



Mineral Analysis of tubers in Deolapur Region of Vidarbha, Maharashtra State, India

Deshpande Suwarna, Surekha Kale, Sachin Dhok and D.K. Kulkarni*

BAIF Development Research Foundation, Pune-411 058.

*dilipkkulkarni@gmail.com

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Abstract

Wild edible plants play a significant role in the sustenance of tribal people residing in forested areas. Conservation and utilization of wild edible plants survey has been carried out in 10 villages of Deolapur region, Taluka: Ramtek, District: Nagpur, Maharashtra, India. The present study deals with six tubers analysis for four mineral contents like P, Cu, Fe, Mn. P is higher 3.21 mg in *Amorphophallus konkanensis* Hett (Saknaru), Cu is higher 11.81 mg in *Colocasia esculenta* L (Gavati kochi), Fe is higher 53.8 mg in *Colocasia esculenta* L (Wild kochi), Mn is higher 11.77 mg in *Amorphophallus konkanensis* Hett (Saknaru). Consumption of wild tubers are rich source of minerals in diet of tribal people. It is first time to report mineral content from *Amorphophallus konkanensis* Hett (Saknaru) a newly reported plant from Vidarbha region.

INTRODUCTION

Aborigines consume a main staple diet and it is supported with supplementary wild foods. These species are consumed by various communities depending on the local availability. A variety of natural resources provide them a balanced diet. They include fruits, nuts, berries, leafy vegetables, tubers, yams, mushrooms, honey, etc. (Sinha and Lakra, 2005). Over 200 such natural plant products can be gathered in a season. Various preparations of plant species are prepared and sold in tribal markets. Tribals and local communities have accurate knowledge of wild food resources due to their long association with nature (Jain and Sinha, 1988).

A mineral is an inorganic element occurring in the form of salts. Minerals are helpful to build tissues, regulate body fluids or assist in various body functions. Calcium and phosphorus minerals are deposited in protein form. Iron is found in blood

as a part of the red pigment -hemoglobin. Minerals play an important role in the regulation of body functions. These functions are: Maintenance of acid-base balance, control of water balance, contraction of muscles normal response of nerves to physiological stimulation and clotting of blood. Carbohydrates, fats and proteins form the major portion of the diet, while minerals and vitamins form comparatively a smaller but never neglected part. The process of plant nutrition is those having to do with acquisition of nutrient elements by plants and with the involvement of the element in the life process of plants. The minerals are present in the plant in the form of organic compounds. Rhizome and leaf parts of genus *Alpinia* and *Zingiber* were studied for mineral content. *Alpinia* and *Zingiber* members of family Zingiberace have been deposited Iron, Calcium, Manganese, Copper, Zinc, Nitrogen and Potassium in the higher level in their rhizome and leaf (Kasarkar and Kulkarni, 2012),

Shunmugapriya and Kalavathy (2012) reported GC-MS analysis of *Stephania wightii* (Arn) Dunn tubers. The mineral compositions of the 8 wild edible fruits were investigated. Nitrogen, Sodium, Potassium, Calcium, Magnesium and Phosphorus were analysed as the major constituents of the fruits and iron, zinc, copper and manganese were identified as a minor constituent. Among all the minerals, Potassium was found in large quantity in all fruits. *Ficus racemosa* L., fruit contain the highest amount of calcium, sodium and potassium. *Grewia tiliifolia* Vahl. Fruit is rich in potassium and magnesium whereas iron content is more in *Meyna laxiflora* Robyns. *Flacourtia indica* (Burm. f.) Merr. fruit is rich in copper and manganese, while *Cordia dichotoma* fruit is rich in zinc. (Valvi and Rathod, 2011). Un-conventional wild fruits were processed for different products in tribal region of Jawhar, Thane district (Chothe *et al.*, 2014).

Present paper deals with collection of tubers from tribal region of Deolapar and analyzed for mineral content at Central Research Station,

BAIF Development Research Foundation, Uralikanchan, Pune.

MATERIALS AND METHODS

The minerals, such as P, Cu, Fe²⁺, Mn²⁺ and Zn were determined by the atomic absorption spectrophotometric method (Tondon, 1978). The samples were digested in diacid solution of HNO₃ and perchloric acid. Make up volume up to 100 ml, were passed through atomic absorption spectrophotometry (AAS) using different lamps or micronutrients and calibrated the value. This whole procedure of Mineral analysis is accomplished at the lab of CRS Uralikanchan.

RESULTS AND DISCUSSION

Mineral analysis of tubers

The results of the minerals estimation of the wild edible tubers is presented in table - 1. This study shows that phosphorus was the least abundant in all wild edible tubers. The species analyzed in this study contained remarkably high amount of Iron.

Table: 1: Mineral analysis of tubers

Sr. No.	Name	DM%	P (mg%)	Cu (mg%)	Fe ²⁺ (mg%)	Mn ²⁺ (mg%)
1	Mataru	35.88	2.01	1.58	29.2	1.78
2	Kochai	27.75	2.32	11.71	33.6	2.76
3	Suran	27.93	1.86	10.86	29.35	1.96
4	Saknaru	20.75	3.21	2.24	0.115	11.77
5	Bhumka	39.75	1.63	8.81	22.76	4.07
6	Wild Kochai	44.21	1.44	1.48	53.8	3.37

Sample 1. Mataru: (*Dioscoria bulbifera* L.) (Dioscoreaceae)

Tuber contain high amount of iron 29.2 mg and low amount of Phosphorus 2.1 mg, Copper 1.58 mg and Manganese 1.78 mg

Sample 2. Gavathi Kochai (*Colocasia esculenta* L.) (Araceae)

Tuber contain high amount of Iron 33.6 mg, moderate amount of Copper 11.71 mg and low amount of Manganese 2.76 mg and phosphorus 2.32 mg

Sample 3. Suran: *Amarphophallus paeonifollius* (Densst) Nicols. (Araceae).

Tuber contain high amount of iron 29.35 mg, moderate amount of copper 10.86 mg and low amount of Manganese 1.96 mg and phosphorus 1.86 mg.

Sample 4. Saknaru: *Amorphophallus konkanensis* Hett. Yadav & Patil. ..(Araceae)

Tuber contain moderate amount of Manganese 11.77 mg, low amount of Copper 2.24 mg and phosphorus 3.21 mg. Very low amount of Iron. 0.115 mg is reported.

Sample 5. Bhumka: (*Costus speciosus* (Koen.) J.E. Smith) (Zingiberaceae)

Tuber contain high amount of Iron 22.76 mg, moderate amount of Copper 8.81 mg and low amount of Manganese 4.07 mg and phosphorus 1.63 mg.

Sample 6. Wild Kochai: (*Colocasia esculenta* L.) (Araceae)

Contain very rich source of Iron 53.8 mg, low amount of manganese 3.37 mg and very low amount of copper 1.48 mg and phosphorus. 1.44 mg.

It is essential to know the role of above minerals in consumption for medicine purpose by human being since ancient time.

Iron combines with protein for the development of hemoglobin and the red pigment of the blood. The main function of Iron in haeme is to carry oxygen from the lungs to the cells and to carry back some Carbon dioxide formed to the lungs for exhalation. Iron is an essential constituent of many tissues (Muscles). Iron is stored in the liver, spleen and bone marrow in the form of the protein Ferritin. Iron is found in various nucleoproteins and porphyrin proteins which include cytochromes, peroxidase and catalase. Therefore, it plays a very important role in respiratory mechanism. A more common problem for humans is iron deficiency, which leads to anemia. A man needs an average daily intake of 7.00 mg of iron and a woman 11.00 mg in a normal diet will generally provide all that is needed. Manganese is a trace element and an essential part of cell enzymes. It is a component of enzymes required for glucose utilization.

Manganese is a very useful for chlorophyll synthesis and respiration. Heavy consumption of Manganese mainly effects on respiratory tract and brain. Symptoms of manganese poisoning are hallucinations, forget full ness and nerve damage.

Copper is an essential mineral to human life, if in higher concentrations, it accumulates in the blood, liver, kidneys and causing anemia, renal and intestinal irritations, coma, death and Wilson's disease

Conclusion

Tribal communities are totally depend upon wild vegetables. They cultivate vegetables like wild relatives of Cowpea, Chilies, Brinjal, Sweet potato, Dioscoreas, Ginger, Medicinal plants, Banana, etc. in their small farm yard or kitchen garden (Kulkarni and Kumbhojkar, 1993). It has been observed that the traditional knowledge of wild food plants is decline due to over exploitation. Unless efforts are need to educate the young generations about their importance, this knowledge may be lost in the near future. During documentation of wild vegetables from Deolapar region of Vidarbha, 'Traditional method of Tuber Cultivation' is recorded from villages - Hivra, Ghoti and Dhanora According to horticulture system of plantation this method can be linked with Row system of cultivation (Deshpande and Kulkarni, 2013).

Rajgond tribal people apply this method for tuberous crops cultivation like Ginger (*Zingiber*

officinale Rose), Mataru (*Dioscoria bulbifera* L.), Bhumka (*Costus speciosus* (Koen.) J.E. Smith) Gavathi Kochai (*Colocasia esculenta* (L.) Schott.) and Turmeric (*Curcuma longa* L.). Mineral analysis of six tubers and their role in tribal diet is very important for health point of view which are rich in Iron, Phosphorus, Copper, Manganese. Present study deals with the mineral analysis of *Amorphophallus konkanensis* Hett. Locally known as **Saknaru** a new report from M.P. state and it is wild in Vidarbha region of Maharashtra State (Shaikh *et al.*, 2012)

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