



Diversity of food composition and nutritive analysis of wild edible flowers: an important facet for food supply of Vidarbha

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Abstract

During documentation of Vidarbha region survey of wild edible plant was carried out. Flowers of *Cassia fistula* L., and *Telosma pallida* (Roxb.) Craib found to be used in the form of vegetable. In present study nutritional value of these flowers was carried out. Fresh as well as shade dried material was used for estimation of moisture content, chlorophyll, anthocyanin, lycopene, vitamin-C, vitamin-A, crude fibre, lipid, fat, reducing and non-reducing sugar, total soluble sugar, starch, total nitrogen and phenols. Mineral content was estimated in terms of ash yield and further analysis was carried out for qualitative and quantitative estimation of different elements. Material was also screened for presence of bioactive compounds imparting medicinal properties of the species. Actual preparation of Recipe has been tried, as was told by informants. The study also focus on that wild plants needs protection in their habitats, it is high time to emphasis on wild food production along with biodiversity and cultural heritage in rural area as its of global importance.

Key words- Vidarbha region, Biodiversity, Flower vegetable, Nutritional value.

Introduction-Survey of ethnic food plants was carried out. Six districts representing a cross section of Vidarbha were selected for survey. Wide range of wild edible plants are available in this region. Rural folk consumes wild edibles in different ways, either raw or cooked. During survey near about 125 wild edible plants are documented and some were selected for nutritional analysis; out of them flowers of *Cassia fistula* L., and *Telosma pallida* (Roxb.) Craib was selected for the present study. Flower vegetables usually are not a regular part of diet; they constitute fancy food or delicacy. However, the nutrition provided by them cannot be neglected. Since generations, this wild edibles are playing a role in supporting rural needs and economy. It is necessary to evaluate the nutritional values of such wild food.

Cassia fistula* L.** is a moderate sized deciduous trees. Leaves pinnate; leaflets in 4-8 pairs, opposite, ovate, acute, glabrous above. Inflorescence lax, drooping, long raceme. corolla bright yellow; petals unequal, obovate, feebly clawed. Fruit a long cylindrical, pendulous. The tree is one of the most widespread occurring in deciduous forests of India. It is common throughout the Gangetic valley, Central India and South India. The tree is not gregarious, but is scattered in mixed, deciduous forests, it occurs frequently in sal forests. It is often cultivated in the gardens. It is widely used as edible (leaves, flowers, fruits) throughout India². In Vidarbha region only flowers are found to be used in Amravati, Yavatmal and Washim district. ***Telosma pallida - Twining under shrubs; stems branched. Leaves ovate-oblong. Flowers many, pale cream, in umbellate cymes; corolla salver-

shaped. Follicles long, lanceolate. Not common, climber found in dry open wastelands. Found from tropical Himalayas to Sikkim, Maharashtra, Rajasthan and Gujarat. The flowers are used as edible in regions of Rajasthan and Gujarat². In Vidarbha region *Telosma pallida* flowers used in Amravati, Buldhana and Nagpur district. Fresh flowers cooked in to vegetables; very much favored delicacy, flowers are sold at 200 to 250 Rs per Kg in local market. (Table 1)

Material and Methods-Plants were brought to laboratory, thoroughly washed and shade dried. For analysis fresh material was preserved at 4°C, while dry powder was made of shade dried plants. For nutritional evaluation moisture content, crude fibre, total carbohydrates, starch, reducing and non-reducing sugars, total nitrogen, total phenols were quantitatively estimated^{15,16}. For evaluation of medicinal properties, plant tissue was tested qualitatively for the cardenolides, flavonoids, leucoanthocyanins, simple phenolics, polyoses, polyuronoids and anthracene glycosides^{5,6,9,12-14}. Plant ash was prepared to estimate the mineral content (in the form of salts) and further qualitative analysis was done to detect various minerals like sulphur, calcium, magnesium, iron, sodium, chloride, phosphorus, aluminum, copper and nickel. Phosphorus and iron were estimated quantitatively by spectrophotometer; whereas, potassium, calcium and sodium were estimated quantitatively by flame photometer^{6,8,14}.

Observations-Certain specialized process of recipes are followed in practice for the preparation of vegetable. Flowers are first washed and boiled in water for few minutes and water is drained. Boiled part is cut into pieces and used to prepare

vegetable. Oil is heated and mustard seeds and chopped onion is added; it is cooked till golden brown, and chilly powder and turmeric powder added. Now, boiled flowers are added along with salt, mixed thoroughly and steam cooked for few minutes.

flowers, fruits and seeds of *Cassia fistula* are used in Indian medicine. Flowers is known to be used in treatment of stomach troubles. Parts of *Cassia fistula* is used in various ailments, roots and fruits are strong purgative, seeds are used in jaundice¹⁰. No such medicinal uses are recorded for *Telosma pallida*.

In many parts world over plants is used as medicine also. Roots, stem bark, stem, leaves

Table 1: Names with mode of use.

Sr. no	Name of plant	Edible part	Corolla colour	Common name	Local name	Mode of use
1	<i>Cassia fistula</i>	Flower	Yellow	Bahava, Aamlatash.	Ramdanda, Bala, Koredanda	Used as vegetable
2	<i>Telosma pallida</i>	Flower	Pale cream	-	Zhuta, Jivati	Used as vegetable

Nutritional analysis Table 2 : Nutrients per 100 gm fresh weight.

Name of plant	Total Lipids	Ascorbic Acid	Anthocyanin	Lycopene	Carotenoids	Total Chlorophyll	Chl-a	Chl-b
<i>Cassia fistula</i>	0.54 gm	10.485 mg	1.78 mg	0.8488 mg	250.02 mg	-gm	-gm	-gm
<i>Telosma pallida</i>	0.2 gm	1.566 mg	1.07 mg	0.62 mg	172.52 mg	0.012 gm	0.0001 gm	0.0134 gm

Table 3 : Nutrient content per 100 gm fresh weight.

Name of plant	Total Carbohydrates	Starch	Reducing Sugar	Non-Reducing Sugar	Protein (N×6.25)	Crude Fat	Total Phenols	Crude Fibre
<i>Cassia fistula</i>	2.287gm	0.237 gm	1.564 gm	0.486 gm	0.182gm	0.93gm	10.51 mg	0.98gm
<i>Telosma pallida</i>	1.58gm	0.043 gm	0.131 gm	1.406 gm	0.88gm	0.48gm	6.452 mg	0.93gm

Table 4 : Qualitative Mineral Profile

Name of plant	Sulphur	Calcium	Magnesium	Iron	Sodium	Chloride	Phosphorus	Aluminum	Manganese	Copper	Nickel
<i>Cassia fistula</i>	++	+	+++	+++	+++	++	+++	++	++	-	-
<i>Telosma pallida</i>	++	++	+	+++	++	+	+	+	+	-	-

Table 5 : Minerals per 100 gm dry weight.

Name of plant	Calcium	Potassium	Sodium	Phosphorus	Iron
<i>Cassia fistula</i>	0.23 gm	0.22 gm	1.358 gm	0.122 gm	0.0559 gm
<i>Telosma pallida</i>	1.026gm	0.56 gm	2.394 gm	0.081 gm	0.0798gm

Table 6 Comparison Table- Nutrients value mg per 100gm (mg/100gm)

Name of the plant	Moisture	Protein N*6.25	Fat	Crude fibre	Carbo hydrate	Vit C	β-Carotene (µg/100gm)
* <i>Moringa olefera</i> (Drumstick flowers)	85.9	3.6	0.8	1.3	7.1	-	-
* <i>Plantain flower</i>	89.9	1.7	0.7	1.3	5.1	16	-
<i>Cassia fistula</i>	70.2	0.481	0.93	0.98	2.05	10.485	250020
<i>Telosma pallida</i>	85.5	0.231	0.48	0.93	1.537	1.566	172520

Table 7 Comparison Table- Nutrients value mg per 100gm (mg/100gm)

Name of the plant	Calcium	Phosphorus	Iron	Sodium	Potassium
*Drumstick flowers	51	90	-	-	259
*Plantain flower	32	42	1.6	20.1	185
<i>Cassia fistula</i>	680	360	16	400	65
<i>Telosma pallida</i>	1480	11	11	340	81

Discussion- Nutraceutical potential of the wild edibles studied here is discussed in light of the role of nutrient components and bioactive molecules they contain. Total carbohydrate content of *Cassia fistula* was (2.287gm /100gm). Total carbohydrate content of various vegetables, fruits and edible flowers was estimated by earlier authors also. However, the values had been calculated only indirectly by subtracting sum of moisture, protein, fat, fibre and ash. During present studies actual estimation of carbohydrates has been done. Also, the components like starch, reducing sugar and non-reducing sugar are estimated here for the first time. In all wild vegetables studied here amount of sugars was always found to be more than starch; except for *C. fistula* flowers, where starch and sugars are found in equal amounts. Sugars are readily available source of energy. The wild vegetables therefore are easily digestible as far as at least carbohydrates are concerned.(Table 3)

However, lipid content in *Cassia fistula* was (0.54gm/ 100gm) and in *T. pallida* was (0.2gm). Flowers of *T. pallida* are highest in protein (0.88gm) but are lowest in crude fat content (0.48 gm). *C. fistula* flowers contained highest crude fat (0.93gm). (Table 2)

Wild edible flowers studied gave negative test for copper and nickel. They shows positive test for sulphur, calcium, magnesium, Iron, sodium, chloride, phosphorus, aluminium and magesene. (Table 4)

Since *C. fistula* flowers are yellow (both calyx and corolla) their chlorophyll content is zero. Chlorophyll content of *T. pallida* is also very low. In *T. pallida* anthocyanin, carotenoid and vitamin C content found as (1.07, 172.52 and 1.566mg). Lycopene and vitamin C was highest in *C. fistula* (0.84 and 10.485 mg). (Table 2) Phenolic content of *C. fistula* flowers showed 10.51 mg (Table 2). Crude fiber content of all flowers is negligible. Flowers of *T. pallida* showed highest iron, sodium and potassium content (0.079, 2.394, 0.56 gm). Phosphorus content was found highest in *C. fistula* (0.122gm).(Table 5)

In bioactive evaluation *C. fistula* flowers were found to content flavones, flavonens, pyrogallol and polyoses. Astringent properties of flowers may be due to pyrogallol that binds with tannins. Pyrogallol may further provide anti-inflammatory, antiseptic and anticancer properties. *C. fistula* flowers are known to contain several types of flavonoids. Petals are known to possess gibberellic acid^{3,4}. Nothing is known about the chemistry of *T. pallida*. Flavonones, Chlorogenic acid fatty acid and polyoses were noted in *T. pallida* flowers. No medicinal use is attributed to the species in

earlier literature. However, they may prove useful as antimicrobial, antitoxin, anti-rheumatic and cosmetic for skin (anti wrinkle).

Nutritional potential of wild edible flowers studied here when compared with commonly used and marketed flowers of drumstick, agathi and plaintain show that wild flowers are in no way inferior to these species except for protein and carbohydrate content. Values of crude fat shows a range of 0.48mg (*T. pallida*) to 0.93mg (*C. fistula*)/100gm which is more than all the compared ones. Vitamin C content of *C. fistula* flowers is also comparable with the marketed flower vegetable. For comparison of β carotene no values are available; however β carotene of all the wild flowers is very high.(Table 6)

As far as nutritional potential is concerned both flowers and fruits provide a good nutritional supplement. With respect to minerals flowers of *Cassia fistula* (680mg/100gm) and *Telosma pallida* (1480mg/100gm) are a rich source of calcium and which is many times that of drumstick flowers (51mg/100gm) and Plaintain flowers (32 mg/100gm) which is a conventionally marketed flower vegetable⁷.(Table 7)

Conclusion- Studies on nutritional potential of selected wild edibles has shown that these are in no way inferior than the conventional marketed vegetables. Most of wild edible species are disease resistance with important biological characters, they can be exploited in genetic engineering and tissue culture practices¹⁷. Wild edible plants are facing threats in their natural habitats from various human activities. The level of impact of these activities varies from place to place. Popularization and cultivation practices of these vegetables will definitely help their conservation. In addition to food value, many of the wild edibles are marketable and provide the opportunity to supplement household income. Status assessment of wild edible plants of Arunachal Pradesh has revealed that, the contribution of wild edibles to the diet and economy of the local people is often significant and therefore focus on these species should remain priority¹.

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