooling, it was transferred quantitatively to 100 ml capacity volumetric flask, diluted to 100 ml with distilled water and kept overnight. Next day the extract was filtered through Whatman No. 44 (Ashless) filter paper. The filtrate was stored properly and used for analysis of inorganic constituents. The level of Calcium, Magnesium, Sodium, Iron, Manganese, Zinc, and Copper were estimated by using Atomic Absorption Spectrophotometer.

In case needed, appropriate dilution of plant extract was made with distilled water. Sodium and Potassium were estimated flame photometrically following the standard method of flame photometer (Model-Elico, ch-22A). For standardization, various concentrations of sodium and Potassium were prepared by ranging from 10 to 80 ppm by diluting stock solution of NaCl (100 ppm). The remaining inorganic elements viz. Calcium, Potassium, Magnesium, Iron, Manganese, Zinc, Copper and Cobalt were estimated by using Atomic absorption spectrophotometer. Total nitrogen content in wild edible plants was estimated according to the method given by Hawk *et al.* (1948). Phosphorus was estimated from the same acid digest by following the method described by Sekine *et al.* (1965).

RESULTS AND DISCUSSION

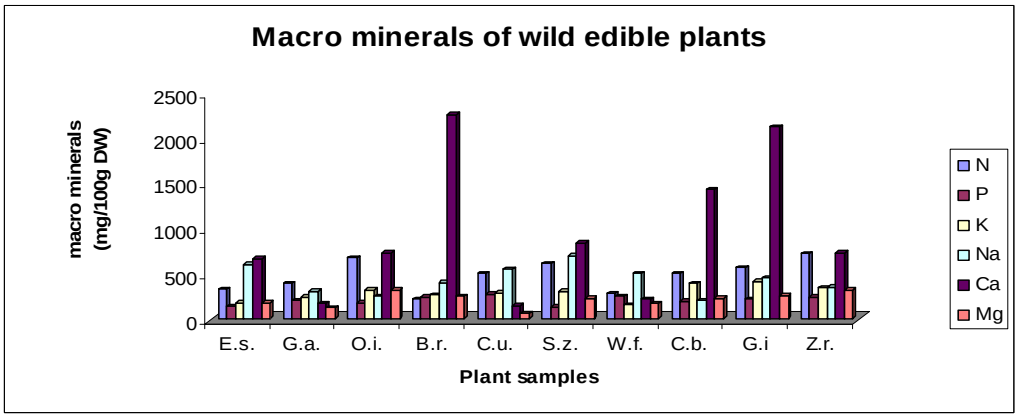
Macrominerals:

Table 2- Analysis of macrominerals

Sr.No.	Name of plant Species	Family	Vernacular name	Edible plant part	Nitrogen (N.) **(mg/100g of DW.)**	Phosphorus (P.) **(mg/100g of DW.)**	Potassium (K.) **(mg/100g of DW.)**	Sodium (Na.) **(mg/100g of DW.)**	Calcium (Ca.) **(mg/100g of DW.)**	Magnesium (Mg.) **(mg/100g of DW.)**
1	*Ensete Superbum* (Roxb.) Cheesuran	Musaceae	Ran-keli, Chaveli-keli	Flower	330 **±4.04**	140 **±13.89**	180 **±6.11**	600 **±4.58**	665.6 **±5.94**	176.8 **±4.86**
2	*Gmelina arborea* Roxb	Verbenaceae	Shivan	Fruit	390 **±4.00**	200 **±8.54**	240 **±11.50**	300 **±9.01**	170.4 **±4.60**	122.0 **±3.26**
3	*Oroxylum indicum* (L.) Vent,	Bignoniaceae	Tetu	Fruit	670 **±4.16**	180 **±9.29**	320 **±7.50**	250 **±8.61**	731.2 **±6.50**	316.8 **±6.64**
4	*Bauhinia recemosa* Lam.	Caesalpiniaceae	Apata	Fruit	220 **±3.05**	240 **±11.13**	260 **±12.01**	400 **±9.60**	2263.6 **±9.86**	251.6 **±5.35**
5	*Caryota urens* L.	Areceae	Ardhashishi,	Fruit	500 **±4.50**	270 **±12.50**	290 **±10.69**	550 **±9.01**	144.8 **±4.11**	56.0 **±2.57**
6	*Smilax zeylanica* L.	Smilacaceae	Chopchini	leaves.	610 **±5.50**	130 **±12.01**	300 **±16.00**	700 **±7.93**	838.8 **±4.30**	226.8 **±3.59**
7	*Woodfordia fruticosa* (L.) Kurz.	Lytharaceae	Dhayati	Flowers	280 **±5.03**	250 **±7.57**	150 **±12.52**	500 **±8.54**	219.4 **±3.95**	166.0 **±6.12**
8	*Commelina benghalensis* L.	Commelinaceae	Kena	Leaves	500 **±5.50**	192 **±13.01**	390 **±15.52**	200 **±7.02**	1431.6 **±6.41**	220.8 **±4.15**
9	*Garcinia indica* (Du Petit-Thou.) Choisy	Clusiaceae	Kokam	Leaves	560 **±6.50**	220 **±13.11**	410 **±10.69**	450 **±11.01**	2122.8 **±6.92**	255.2 **±4.11**
10	*Zanthoxylum rhetsa* (Roxb.) DC.	Rutaceae	Tirphal, Chirphal.	Fruit	720 **±3.00**	240 **±10.53**	340 **±12.52**	350 **±6.08**	731.2 **±5.61**	316.8 **±4.92**

Among all the mineral nutrients nitrogen is the most important nutrient for the growth of plant. In present study, *Zanthoxylum rhetsa* (Roxb.) showed highest amount of nitrogen (720±4.04 mg/100g DW), where as higher Phosphorus in *Caryota urens* L (270±6.55mg/100g DW), potassium in *Garcinia indica* (Du Petit-Thou.) Choisy, (410±7.63 mg/100g DW), sodium in *Ensete Superbum* (Roxb.) Cheesuran (600±7.21 mg/100g DW), calcium in *Bauhinia recemosa* Lam. (2263.6±3.50 mg/100g DW) and magnesium in *Oroxylum indicum* (L.) Vent (316.8± 5.10 mg/100g DW).

The macro and micro mineral content of some wild edible leaves consumed in Eastern Anatolia carried out by Turan et al (2003). The nutrient analysis of the South African vegetable *Corchorus olitorius* Ndlovu and Afolayan (2008). They reported the leaves of *C. olitorius* contained 0.258± 0.03 g/kg phosphorus. Nutrient composition and antinutrional factors of the fresh fruit pulps of *Spondias mombim*, *Diallum guineese* and *Mordii whytii* were determined by Adepoju (2009). Mensah et al. (2008) found out the nutritional status of some leafy vegetables consumed by Edo people of Nigeria. In present work, all plants showed good values of macrominerals according to R. D. A. level..



E.s.- *Ensete superbum* (Roxb.) Cheesuran., G.a- *Gmelina arborea* Roxb., O.i.- *Oroxylum indicum* (L.) Vent, B.r.- *Bauhinia recemosa* Lam., C.u.- *Caryota urens* L, S.z- *Smilax zeylanica* L, W.f.- *Woodfordia fruticosa* (L.) Kurz, C.b.- *Commelina benghalensis* L, G.i.- *Garcinia indica* (Du Petit-Thou.) Choisy, Z.i.- *Zanthoxylum rhetsa* (Roxb.) DC.

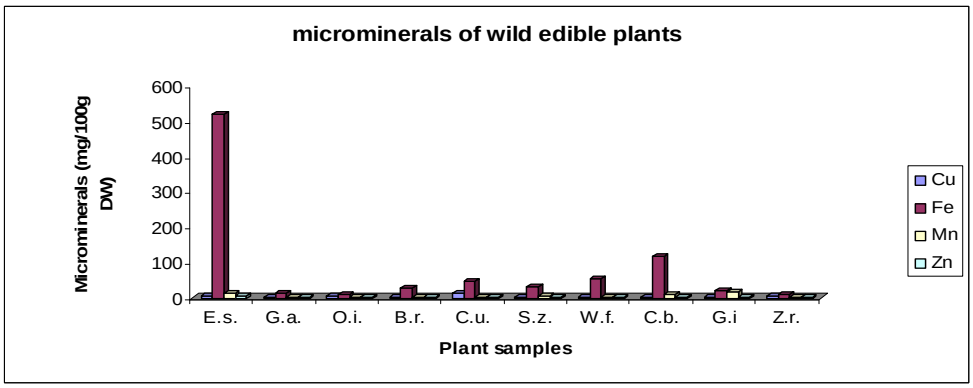
Microminerals:

Table 2- Analysis of microminerals

Sr. No.	Name of plant Species	Family	Vernacular name	Edible plant part	Copper (Cu.) (mg/100g of DW.)	Iron (Fe.) (mg/100g of DW.)	Manganese (Mn.) (mg/100g of DW.)	Zinc (Zn.) (mg/100g of DW.)
1	*Ensete Superbum* (Roxb.) Cheesuran	Musaceae	Ran-keli, Chaveli-keli	Flower	4.46 ±0.15	518.4 ±11.06	11.74 ±0.46	3.78 ±0.15
2	*Gmelina arborea* Roxb	Verbenaceae	Shivan	Fruit	2.36 ±0.15	14.68 ±0.12	0.70 ±0.08	2.74 ±0.11
3	*Oroxylum indicum* (L.) Vent,	Bignoniaceae	Tetu	Fruit	4 ±0.10	9.52 ±0.12	0.70 ±0.12	1.60 ±0.11
4	*Bauhinia recemosa* Lam.	Caesalpiniaceae	Apata	Fruit	0.097 ±0.008	28.66 ±0.60	2.46 ±0.27	2.36 ±0.13
5	*Caryota urens* L.	Areceae	Ardhashishi,	Fruit	13.82 ±0.27	45.76 ±0.53	0.82 ±0.12	1.06 ±0.11
6	*Smilax zeylanica* L.	Smilacaceae	Chopchini	leaves.	2.56 ±0.075	29.92 ±0.54	5.58 ±0.15	2.00 ±0.13
7	*Woodfordia fruticosa* (L.) Kurz.	Lytharaceae	Dhayati	Flowers	0.640 ±0.011	55.14 ±0.48	1.06 ±0.11	1.589 ±0.14
8	*Commelina benghalensis* L.	Commelinaceae	Kena	Leaves	2.72 ±0.096	115.92 ±5.51	7.98 ±0.26	2.68 ±0.17
9	*Garcinia indica* (Du Petit-Thou.) Choisy	Clusiaceae	Kokam	Leaves	1.56 ±0.06	20.56 ±0.97	15.18 ±0.14	3.02 ±0.11
10	*Zanthoxylum rhetsa* (Roxb.) DC.	Rutaceae	Tirphal, Chirphal.	Fruit	4 ±0.14	9.52 ±0.33	0.70 ±0.06	1.06 ±0.13

Trace minerals are very important in a required amount, as excess or lower amount is harmful in the body. Iron is required for hemoglobin formation, similarly each element play important role (Adeyeye and Otokiti, 1999; Alessandra and Robert, 2005). The deficiencies of manganese are unusual but may lead to bone deformities, rashes, reduced hair growth etc. (Prasad, 1993; Hamilton *et al*., 1994). Zinc is relatively nontoxic (Prasad, 1982). Zinc is necessary for the growth and multiplication of cells, skin integrity, bone metabolism, and functioning of taste and

eyesight (Thunus and Lejeune, 1994). The deficiency of copper has been associated with cardiac abnormalities in human and animal causes anemia and neutropenia (Mills,1981).



E.s.- Ensete superbum (Roxb.) Cheesuran., G.a- Gmelina arborea Roxb., O.i.- Oroxylum indicum (L.) Vent, B.r.- Bauhinia recemosa Lam., C.u.- Caryota urens L, S.z- Smilax zeylanica L, W.f.- Woodfordia fruticosa (L.) Kurz, C.b.- Commelina benghalensis L, G.i.- Garcinia indica (Du Petit-Thou.) Choisy, Z.i.- Zanthoxylum rhetsa (Roxb.) DC.

Among microelements *Ensete superbum* (Roxb.) Cheesuran shows copper (4.46±0.15 mg/100g DW), iron (518.4±11.06 mg/100g DW) and Zinc (3.78±0.15mg/100g DW) in higher amount. Whereas manganese and zink present in least in all plants.

Tayie and Asibey-Berko (2001) carried out mineral analysis of some indigenous vegetables of Ghana. They reported the zinc content in leaves of *Corchorus tridens* (1.76 ± 0.18) and *Ipomoea batatas* (0.95 ± 0.10) mg/100 g. Valavi *et al* (2011) have done mineral analysis of some wild edible fruits. Adepaju (2009). carried out proximate composition and micronutrient potentials of the locally available wild fruits in Nigeria. Thus the above result suggest that the bioactive potential of ten plant.

CONCLUSION

All the plants studied for their mineral analysis showed good amount of mineral content. As the macroelement concerned, *Zanthoxylum rhetsa* (Roxb.) DC. showed higher amount of macrominerals and *Ensete Superbum* (Roxb.) Cheesuran showed higher amount of microminerals. The above plant can be explored as an alternative food for malnutrition population in developing countries. Further study is regarded to determine how to explit its food value to promote human health.

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