

Biomedical Benefits and Nutritional Potential of Some Wild Leaf Vegetables of Wadwal Nagnath (Sanjivani) Bet in the Marathwada Region of Maharashtra

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Abstract: *Wadwal Nagnath Bet (Hill) is very famous for its unique feature of producing a very rare species of Ayurvedic bushes and plants. It is 16.5 km away from Chakur and 39 Km from Latur city. The hill is of 600- 700 feet height from the ground and is 3 km near the Wadwal-Nagnath village. The rare species of Ayurvedic plants grows in the Uttara Nakshatra and hence the well-known ayurvedic practitioners from nearest states are visiting this hill in the same period. This place is famous for plant Ayurvedic medicines. vanaushdhi vaidyas are here very popular from old. Every utara nakshtra means in month of July here celebrates medicine festival by people of wadwal nagnath which is the nearest town and people are visited mostly from out of town, district, state. This paper deals with the medicinal and nutritional value of wild leaves vegetable plants like *Amaranthus tricolor L.*, *Amaranthus hybridus L.*, *Amaranthus spinosus L.*, *Cassia tora L.*, *Celosia argentea L.*, *Chenopodium album L.*, *Glossocardia bosvallia (L.f.) DC.*, *Launea procumbence (Roxb.) Ramayya & Rajagopal*, *Portulaca oleracea L.*, *Portulaca quadrifida L.*, *Rivea hypocrateriformis (Desr.) Choisy* and *Trianthema portulacastrum*. These are highly popular plant species of vegetables to which leaves are eaten as potential herb in vegetable recipe, cooked with other vegetables, with a main dishes or by itself. The people of Marathwada mainly rural population depend on wild greens as food supplements. This paper encompasses the information of 12 species, 9 genera of 7 families were tabulated as botanical name, local name, family, habitat, mode of consumption and medicinal uses. Use of wild leafy vegetables may act as alternative food resources other than cultivated vegetables, thus also acting as a multi-valued resource for health and wealth.*

Keywords: Biomedical benefits, Nutritional Potential, Leafy vegetables, Wadwal Nagnath Bet, Traditional knowledge

I. INTRODUCTION

Latur district is in the south-eastern part of the Maharashtra state, and is situated on the MaharashtraKarnataka boundary. Latur is situated on the 18.7° latitude and 73.25° longitude. The total area of Latur district is 7,372 sq.km. There are 943 villages and 10 Talukas in Latur district and the population is 2,080,285. This is the land of 11 sugar factories, and 2,283 smallscale industries. The percentage land under agriculture is 91%. The major crops include sugarcane, edible oils, soybeans, wheat, jowar, grapes and mangoes. Latur is now famous for some best-known brands like Tinna Oils, Kirti Gold, Videocon, and Kalantry Group's Agro Processing Industries.

The rare plants grow in the month July to September (Uttara Nakshatra). In this period Ayurvedic practitioner, researchers from various places visit this place in search of rare plants. The Government of Maharashtra organises Vaidya Sammelan (conference) for various Ayurvedic doctors and, local practitioners who use traditional remedies for primary healthcare. As there is a tremendous response from the practitioners and local people of this region, this conference provides a platform for sharing of rich traditional knowledge which is also beneficial to the local tribes. The government has established a research centre for the study of medicinal plants, but till now, no documents are available on any ethno-medicinal study among the tribes of Latur district. The aim of this study was to evaluate the use of plants for medicinal and nutritional purpose by the Kunbhi, Gawali, Gond, and other tribes of this district. This paper will provide a strong base for developing an attitude for research in use of plants for medicinal purposes

Wild edible plants are largely ignored in land use planning and implementation, economic development, and biodiversity conservation. Wild edible plants related traditional knowledge is rapidly eroding.

Documentation of traditional knowledge regarding wild edible plants limited compared to medicinal plants (Upreti Y, 2012). In Marathwada, a limited work has been carried out by botanists. In Marathwada region, the data of floristic composition has been collected by (Naik 1999). The work of documentation of traditional knowledge of wild edible leafy vegetables remains untouched (Prashanth Kumar and Shiddamallayya, 2014). Hence the present documentation of traditional knowledge of wild leafy vegetables of Marathwada region is to create awareness in the public and further research by scientific community.

1.1 Study Area

The Sanjivani Bet (Wadwal Nagnath Bet) is known for rare species of Ayurvedic bushes and plants. This place is 16.5 km away from Chakur and 39 Km from Latur city. The height of this hill is of 600-700 feet height from the ground and it is 3 km away from Wadwal Nagnath village.

1.2 Methodology

Ethno-botanical information was documented through semi structured questionnaires; key informant interviews, frequent interactions and discussion with the local villagers, mainly from local vaidya, cowboys, farmers and housewives. The questions focused to be primarily on the local name of the plant, knowledge of the uses of plants in the past and present for consumption, collection, mode of food preparations. Sometimes collected plants were taken to old age people of village to authenticate the edibility. The collection of plant specimens from the field along with digital photography and field notes for further processing for herbarium techniques use by (Survase and Dhabe, 2013) and taxonomical identification. Botanical identification of the collected species has been carried out by using floras (Naik, 1999) and herbarium specimens of the Institute, which is internationally recognized with acronym Dr. Babasaheb Ambedkar Marathwada University Herbarium Aurangabad.

1. *Amaranthus hybridus* L. (Amaranthaceae)

Local name: Rajgira

Medicinal Uses: Amaranth leaves are rich in vitamin A and a cup can meet 97% of your daily need for this antioxidative vitamin. They are also full of flavonoid polyphenolic antioxidants like beta-carotene, zeaxanthin, and lutein which provide a protective layer against oxidative stress caused by free radicals. A tea made from the leaves is astringent. It is used in the Intestinal bleeding, diarrhoea, excessive menstruation (Tanaka and Nakao S. 1976).

Consumption Mode: Leafy Amaranths are rarely consumed raw (like salad). The modes of preparation are diverse: (47% of surveyed people consume the leaves boiled with or without cereal-based meal like couscous); but when that is feasible, 94% of the interviewed people use Amaranth leafy stems in groundnut sauce. The species *A. hybridus* are cooked directly with other sauce or meal component whereas others (*A. spinosus*) need precooking (one or several boiling and rinsing before adding into a sauce or meal). The precooking is supposed to help to eliminate or to reduce some anti-nutrient factors such as phytic acids or oxalates (Hilou A. et. al. 2016). *A. hybridus* is used in both ways depending on season (precooking during dry season and direct cooking during rainy season). For precooking, the leaves are first cooked in a great volume of water and then the precooked leaves are dewatered.

2. *Amaranthus spinosus* L. (Amaranthaceae)

Local name: Katemath

Medicinal Uses: Amaranth is a nutritious, gluten-free grain that provides plenty of fiber, protein and micronutrients. It has also been associated with a number of health benefits, including reduced inflammation, lower cholesterol levels and increased weight loss.

Consumption Mode: The leaves and stems of *Amaranthus spinosus* are eaten raw or cooked as spinach. Remove the spines in older plants. Seed are easy to harvest and very nutritious.

3. *Amaranthus tricolor* L. (Amaranthaceae)

Local name: Tandulja

Medicinal uses: Leaves - raw or cooked. Often used at the young seedling stage, they are also cooked as spinach and have a very mild flavour. An excellent hot weather substitute for spinach. The leaves contain about 3.5% protein, 0.25% fat, 6.6% carbohydrate, 3.1% ash, 24mg iron per 100g, 464mg calcium per 100g; they are rich in vitamin A and have a fair content of vitamins B1 and C. On a zero moisture basis 100g of the leaves contains up to 2441mg calcium, 1008mg phosphorus, 51mg iron, 34mg sodium, 4475mg potassium, 37,623 micrograms beta-carotene equivalent, 0.68mg thiamine, 2.37mg riboflavin, 11.48mg niacin and 730mg ascorbic acid. The crisp interior of large stems makes a tasty vegetable. It can be eaten raw or cooked as an asparagus substitute. Seed - cooked. Very small, about 1mm in diameter, but easy to harvest and very nutritious. The seed can be cooked whole, and becomes very gelatinous like this, but it is rather difficult to crush all of the small seeds in the mouth and thus some of the seed will pass right through the digestive system without being assimilated [K]. The seed contains saponins. If this is the case it is probably best to either soak the seed for at least 12 hours and then rinse thoroughly before cooking or to give the seed a long slow cooking in order to destroy the saponins [K].

Consumption Mode: *Amaranthus tricolor* is used as a cooked leaf vegetable. In Asian countries it is occasionally eaten raw in salads; the soft stems are eaten like asparagus in India. Forms with bright red, red, yellow and green-coloured leaves are grown throughout the world as ornamentals. Medicinally *Amaranthus tricolor* is used externally to treat inflammations, and internally as a diuretic.

4. *Cassia tora* L. (Caesalpiniaceae)

Local name: Tarota

Medicinal uses: According to Ayurveda the leaves and seeds are acrid, laxative, antiperiodic, anthelmintic, ophthalmic, liver tonic, cardiotoxic and expectorant. The leaves and seeds are useful in leprosy, ringworm, flatulence, colic, dyspepsia, constipation, cough, bronchitis, cardiac disorders.

Recommended for reclamation of saline, alkaline and brackish soils. Used as green manure crop in acidic soils. Dried seed contain protein (up to 24 percent) and is given as a protein rich feed for livestock and birds. Roasted seeds are substituted for coffee like Tephrosia seeds. Seeds yield tannins and dyes (yellow, blue and red). fields a gum (7.50%), which is a good agent for suspending and binding. The aqueous extracts of whole plant and leaves produces inhibitory allelopathic effects on common weeds specially on *Parthenium hysterophorus*. Recommended to grow in Parthenium infested areas as smoother crop. Stimulatory allelopathic effects on rice and wheat have been reported. Seeds used in preparation of sweet dishes. Leaves are popular potherb. In organic farms of India, *Cassia tora* is used as natural pesticide. Fungicidal activity of chrysophanic acid-9-anthrone from *Cassia tora* has been reported.

Consumption Mode: *Cassia tora* has many uses. The whole plant and roots, leaves, and seeds have been widely used in traditional Indian and South Asian medicine. The plant and seeds are edible. Young leaves can be cooked as a vegetable while the roasted seeds are used as a substitute coffee. Sexual debility *Cassia tora* roots 3-5grams mixed with ghee and sugar is given daily early in the morning.

5. *Celosia argentea* L. (Amaranthaceae)

Local name: Kurdu

Medicinal uses: Anthelmintic: Used to destroy parasitic worms. Antioxidant: Neutralize the oxidant effect of free radicals and other substances. Antiparasitic: expel parasitic worms (helminths) and other internal parasites from the body. Antiperiodic: Preventing regular recurrence of the symptoms of a disease, as in malaria. Antiseptic: Capable of preventing infection by inhibiting the growth of infectious agents. Depurative: Purifying agent. Hepatoprotective: Prevent damage to the liver. Laxative: Tending to stimulate or facilitate the evacuation of the bowels. Purgative: Strongly laxative in effect. Stomachic: Stimulates gastric activity. Vermifuge: Anthelmintic medicine.

Consumption Mode: Blood purifier: The dried root of *Cassia tora* is a good purifier of blood and a tonic. The very fine powder of the root is given in doses of 3-4 grams every morning mixed with 30ml of ghee and 7ml powdered sugar. The decoction of equal parts of the dry roots of *Cassia tora*, *Asparagus racemosus* and *Sida cordifolia* (bala) is made by boiling the mixture with 32 times its weight of water till the liquid is reduced to one eighth of its original weight. The

strained decoction is made into syrup by boiling it with twice its weight of sugar 14-28ml of this syrup is taken with powdered cardamoms twice a day with milk for six weeks. It is also used as leafy vegetable. The roasted seeds are used like coffee. For this purpose, 2 teaspoon roasted seeds are boiled in one cup water, filtered and taken. Boiled seeds are given to the animals to treat hypogalactia.

6. *Chenopodium album* L. (Chenopodiaceae)

Local name: Chill

Medicinal uses: This plant was used in folk medicine as antihelmintic, laxative, as a blood purifier, and it was also used for the treatment of hepatic disorders, intestinal ulcers, and burns. Beside these traditional uses, this species is a known antirheumatic remedy in the traditional medicine of Lebanon. The decoction of its aerial parts mixed with alcohol was utilized against rheumatism and arthritis. *C. album* is common in Italy, where it is also known as fat hen, and traditionally consumed boiled or used in salads, soups, and stews.

Consumption Mode: The leaves and young shoots may be eaten raw or cooked as a leaf vegetable,^{[18][a]} but should be eaten in moderation due to high levels of oxalic acid. The flower buds and flowers can also be eaten cooked. Each plant produces tens of thousands of black seeds. Quinoa, a closely related species, is grown specifically for its seeds. The Zuni people cook the young plants' greens.

7. *Glossocardia bosvallia* (L.f.) DC. (Astraceae)

Local name: Khadaksepu

Medicinal uses: Paste of the whole plant is used against physical wounds. Traditional medicinal knowledge and medicinal plants are under threat due to conservative inheritance processes and anthropogenic pressures for various reasons.

Consumption Mode: The leaves and young shoots may be eaten as a leaf vegetable,^[a] either steamed in its entirety, or cooked like spinach, but should be eaten in moderation due to high levels of oxalic acid.^[20] Each plant produces tens of thousands of black seeds. These are high in protein, vitamin A, calcium, phosphorus, and potassium. Quinoa, a closely related species, is grown specifically for its seeds.^[21] The Zuni people cook the young plants' greens.^[22] Bathua seeds also double up for rice and dal. Napoleon Bonaparte is said to have once relied on bathua seeds to feed his troops during lean times.

In India, the plant is called *bathua* and found abundantly in the winter season.^[24] The leaves and young shoots of this plant are used in dishes such as soups, curries, and paratha-stuffed breads, common in North India. The seeds or grains are used in *phambra* or *laafi*, gruel-type dishes in Himachal Pradesh, and in mildly alcoholic fermented beverages such as *soora* and *ghanti*.^[25] In Haryana state, the "*bathue ka raita*" i.e. the raita (yogurt dip) made with bathua, is very popular in winters.^[26]

8. *Launaea procumbens* (Roxb.) Ramayya & Rajagopal (Astraceae)

Local Name: Pathri

Medicinal uses: *Launaea procumbens* (L.) is traditionally used in the treatment of various human ailments including pulmonary damages. The present study was arranged to evaluate the role of *Launaea procumbens* methanol extract (LME) against carbon tetrachloride (CCl₄) induced oxidative pulmonary damages in rat.

Consumption Mode: Pithari plant is used as an emmenagogue in medicine. In Ayurveda, the plant is used as a substitute for *Oldenlandia corymbosa*. The tribal inhabitants of western Maharashtra use a decoction of the plant as febrifuge. A paste of the fresh Pithari plant is applied to promote healing of sores and wounds. It has a bitter taste and fennel like odour. Besides serving as a medicinal plant Pithari plant is also used in culinary purposes. People of some states in India take Pithari plant as a vegetable.

9. *Portulaca oleraceae* L. (Portulacaceae)

Local Name: Ghol

Medicinal uses: The young leaves are a very acceptable addition to salads, their mucilaginous quality also making them a good substitute for okra as a thickener in soups. Older leaves are used as a potherb. The seed can be ground into a

powder and mixed with cereals for use in gruels, bread, pancakes. The fresh juice is used in the treatment of strangury, coughs and sore. The leaves are poulticed and applied to burns; both the leaves and the plant juice are particularly effective in the treatment of skin diseases and insect stings. A tea made from the leaves is used in the treatment of stomach aches and headaches. The leaf juice is applied to earaches, it is also said to alleviate caterpillar stings. This remedy is not given to pregnant women or to patients with digestive problems. The seeds are tonic and vermifuge. They are prescribed for dyspepsia and opacities of the cornea. To complete the range of its applications, one could mention its use as an insecticide, in which case its juice is poured on to anthills, and also its ornamental use in Roman and medieval gardens. Another authority declared that the distilled water took away pains in the teeth, the seeds, bruised and boiled in wine, were given to children as a vermifuge. In Africa, the whole plant is considered antiphlogistic (takes the heat out) and bactericide in bacillary dysentery, diarrhoea, haemorrhoids, enterorrhagia. It has been used in prescriptions as an antidiabetic. Externally it is used as a cataplasm of fresh leaves for maturing of abscesses. The seeds are also calmativ and will help slake a thirst. An infusion is used as anthelmintic for children to expel roundworms, in high doses as an emetic and also as a cooling drink, with a mild diuretic effect. In Nigeria the plant is used as a diuretic. The bruised leaves are used in external application for erysipelas, treatment of burns and are applied topically to swellings. In Benin area, the plant along with other ingredients is taken as an aid to the development of the foetus.

Consumption Mode: The leaves can be harvested at any time before the plant flowers; they are used fresh or dried. As a significant source of omega-3 oils, *P. oleracea* could yield considerable health benefits to vegetarian and other diets where the consumption of fish oils is excluded. Scientific analysis of its chemical components has shown that this common weed has uncommon nutritional value, making it one of the potentially important foods for the future (Md. Kamal Uddin, 2014).

10. *Portulaca quadrifida* L. (Portulacaceae)

Local name: Hagryaghol

Medicinal uses: The leaves and young shoots of *Portulaca quadrifida* are collected from the wild and are eaten raw. They have a mild pleasant flavour and are frequently used in salads. They are also consumed as a cooked vegetable. In India boiled leaves are mixed with sorghum or pearl millet flour in preparing a kind of bread. Plants are a good feed for pigs, chicken and other birds. Large types are sometimes planted as an ornamental (e.g. in Rwanda) or as a soil binder to prevent erosion (e.g. in Kenya). Medicinally *Portulaca quadrifida* is used less widely but has similar medicinal applications as *Portulaca oleracea* L. The general uses are as a diuretic, to treat rheumatism and gynaecological diseases, as a sedative, analgesic and cardiogenic, to treat fever, disorders of the urinary tract, worm diseases, as a tonic and choleric, to treat dysentery, and to apply externally to ulcers, eczema and dermatitis.

Consumption Mode: The traditional food plants are regionally very important and local communities rely on them for their nutritional needs. During the coronavirus disease 2019 (COVID-19)-like situations, purslane can be one of the important emergency foods for far-flung areas where food aid is disrupted due to COVID-19-like situations in the future. It is not surprising that COVID-19 has disturbed the global supply chains of the foods, and in the future, such crops can be important for sustaining the communities that lack basic food distribution (Ajya Kumar et. al. 2021).

11. *Rivea hypocrateriformis* (Desr.) Choisy (Convolvulaceae)

Local name: Phanji

Medicinal uses: The plant is also reported for its ethnomedicinal uses in treating cough, headache, skin disease, malaria etc, as well as treating external conditions such as burns, piles and to relieve pain.

Consumption Mode: Leaves and young shoots-cooked and eaten as a vegetable. The leaves are also boiled together with condiments and prepared into dishes such as bhaji. They can be boiled in water, then added to bajri (Millet) or jowari flour which is then made into bread. The plant has high vitamin A content retaining 75-98% of this even when cooked. The laeves are a good functional food. They contain a range of active compounds and possess mild antioxidant potential. The plant is good source of energy and micronutrients and can be used as nutritious leafy vegetable in daily life and specifically in conditions such as when suffering from cough, skin disease and asthma.

12. *Trianthema portulacastrum* L. (Aizoaceae)

Local Name: Osu

Medicinal uses: In Africa the young tops and leaves of *Trianthema portulacastrum* are eaten as a cooked vegetable or in soups; there are records of such use from Ghana, Cameroon and Tanzania. In India and South-East Asia it is similarly used. However, the plant may cause diarrhoea or paralysis, particularly when older leaves are eaten. When used as a fodder, it can produce similar effects and most domestic animals refuse to eat it. The seeds are harmful contaminants in food grains and other crop seeds. The plant has a potential value as a source of organic matter. The roots have cathartic and stomachic properties and in Africa, the Philippines, Thailand and India they are used to relieve obstructions of the liver and to relieve asthma. In Asia they are given as an emmenagogue and in large doses as an abortifacient. The leaves are diuretic and are applied in the treatment of oedema, jaundice, painful discharge of urine and dropsy. A decoction of the herb is used as a vermifuge and is useful in rheumatism; it is considered an antidote to alcoholic poisoning. The fleshy nature of the leaves makes them suitable for use as a wound-dressing or poultice. In Nigeria the old leaves are used in a treatment against gonorrhoea. In Gabon a decoction of the powdered root is taken to treat venereal discharge. Dried plants are occasionally traded in local markets and by herbalists.

Consumption Mode: Curry with Pulses and Garlic. Green leafy vegetables are very important among the foods as they are a good source of vitamins and minerals for human beings. Dark greens are nutrient-rich than light colored vegetables.



1. *Amaranthus hybridus*, 2. *Amaranthus spinosus*, 3. *Amaranthus tricolor*, 4. *Cassia tora*,
5. *Celosia argentea*, 6. *Chenopodium album*, 7. *Glossocardia boswellia*,
8. *Launea procumbens*, 9. *Portulaca oleraceae*, 10. *Portulaca quadrifida*,
11. *Rivea hypocrateriformis*, and 12. *Trianthema portulacastrum*

II. RESULT

The study area is floristically rich and includes various useful wild leafy vegetable species. The present survey encompasses 11 wild leafy vegetable species belonging to 8 family and 9 genera tabulated with botanical name, local name, family, consumption mode and medicinal uses of wild leaf vegetable plants. A maximum of 04 plants from Amaranthaceae, 02 from Portulacaceae 02 Astraceae, 01 Convolvulaceae, 01 Chenopodiaceae, 01 Caesalpinaceae, 01 Aizoaceae (Table.1 and Fig. 1).

III. CONCLUSION

The people of Marathwada region have rich knowledge on use of wild leaf vegetable plant species. Uses of wild leafy vegetables provide seasonal, staple foods and important alternative to the agriculturally cultivated crops. The study revealed that the distribution, traditional knowledge and importance of wild leafy vegetable species utilization in the past and present in Marathwada region. It shows that wild leafy vegetable use is influenced by traditional knowledge, culture, and socio- economic conditions. Many valuable wild food plants are familiar to certain areas or to certain communities

but are unknown to others. Wild leafy vegetables are not only sources of food and nutrients to the local communities, but could also be means of income generation, if managed sustainably (Upreti Y, 2012). Several wild leafy vegetables can benefit local people not only as food, but also with their medicinal properties. These multi-valued resources are threatened by several anthropogenic and natural causes such as land-use change, habitat destruction, unscientific harvesting, over-grazing and invasive species. Therefore, sustainable management of these resources for the wellbeing of the local communities as well as to conserve biodiversity is of the most importance and could also contribute to preserve cultural and genetic diversity (Upreti Y, 2012). Inclusion of wild leafy vegetable species in community forest management plans would be the most realistic conservation and livelihood approach for the study areas as most forests are managed by community forest user groups.

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