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PHYTOCHEMICAL STUDIES ON UNEXPLORED ETHNOVEGETABLES FROM MELGHAT (DIST. AMRAVATI) MAHARASHTRA

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ABSTRACT:

Melghat is one of the nine habitats initially selected in the country during 1973 for launching "Project Tiger" scheme. The tribal population of the area is about 80% of the total. They are predominantly scheduled tribes and majority of them belong to the Korku tribe. This paper deals with phytochemical screening of some ethno-vegetables. Total 29 ethno-vegetables routinely used by Korkus were enlisted by authors. Out of these *Oxalis latifolia* Kunth, *Begonia crenata* Dryand. and *Dioscorea bellophyla* (Prain.) Haines were selected for phytochemical screening. The chemical profile of ethno-vegetables was studied by chemical tests carried out in detail. Free amino acids were detected by two-dimensional chromatography.

KEY WORD: *Ethnovegetables, Korku tribe, Phytochemistry, Melghat.*

INTRODUCTION:

Consumption of green vegetables is a chief source of vitamins and micro-nutrients for those who are vegetarian. Knowledge of these edible plants is part of their traditional knowledge which is usually transmitted by elders to young ones and also by participation of individuals in collection of vegetable plants. Availability observations were done using regular visits with informants. Use of plants for one or other purpose is done by the human societies since very long period While, the hunter-gatherer societies still

continue to profess such lifestyles, the agricultural societies did not eliminate the use of non-cultivated resources. Now a days, human vegetable consumption is based on rather very limited number of crops (12-15 species) but in many parts of the world the use of wild plants is very common (Scherrer et.al., 2005). Food & Diet related researches never considered wild edible plants as vegetables. They only concentrated on cultivated vegetable species (Pieroni et. al. 2007). Wild plants can be the best genetic resources as they are relative of the most cultivars. They can be useful in case of genetic erosion or for crop improvement (Kala C. P., 2007) Changing social values, depopulation of rural areas is main reason for erosion of traditional knowledge (Maikhuri et. al. 2004). Many publications (Sundriyal & Sundriyal 2001,2003; Chweya & Eyzaguirre, 1999; Ogoye-Ndegwa & Aagaard-Hansen, 2003) have emphasized on the diversity and value of traditional vegetables. The nutritional value of traditional leafy vegetables is higher (Shackleton, 1998) than several known vegetables. Most of these ethnovegetables have a potential to compete with cultivated vegetables (Shackleton, 1998). Consumption of traditional diets known to these societies are said to have many beneficial effects such as prevention of some age related degenerative diseases – arteriosclerosis, stroke, etc. (Orech et al. 2007; Jansen van Rensburg 2004).

STUDY AREA:

The study area is situated on the branch of Satpuda range to the south of Tapti River. The prominent feature is the main ridge of Gawilgarh hills. Reserve forest of Melghat division is divided into East Melghat and West Melghat division. It stretches from south to north between latitudes 21^0-11' and 21^0-46' north and from west to east between longitude 78^0 - 38' and 77^0-34' east. It turns to southwest and widens into Chikhaldara and Vairat plateau with. Vairat is highest point being 1,177.75 meters above sea level.

The striking feature of Melghat ridge is its almost flat-topped plateau descending in a series of precipitous scarps on either side, one below the other, separated by narrow steps of lesser gradients and finally sloping down to the narrow step valleys known as *Khoras.* There are about 61 villages are in buffer and reserve forest zone of Tiger Reserve. About 80% populations is of tribals (Indurkar, 1992).

MATERIALS AND METHODS:

Major ethnobotanical survey of the area was conducted during 1997–1998. During these surveys data on medicinal uses of the plants used by tribal people, the diversity of wild food plants available for use was documented. Informal discussions, interviews and village walks with informants, medicine men were held to enhance understanding and gather information about different species of wild vegetable plants available around the villages and in cultivated areas. A schedule was used to collect information on personal data, traditional knowledge about each species used by the housewives. Adult female member from the house, who is responsible for vegetable preparation, was considered as the respondent with additional information from children and men those assisting in collection and processing of wild leafy vegetables.

Field visits were made with the informants for collection of specimens. Identification of the collected specimens was made with the help of Flora of Melghat (Patel,1968) and other Standard Floras (Hooker, 1872-1897; Dhore, 1998; Naik,1998; Bhogaonkar & Devarkar, 1999). Herbarium specimens were deposited in the Govt. Institute of Science and Humanities, Amravati (Maharashtra) in Department of Botany. Botanical Survey of India, Pune was also consulted for identification and confirmation of identification of the specimens.

Preliminary phytochemical screening for bioactive compounds, amino acid composition by two-dimensional paper chromatography, qualitative ash analysis for the presence of inorganic compounds were done by standard methods given in reference books by Gangulee et. al. (1959), Evans (1996), Gibbs (1974), Harborne (1973), Johansen (1940), Peach & Tracey (1979) and Rastogi & Mehrotra (1999).

RESULTS:

***Oxalis latifolia* Kunth. (Teenpani) OXALIDACEAE Plate :1- Image 1&1a**

Small herbs, 5 x 1.5 cm. with an ovoid bulb; stolons, bearing ovoid bulblets. Leaves radical, 6-10; leaflets3, sessile, broadly ob-deltoid, with 2 obtuse divergent lobes base cuneate; petiole 15 cm long. Sepals 5, lanceolate, 0.6 x 0.3 mm. Petals 5, purple, oblanceolate, 1.7 x 0.3 cm clawed, connate. Stamens 5+5; 5 longer filaments and 5 shorter. Ovary elongate, 2.5 mm, 5 - lobed; ovules 4 per cell, styles 5; stigmas laciniate. Grows abundantly, forming thick patches, spreading over large areas.

Ethnobotanical Use : Leaves area used as vegetable. Sour in taste. Eaten raw as well as cooked as vegetable. Leaves are cooked just with a pinch of salt and red chilly powder.

Chemistry Studied: Total amino acids present nine. They are Aspartic acid, Threonine, DL-Alanine, Lycine-monohydro-chloride, Methionine, Isoleucine, Tryptophan and one unidentified protein (Rf – 0.169/0.141, purple) & one unidentified non-protein (Rf – 0.574/0.046, orange pink). Alkaloids, Flavonoids, Phenolics (Catechol) and Steroids present. Ash contains Sulphur, Calcium, Iron, Chlorine, Phosphorus and Sodium (Table: 1).

***Begonia crenata* Dryand. (Khattibhaji) BEGONIACEAE Plate :1- Image 2**

Small, herbaceous, 1-4 leaved plants; root sub-tuberous stems usually red, smooth slender. Leaves 2-8 x 2-5 cm. with few stout hairs above; petiole of the radical leaves 2-5 in long, those of cauline 1.5 – 6 cm. long, usually red with a few scattered hairs; stipules triangular, acute. Flowers pale pink, beautifully marked with glistening dots when fresh, in few flowered cymes, unisexual. Sepals 2 in male flowers; stamens many, monadelphous; anthers yellow. Female flowers with 5 - segments of perianth, soon become larger than male flowers. Styles 3, connate; stigmas reniform. Capsules membranous, crowned by the accrescent perianth, 3-winged, ciliate tipped with glandular black dots; 2-celled. Seeds minute, ellipsoid. A

beautiful, small monsoon herb with pink flowers, growing on hill slopes. Not common but whenever it grows, grows in small dense patches.

Ethnobotanical Use: Leaves are used as vegetable.Sour in taste. Eaten raw like green salad.

Chemistry Studied: Total amino acids present eight. They are Aspartic acid, Threonine, DL-Alanine, L-Methionine, L-Tyrosine, Isoleucine, and one unidentified protein (Rf –0.169/0.141, purple) & one unidentified non-protein (Rf –0.905/0.207, brown). Alkaloids, Flavonoids, Phenolics (Catechol and Hydroquinone) and Steroids present. Ash contains Sulphur, Calcium, Magnesium, Iron, Chlorine, and Phosphorus (Table: 1).

***Dioscorea bellophyla* (Prain.) Haines (Kadukaranda) DIOSCOREACEAE Plate:1-Image 3**

Perennial climbing shrubs, unarmed. Rhizomes small, bearing tubers at the end of fleshy roots; tubers 1-3, small, subfusiform. Leaves simple, 7.5-13.0 x 2-9 cm, usually ovate or ovate-oblong; base deeply cordate or sagittate, lower often alternate, upper usually opposite, 5-nerved. Flowers greenish white in axils. Male flowers in panicles; spikes 2-5-4.0 cm long; female flowers usually in solitary 5.5-12.0 cm long spikes. Capsules 1-5-2.0 x 1.1 - 3.0 cm, obovate with retuse apex, stipe short, wings evenly rounded. Seeds with reddish - brown wings all around. Common climber of forest.

Ethnobotanical Use: Tubers are used as vegetable. Tubers are collected during summer. They are made into slices and kept in running water for a day (about 24 hrs.) and then cooked. Slices are also roasted and eaten with a pinch of salt.

Chemistry Studied: Total amino acids present seven. They are Serine, DL-Alanine, Valine, DL-Valine, and one unidentified protein (Rf – 0.096/0.154, purple) & one unidentified non-protein (Rf – 0.578/0.171, orange). Alkaloids, Flavonoids, Iridoids, Phenolics and Steroids present. Ash contains Sulphur, Calcium, Magnesium, Iron, Chlorine, Phosphorus and Sodium (Table: 1).

DISCUSSION AND CONCLUSION:

Chemistry of the *Oxalis latifolia* H.B.& K. and *Begonia crenata* Dryand. has been worked out for the first time. *Oxalis corniculata* is reported to have malic acid, tartaric acid and citric acid (Chatterjee & Pakrashi 1991-95). Disocoreas have been studied extensively for their chemistry. No Indian species contains Diosgenin in the amount so as to exploit commercially. However, tubers of most of the species form supplementary diet of tribals of many areas. The poisonous alkaloid, Dioscorine is removed by boiling the tubers or by keeping thin slices in running water for 24 – 28 hours.

Amino acids occur in plants both in Free State and as the basic units of proteins and other metabolites. Of the 23 protein amino acids 09 present in *Oxalis latifolia* H. B. & K., 08 present in *Begonia crenata* Dryand. and 07 present in *Dioscorea bellophyla* (Prain.) Haines.

Alkaloids are often toxic to man and many have dramatic physiological activity. The activity ranges from narcotic – central nervous system stimulant – Anesthetic – Anticancer. Steroids occur as steroidal saponins

steroids associate with saponins steroidal alkaloids and other phytosterols like stigmasterol and sitosterol. Steroidal saponins are of great pharmaceutical importance because of their relationships to compounds such as sex hormones cartisones, diuretic steroids, vitamin D. and cardiac glycosides. Steroids are also known for their lypolytic activity. Phenols are important constituents of some medicinal plants. These are eight Phenolic classes of pharmaceutical interest; Of these simple phenolic compounds, anthraquinones, flavones & flavonoids are tested in the species. Flavonoids are known to act as antirheumatic and simple phenols are known as vermicide, sedative and in some cases as flavoring agents. Iridoids are monoterpene lactones. Many medicinal plants contain iridoides but then exact action on human body is not known. (Gangulee et. al. 1959 and Rastogi & Mehrotra, 1999).

Alkaloids, Flavonoids, phenolics and steroids are present in all three plants studied. Iridoids detected only in *Dioscorea bellophyla* (Prain.) Haines.

Ash analysis resulted that all plants studied contains Sulphur, Calcium, Iron, Chlorine and Phosphorus. Whereas, Magnesium is noted in *Begonia crenata* Dryand. and Dioscorea *bellophyla* (Prain.) Haines only. Sodium was absent in *Begonia crenata* Dryand.

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REFRENCES:

Bhogaonkar & Devarkar. 1999. *Additions to the Flora of Melghat (Some rare and Uncommon Plants). Technical Bulletin No. VII*. The Directorate Project Tiger Melghat, Amravati. (Maharashtra, India.)

Chatterjee A. & S. C. Pakrashi. 1991-1995. *The Treatise on Indian Medicinal Plants. Volumes 1-4*. Publications & Information Directorate, CSIR, New Delhi.

Chweya J.A. and Eyzaguirre P.B. 1999. *The Biodiversity of Traditional Leafy Vegetables*. Rome: International Plant Genetic Resources Institute;

Dhore M. A. & P. A. Joshi. 1998. *Flora of Melghat Tiger Reserve*. Directorate, Project Tiger Melghate, Paratwada, Distt. Amravati, Maharashtra.

Evans, W.C. 1996. *Trease and Evans' Pharmacognosy*. Saunders Publications, India.

Gangulee, H. C., K. S. Das and C. Datta. 1959. *College Botany Vol. I*. New Central Book Agency, Calcutta – 9 (India).

Gibbs, R. D. 1974. *Chemotaxonomy of Flowering Plants*. Vol. I. Mc Gill – Queens University Press, London.

Harborne, J.B. 1973. *Phytochemical Methods. – A Guide to Modern Techniques of Plant Analysis*. – Chapman and Hall, London.

Hooker J. D. 1872-1897. *The Flora of British India*. Vol. I - VII. London.

Indurkar R. N. 1992. *Settlement of the Erstwhile Forest Villages in Melghat. Two Decades of Project Tiger, Melghat. (1973-1993).* Publicity & Information Officer. Pune.

Jansen van Rensburg W.S., Venter S.L., Netschluvhi T.R., Heever E, Vorster H.J., de Ronde J.A. 2004. Role of indigenous leafy vegetables in combating hunger and malnutrition. *South African Journal of Botany*, 70:52-59

Johansen, D.A. 1940. *Plant Microtechniques,* Tata McGraw Hill Pub. Ltd., New Delhi.

Kala C.P. 2007. Prioritization of cultivated and wild edibles by local people in the Uttaranchal hills of Indian Himalaya. *Indian Journal of Traditional Knowledge,* 6:239-243.

Maikhuri R.K., Rao K.S., Saxena K.G. 2004. Bioprospecting of wild edibles for rural development in central Himalaya. *Mountain Research and Development*, 24:110-113.

Naik V. N. 1998. *Flora of Marathwada*. Vol. I & II Amrut Prakashan, Aurangabad, India.

Ogoye-Ndegwa C., Aagaard-Hansen J. 2003. Traditional gathering of wild vegetables among the Luo of western Kenya – A nutritional anthropology project. *Journal of Ecology of Food Nutrition*, 42:69-89

Orech F.O., Aagaard-Hansen J., Friis H. 2007. Ethnoecology of traditional leafy vegetables of the Luo people of Bondo district, western Kenya. *Int. J. Food Sci. Nutr.*, 58(7):522-530.

Patel R. I. 1968. *Forest Flora of Melghat*. Prabhat Press, Meerat.

Peach, K and Tracey, M. V. 1979. *Modern Method of plant Analysis. (Rep. Edn.) Vol, I – VII.* Narosa Publication, New Delhi.

Pieroni A, Houlihan L, Ansari N, Hussain B, Aslam S. 2007. Medicinal perceptions of vegetables traditionally consumed by south-Asian migrants living in Bradford, Northern England. *Journal of Ethnopharmacology,* 113:100-110.

Rastogi, R. P. and Mehrotra B. N. – 1999. *Compendium of Indian Medicinal Plants Vol. 2 (1970-1979).* Central Drug Research Institute, Lucknow and National Institute of Science & Communication, New Delhi.

Scherrer A.M., Motti R, Weckerle C.S. 2005. Traditional plant use in the areas of Monte Vesole and Ascea, Cilento National Park (Campania, Southern Italy). *Journal of Ethnopharmacology*, 97:129-143.

Shackleton S.E., Dzerefos C.M., Shackleton C.M., Mathabala F.R. 1998. Use and trading of wild edible herbs in central lowveld savannah region, South Africa. *Economic Botany*, 52:251-259.

Sundriyal M, Sundriyal R.C. 2001. Wild edible plants of the Sikkim Himalaya: Nutritive values of selected species. *Economic Botany*, 55:377-390.

Sundriyal M, Sundriyal R.C. 2003. Underutilized edible plants of the Sikkim Himalaya: Need for domestication. *Current Science*, 85:731-736.

Websites:

www.birdwatchingtourmelghat.blogspot.com/

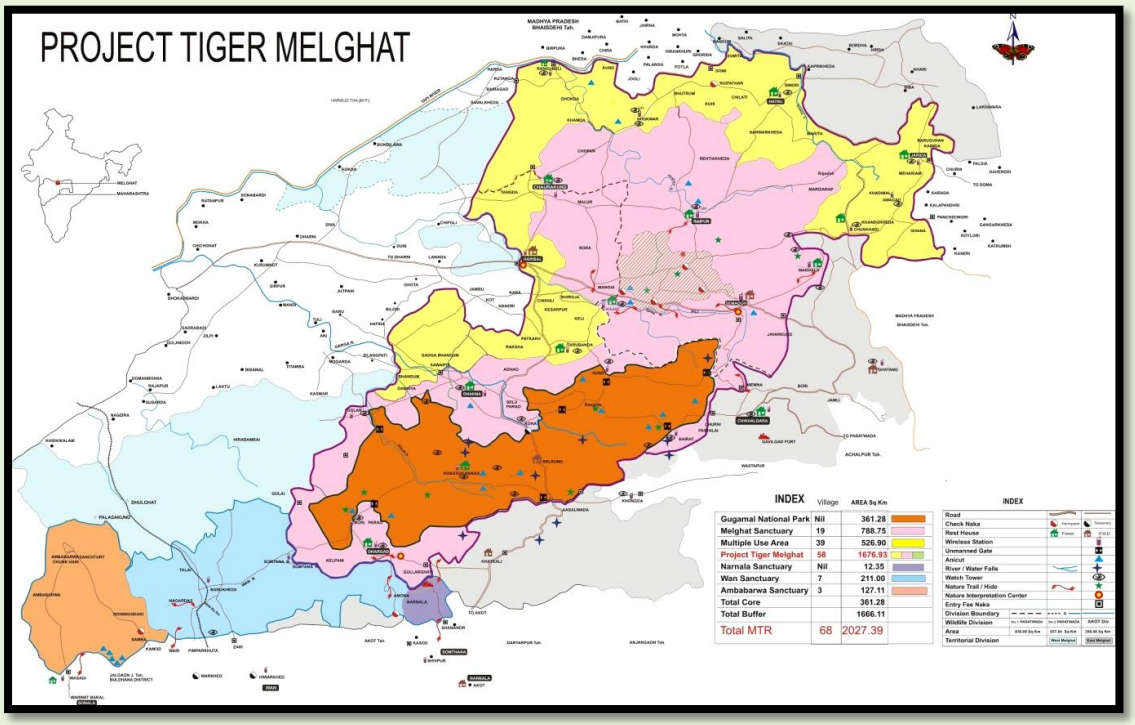
www.flickr.com/photos/dinesh_valke/3803958807/

www.flickr.com/photos/dinesh_valke/4787517694/.

Table 1: Phytochemical tests & Observations

Name of Test	*Oxalis latifolia*	*Begonia crenata*	*Dioscorea bellophyla*
1. Protein Amino Acidal Profile			
Argenine	-	-	-
Aspartic Acid	+++	+++	-
Citruline	-	-	-
DL-Alanine	+++	++	+++
DL-2- Amino-n-Butyric acid	-	-	-
DL-Dopa	-	-	-
DL-Methionine	-	++	-
DL- Valine	-	-	++
Glutamic Acid	-	-	-
Glycine	-	-	-
Histidine	-	-	-
Iso-Leucine	+++	+++	+++
L-Cystine	-	+	-
L-Tyrosine	-	+	-
Lycine monohydrochloride	+++	-	-
Methionine	+++	-	-
Nor-Leucine	-	-	-
Ornithine monohydrochloride	-	-	-
Proline	-	-	-
Serine	-	++	+++
Threonine	+++	-	-
Ttryptophan	+++	-	-
Valine	-	-	+++
2. Alkaloids	+++	+	+
3. Steroids			
Steroid Nucleus	+++	+	+
Unsaturated Steroid	+++	+++	+++
4. Iridoids (acubins)	-	-	+
5. Flavonoids			
Shinoda	+	+++	+++
Flavonols	-	-	-
Flavanones	-	-	-
Flavanonols	-	-	-
6. Phenolics			
Catechol	+++	++	+++
Hydroquinone	-	++	-
Napthol	-	-	-
Pyrogallol	-	-	-
7. Anthraquinones	-	-	-
8. Acid Soluble Ash Fraction			
Calcium (Ca)	+++	+++	++

Name of Test	*Oxalis latifolia*	*Begonia crenata*	*Dioscorea bellophyla*
Iron (Fe)	+++	+++	+++
Magnesium (Mg)	-	++	+
Sulphur (S)	++	++	+++
Chlorine (Cl)	++	+	+++
Phosphorus (P)	+++	++	+++
Sodium (Na)	+	-	+



STUDY AREA

Plate I

Fig. 1

***Oxalis latifolia* Kunth. (Flowers)**

Fig. 1a

***Oxalis latifolia* Kunth. (Leaves)**

Fig. 2

***Begonia crenata* Dryand. (Plant)**

Fig. 3

***Dioscorea bellophyla* (Prain.) Haines (Plant)**

Fig. 1 *Oxalis latifolia* Kunth Fig. 2 *Begonia crenata* Dryand. Fig. 3 Dioscorea bellophyla (Prain.) Haines