REVIEW ARTICLE

Edible leafy vegetation: source of nutrition for chhattisgarhi people

Bhagyashree Agrawal[1], Bhaskar Kumar Gupta[2], Ritesh Jain[1]

[1]Department of Pharmaceutical Chemistry, School of Pharmacy, Chouksey Engineering College, Bilaspur, Chhattisgarh, India, [2]Department of Pharmacognosy, School of Pharmacy and Research, People's University, Bhopal, Madhya Pradesh, India

Abstract

Chhattisgarh is located at 80°15' to 84°24' E longitude and 17°46' to 24°5' N latitude. It is 10th largest state of India according to land area. It is in the Central part of country. Wild edible plants provide food quality and contribute as a nutrition source throughout the year. In India, around 800 species are consumed as wild edible plants. The diversity of leafy vegetables provides different culinary dishes to family diet, helps household food security, and enhances the nutritional value in diet. The use of wild plants as food has been formed an integral part of the culture and tradition of many indigenous communities of the world. It constitutes an essential component in the diet and food security of many tribal communities particularly people living around the forest fringe or in its vicinity. Various wild leafy vegetables are the virtue of nature to the tribal people throughout the year for fulfilling their nutritional requirements. The present article is focused on the leafy vegetation eaten by the local and tribal people of the state as per their nutritional needs.

Key words: Chhattisgarh, health benefits, local people, local vegetations, nutritional needs

INTRODUCTION

Chhattisgarh is a state in Central India, formed on November 1, 2000, by partitioning 16 Chhattisgarhi-speaking south-east districts of Madhya Pradesh state. It is the 10th largest state with an area of 135,190 km^2. Raipur was made its capital city and Bilaspur with law capital. Chhattisgarh is located at 80°15' to 84°24' E longitude and 17°46' to 24°5' N latitude. The state shares its borders with Madhya Pradesh, Odisha, Jharkhand, Maharashtra, and Andhra Pradesh. The population density of the state per square km is 108. The topography of Chhattisgarh can be divided into many physiographic divisions. Chhattisgarh is the source of minerals, electricity, and steel for India. The state comprises 33 districts in five divisions, that is, Bastar Division: Bijapur, Sukma, Dantewada, Bastar, Kondagaon, Narayanpur, Kanker. Durg Division: Kabirdham (Kawardha), Rajnandgaon, Balod, Durg, Bemetara, Khairagarh-Chhuikhadan, Mohla-Manpur. Raipur Division: Dhamtari, Gariyaband, Raipur, Baloda Bazar, Mahasamund. Bilaspur Division: Bilaspur, Mungeli, Korba, Janjgir-Champa, Raigarh, Sakti, Sarangarh-Bhiliagarh, Gaurela-Pendra. Surguja Division: Koriya, Surajpur, Surguja, Balrampur, Jashpur, Manendragarh-Chirmiri. The Satpura Range, Vindhyachal Mountain Range, and the Maikal Range forms the hilly terrain of Chhattisgarh. The Indo-Gangetic plain in the state is highly fertile. The Chhota Nagpur Plateau is another important topographical division of Chhattisgarh. The eastern end of the Satpura Range and the western edge of the Chota Nagpur Plateau form an east-west belt of hills that divide the Mahanadi River basin from the Indo-Gangetic plain. The central part of the state lies in the fertile upper basin of the Mahanadi-river and its tributaries. The upper Mahanadi basin is separated from the upper Narmada basin to the west by the Maikal Hills (part of the Satpuras) and from the plains of Odisha to the east by ranges of hills. The southern part of the state lies on the Deccan plateau, in the watershed of the Godavari River and its tributary, the Indravati River. The Mahanadi is the chief

Address for correspondence:
Bhagyashree Agrawal, Department of Pharmaceutical Chemistry School of Pharmacy, Chouksey Engineering College, NH-49, Masturi-Jairamnagar Road, Lalkhadan, Bilaspur - 495 004, Chhattisgarh, India.
Phone: 08827780841.
E-mail: bhagyashreeagrawal@rocketmail.com

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river of the state. The other main rivers are Hasdo, Rihand, Jonk, Arpa, and Shivnath. The soil is red in color and very fertile. The major crop of Chhattisgarh is rice. The state has forest of Sal, Teak, Bamboo, Saja, Sarai, Haldi, etc.[1-3]

In India, around hundreds of wild edible plant species are consumed as food. The diversity of leafy vegetable provides different culinary dishes to family diet, helps household food security, and enhances the nutritional value in diet. Various wild leafy vegetables are the virtue of nature to the tribal people throughout the year for fulfilling their nutritional requirements. As, the green leafy vegetables have significant role as the main food because it contains high Vitamin K, nutritional value, and mineral sources such as iron, calcium, potassium, and magnesium compared to other fruit and vegetables. Leafy vegetables are in readily available in Chhattisgarh. Leafy vegetables are important fresh food sources and dried food sources during the rainy, winter, and spring seasons. The leafy vegetables in fresh and dried form in the local market works as source of protein, vitamins, fibers, and minerals.

Conventionally, herbs and herbal products have considered non-toxic and have been used by the tribal people worldwide to treat a range of aliments. The vegetation of Chhattisgarh comprises numerous varieties of horticultural plants, trees, crops like paddy, maize, pulses, and many more. The vegetation of Chhattisgarh includes the vast stretch of forests.

The main aim of the article was to spread information about the leafy vegetables plant species which are used by the tribal and local peoples of Chhattisgarh.

MATERIALS AND METHODS

Literature Search

Authors have searched database for information restricted to English-language, peer-reviewed articles from 2000 to 2021, finding the subsequent keywords: Edible leaves, Chhattisgarh, nutritional content, and local vegetation. The inclusion criteria for content are spreading awareness about the local crops and their nutritional values, tribal community, cultivation and vegetation, diet supplement, nutritional needs, and health benefits.

Edible Plants and their Nutritional Values

Leafy vegetables are abundantly available in Chhattisgarh. Leafy vegetables are important food sources in both fresh and dried form. The leafy vegetables in the local market work as a source of protein, vitamins, and minerals. Leafy vegetables such as Amaranthus species, Borhaavia diffusa, Basell rubra, Cleome gynandra, Chenopodium species, Corchorus species, Leucas cephalotes, Hibiscus cannabinus, and Trianthema portulacastrum are widely used by all the communities throughout the state.

Various wild leafy vegetables are the gift of nature to the tribal people throughout the year for fulfilling their nutritional requirements. The green leafy vegetables have a significant role as main food because it contains high Vitamin K, nutritional value, and mineral sources such as iron, calcium, potassium, magnesium, and other essential minerals.

The state has poor socioeconomic status, which deficient the tribal communities from consumption of some of the specific nutritional food items, in that condition green leaves help in fulfilling the nutritional needs. Because of rich biodiversity, green leafy vegetation plays a significant role in the food and nutritional security of the tribal people. The consumption of leafy vegetables provides food quantity, food quality, and diverse dishes, with enhancing the nutritional values throughout the year. The green leafy vegetables also help in earning the livelihood for tribal people by selling it to nearby cities of the state. This makes the local people get benefits of the vegetation, source of earning for tribals, and protection to the cultural culinary heritage of the state.

Green leafy vegetables are used mostly in daily life of various people of the state in different dishes, by using various traditional cooking methods. Nowadays, even the people of other parts of the country are attracted toward the rich vegetation culture of state. The edible parts of leafy vegetables are potherbs, leafy greens, tender petioles, and shoots.

Leafy vegetables are one of the healthiest foods that provide a wide range of benefits for daily nutrition, boosting immunity, and overall health. Green leafy vegetables are a boon for human being because they provide the nutrients, medical benefits, and roughage in food. Green leafy vegetables are nutrient and abundantly healthy in nature, bundle of phytochemical, anti-oxidants, vitamins, and minerals such as beta-carotene, lutein, and zeaxanthin that prevents cell damage and acts as anti-ageing.

In Chhattisgarh, many green leafy plant species are used for medicinal purposes by tribal and local people. In Chhattisgarh, many herbs are edible and abundantly available as delicious delicacies and consumed in daily diet with steamed rice. Assortment of green leafy herbs and edible plants are found growing in roadside, kitchen garden, as weeds in agriculture fields, undergrowth in forests, and marshy lands.

Leaves are green due to the pigment chlorophyll. Chlorophyll helps in blood detoxification, increasing oxygen transport, maintaining body pH, and increasing the production of red blood cells. It can be called as superfood as it boosts cognition and immune function, provides energy. Green leafy veggies

contain cellulose, dietary fibers matter, and moisture. Leafy vegetables add-on roughage in the diet, stimulate intestinal activities and relief from constipation, and help in alleviating the risk of colorectal cancer.

Chhattisgarh is the state of rich tribal culture and heritage value. The tribal communities of various districts in state are Gond, Abujmaria, Bisonhorn, Maria, Oraon, Birhor, Khairwar, Muria, Halba, Bhatra, Parja, Dhurvaa, Muriya, Dandami, Mariya, Dorla, Bhunjia, Kol, Korwa, Kawar, Rajgond, Bhaiyana, Binjwar, Dhanwa, Parghi, Savra, Manji, Bhayna, Kamar, and Munda.

The tribal people of the state depend on the forest, flora, and fauna diversity for their food and other purposes. Leafy vegetables supply essential constituent for overall health, important nutrients, and trace elements, and work as protective food for the maintenance of health, prevention, and treatment of various diseases.

The occupation of tribal people in the state is mainly agriculture. Forest and its products are an essential part of life of tribal and local people. Tribal people fulfill their major needs like food, medicine, and fibers from these sources. Food requirement is satisfied by agriculture, still tribal people collect roots, tubers, leaves, flowers, and fruits from the forest for secondary food needs.

Forest are reservoirs of various important products such as fruits, barks, seeds, shelter, clothing, gums, tubers, and roots needed by tribal communities for their survival irrespective of the season or climatic conditions such as drought, summer, and famine. It is average estimated that tribals from central and eastern parts of India which includes Madhya Pradesh, Chhattisgarh, Odisha, Jharkhand, and Bihar depends on forest for their 30% of yearly food needs.

In Chhattisgarh, there is a rich diverse culture of flora, fauna, forest, agriculture, herbs, plantation, vegetation, etc. With support of that the tribal as well as the local communities gets the abundant benefit of these sources.

RESULTS

Authors retrieved 50 articles by searching database from 2000 to 2021. The data collected were summed up in [Table 1] for edible leafy vegetables and their nutritional values. No new

Table 1: Edible leafy vegetations with their nutritional values[4-16]

S. No	Common name/local name	Botanical name	Family	Habit	Ethno-botanical important part	Medicinal value
1.	Aloo Bhaji	*Solanum tuberosum* L.	*Solanaceae*	Cultivated	Leaves and tubers	Burns, Corns, Cough, Cystitis, Scurvy, Diuretic, Stomach disorders, to improve liver function
2.	Amari Bhaji	*Hibiscus sabdariffa* L.	*Malvaceae*	Cultivated	Leaves	Rich source of iron, Vitamin C, Good for human health (prevents heavy bleeding during menstruation), Maintaining strong and healthy bone, Boosting the immune system, Control blood sugar levels, Prevents constipation, Stomach soother
3.	Amrul or tinpania Bhaji	*Oxalis corniculata*	*Oxalidaceae*	Weeds	Leaves	anti-inflammatory, anxiolytic, anticonvulsant, antifungal, antiulcer, antinociceptive, anticancer, antidiabetic, hepatoprotective, hypolipidemic, abortifacient, antimicrobial
4.	Bandhgobhi Bhaji	*Brassica oleracea* var. capitata L.	*Brassicaceae*	Cultivated	Leaves	Anti-inflammatory, Treatment for glaucoma and Pneumonia

(Contd...)

Table 1: *(Continued)*

S. No	Common name/local name	Botanical name	Family	Habit	Ethno-botanical important part	Medicinal value
5.	Barbatti Bhaji	*Phaseolus vulgaris*	*Papilionaceae*	Cultivated	Leaves	Diuretic, to reduce blood sugar level, also useful in mild case of diarrhea
6.	Bathua Bhaji	*Chenopdium album* L.	*Chenopodiaceae*	Weeds	Leaves and seeds	Anthelmintic, Antiphlogistic, Antirheumatic, Bug bites, Urinary problem, sunstroke, Promotes eye health, Cardiotonic, Diuretic
7.	Bohar Bhaji	*Cordia myxa* Roxb.	*Boraginaceae*	Weeds	Leaves, bark, fruits, and seeds	to treat cough and chest complaints, as well as for the treatment of wounds and ulcers
8.	Chana Bhaji	*Cicer arietinum* L.	*Papilionaceae*	Cultivated	Leaves and seeds	The leaves of this plant are sour, Astringent, Improves taste and appetite, Cures bronchitis
9.	Charota Bhaji	*Cassia tora* L.	Caesalpiniaceae	Weeds	Leaves and seeds	Ring worm, Leprosy, Itching, Snake bites, Cardiac disorders
10.	Chaulai Bhaji	*Amaranthus viridis* L.	Amaranthaceae	Cultivated	Leaves and stem	Diuretic, Analgesic, Antipyretic, Antiulcer, Antichlorsterolemic, Asthma and veneral disease
11.	Chaulai Kata	*Amaranthus spinosus* L.	Amaranthaceae	Weeds	Leaves and stem	Diuretic, Analgesic, Antipyretic, Antiulcer, Antichlorsterolemic, Asthma and veneral disease
12.	Chech Bhaji	*Chorchorus olitorius* L.	Tiliaceae	Cultivated	Leaves	The leaves are used as a plaster to reduce swellings
13.	Chunchunia Bhaji	*Marsilea vestita* Hook and Grev.	*Marsileaceae*	Weeds	Leaves	Anti-inflammatory, Diuretic, Depurative, Febrifuge, and Refrigerant, It is also used to treat snake bite
14.	Gajar bhaji	*Daucus carota*	*Brassicaceae*	Cultivated	Leaves and roots	antioxidant, analgesic, anti-inflammatory, antimicrobial, antifungal, diuretic, lithontripic, emmenagogue
15.	Ganthgobhi Bhaji	*Brassica oleracea* var. caularpa L.	*Brassicaceae*	Cultivated	Stem	antidiabetic, anticancer, antihypertensive and anticholesterolemic, antioxidant, anti-inflammatory, antibacterial, anti-obesity, anticoagulant, and hepatoprotective

(Contd...)

Table 1: *(Continued)*

S. No	Common name/local name	Botanical name	Family	Habit	Ethno-botanical important part	Medicinal value
16.	Gobhi Bhaji	*Brassica oleracea* botrytis L.	*Brassicaceae*	Cultivated	Leaves and inflorescence	Cleansing qualities, Glaucoma, and pneumonia
17.	Gol Bhaji	*Partulaca oleracea* L.	*Partulacaceae*	Weeds	Leaves, stem, and whole plant	Antiseptic, Febrifuge, Vermifuge, Antibacterial, Antiulcerogenic, Wound healing properties
18.	Gumee Bhaji	Le*ucas cephalotes Spreng*	Lami*aceae*	Weeds	Leaves, stem and whole plant	treating snake bite, Scorpion stings, it is also used in treating liver disorders, Jaundice, Asthma, Cough, Cold
19.	Haramgi Bhaji	*Shorea robusta* L.	*Dipterocarpaceae*	Weeds	Bark, wood, resin, seeds, and young leaves	treat wounds, ulcers, leprosy, cough, gonorrhea, earache, and headache
20.	Hurhuria bhaji	*Cleome viscosa*	*Capparidaceae*	Weeds	Leaves and seeds	rheumatic arthritis, hypertension, malaria, neurasthenia, and wound healing
21.	Jadi Bhaji	*Amaranthhus gangaticus* L.	*Amaranthaceae*	Weeds	Leaves and stem	Blood pressure, hemorrhagic colitis, relieve headache
22.	Jillo Bhaji	La*thyrus* sp.	*Papilionaceae*	Weeds	Leaves	Plant-based protein, contain antioxidants and antifungal properties
23.	Kakdi bhaji	*Cucumus sativus*	*Cucurbitaceae*	Cultivated	Leaves and fruits	antioxidant, anti-diabetic, UV protectant, hepatoprotective and gastroprotective, anti-helminthic, wound healing, antimicrobial, and anticancer
24.	Kanda Bhaji	*Ipomoea batatas* Lam.	*Convolvulaceae*	Cultivated	Leaves and tubers	Rich in calcium and phosphorus, Treat abdominal disease, antidiabetic, and antioxidant
25.	Karela bhaji	*Momordica charantia*	*Cucurbitaceae*	Cultivated	Leaves, fruits, roots and seeds	treating of diabetes-related conditions
26.	Karmota Bhaji	*Ipomoea aquatica* Frosk.	*Convolvulaceae*	Weeds	Leaves	reduce blood pressure, gives immunity to cancer, improve vision, and treat skin disease
27.	Kaunaakeny Bhaji	*Commelina benghalensis* L.	*Commelinaceae*	Weeds	Leaves	infertility, burns, sore throats, sore eyes, dysentery, rashes, and leprosy

(Contd...)

Table 1: *(Continued)*

S. No	Common name/local name	Botanical name	Family	Habit	Ethno-botanical important part	Medicinal value
28.	Kochai Bhaji	*Colocasia antiquarum* Schott.	*Araceae*	Cultivated	Leaves	treatment of various ailments such as asthma, arthritis, diarrhea, internal hemorrhage, neurological disorders, and skin disease, promote menstruation
29.	Koliaari Bhaji	*Bauhinia purpurea* L.	*Caesalpiniaceae*	Tree	Stem bark, flowers, and leaves	dropsy, pain, rheumatism, convulsions, delirium, and septicemia
30.	Kumda Bhaji	*Cucurbita maxima* Duch.	*Cucurbitaceae*	Cultivated	Leaves and fruits	treatment of urinary disorders, blood pressure regulation and prevention of constipation
31.	Kusum Bhaji	*Carthemnus oxycantha* L.	*Asteraceae*	Weeds	Leaves	wound-healing and anti-inflammatory purposes
32.	Lakhadi Bhaji	La*thyrus sativa* L.	*Papilionaceae*	Cultivated	Leaves	treating paralysis and affections of the spinal cord, Deformities like knock knees
33.	Lal Bhaji	*Amaranthus tricolour* L.	*Amaranthaceae*	Cultivated	Leaves	Anti-inflammatory, Intestinal cramps, externally to treat wounds, Hepatitis, Bronchitis, Asthma, Lung troubles
34.	Lauki bhaji	La*genaria vulgaris*	*Cucurbitaceae*	Cultivated	Leaves	treatment of jaundice, diabetes, ulcer, piles, colitis, insanity, hypertension, congestive cardiac failure, and skin diseases
35.	Masaria Bhaji	*Corchorus acutangulus* Lam.	*Tiliaceae*	Weeds	Leaves	treating anemia, improving memory, intelligence, aphrodisiac, laxative
36.	Methi Bhaji	*Trigonella foenum graceum* L.	*Papiolionaceae*	Cultivated	Leaves and seeds	appetiser, relieves fever, antitumor, laxative, carminative, anti-carcinogenic, and antidiabetic
37.	Mirchi Bhaji	*Capsicum annum* L.	*Solanaceae*	Cultivated	Leaves and fruits	antioxidant, antimicrobial, antiviral, anti-inflammatory, and anticancer
38.	Mooli Bhaji	*Raphanus sativus* L.	*Brassicaceae*	Cultivated	Leaves and root	Whooping cough, Cancer, liver problem, gallbladder problem, arthritis, asthma, and indigestion

(Contd...)

Table 1: *(Continued)*

S. No	Common name/local name	Botanical name	Family	Habit	Ethno-botanical important part	Medicinal value
39.	Munga Bhaji	*Moringa pterygosperma* Lam.	*Moringaceae*	Tree	Leaves, roots, root bark, flowers, fruits, and seeds	anti-asthmatic, anti-diabetic, hepatoprotective, anti-inflammatory, anti- fertility, anti-cancer, anti-microbial, anti-oxidant, cardiovascular, anti-ulcer, CNS activity, anti-allergic, wound healing, and analgesic
40.	Muskeny Bhaji	*Merremia emarginata* Burmf	*Convolvulaceae*	Weeds	Leaves	Diuretic used in rheumatism and neuralgia
41.	Palak Bhaji	*Spinacea oleracea* L.	*Chenopodiaceae*	Cultivated	Leaves	Anemia, night blindness, used to treat stomach and intestinal complaints and fatigue, blood builder, and an appetite stimulant
42.	Palak Bhaji (Khatta)	*Spinacea glabra* L.	*Chenopodiaceae*	Cultivated	Leaves	Anemia, night blindness, used to treat stomach and intestinal complaints and fatigue, blood builder and an appetite stimulant
43.	Patawa Bhaji	*Hibiscus cannbinus* L.	*Malvaceae*	Weeds	Leaves	treat various disorders, such as of the blood, diabetes, bilious, the throat, and coughs
44.	Patharri Bhaji	*Boerhaavia diffusa* L.	*Nyctaginaceae*	Weeds	Fresh whole plant, roots, leaves and flowers	inflammation, jaundice, asthma, rheumatism, nephrological disorders, ascites, anemia, and gynecological disorders
45.	Pipal Bhaji	*Ficus religiosa* L.	*Urticaceae*	Tree	Bark, shoot, leaves and fruits, wood	Asthma, jaundice, anemia, snake venom, liver diuretic, and dysentery
46.	Poi Bhaji	*Basella rubra* L.	*Basellaceae*	Weeds	Leaves	Anti-ulcer, antioxidant, cytotoxic, antibacterial, nephroprotective, and wound healing properties
47.	Pyaj Bhaji	*Allium cepa* L.	Li*liaceae*	Cultivated	Leaves and bulb	Sunstroke, vomiting, prevention of cancer, antibacterial, antifungal, and sexual debility
48.	Salsa Bhaji	*Trianthema portulacastrum* L.	*Aizoaceae*	Weeds	Leaves	analgesic, stomachic, laxative, treatment of blood disease, anemia, inflammation, and night blindness
49.	Sarson Bhaji	*Brassica compestris* L.	*Brassicaceae*	Cultivated	Leaves and seeds	Fever, weakness, menstrual disorder, internal pains, and treat joint-related issues

(Contd...)

Table 1: *(Continued)*

S. No	Common name/local name	Botanical name	Family	Habit	Ethno-botanical important part	Medicinal value
50.	Sem bhaji	*Dolicus lablab*	*Papilionaceae*	Cultivated	Leaves and pod	treat diarrhea and other gastrointestinal disease
51.	Urad Bhaji	*Phaceolus radiatus* L.	*Papilionaceae*	Cultivated	Leaves and seeds	Boosts bone health, regulates diabetes, improves heart health, and nourishes nervous
52.	Chirchida Bhaji	*Achyranthes aspera* L.	*Amaranthaceae*	Weed	Leaves	Astringent, snake and insect bite, stomach pain, Pyorrheic and toothache, renal complications, cold and cough, and bronchitis
53.	Chimti (Chanti) Bhaji	*Polygonum plebeium* R. Br.	*Polygonaceae*	Weeds in sandy soil	Leaves	Antioxidants, curing gastrointestinal disturbances, to control blood pressure

articles were selected from the reference lists of published papers.

DISCUSSION

The leafy vegetations are readily used for their nutritional benefits and serves as a boon to mankind. Some of the specific parts with highly nutritional content are preferred for consumption. These are useful to achieve more nutritional and medicinal benefits. The knowledge of these medical benefits is transferred to generations in tribal communities. This serves as the tradition, culture, and lineage of information for the community. In developing nations or to be precise for states with poor socio-economic status, these locally grown green vegetations and their health benefits not only provide nutrition to local people but also serves as the way to gain finances and cognitive heritage. This knowledge acts as the savior data for generations to get better medicinal benefits. Edible leafy vegetations have the excellent nature of improving the health profile; they are low in calories and rich dietary fiber content. Green leafy vegetables are warehouse of bioactive constituents such as alkaloid, tannins, flavonoid, and phenolic compounds, so they are used as spices and food along with their uses in health aliments. The knowledge of health benefits of leafy vegetations is still lacking the importance as it is not documented authentically, but it has been transferred to generations only by vocal way. This documentation will help in the discovery of new pharmacophores and opens the scope of new multidisciplinary research. The collaborative work of technology and traditional knowledge will help in opening the new ways of research and development.

CONCLUSION

The present article concludes that the leafy vegetation, diverse culture of flora, rich heritage of edible leafy vegetables makes the best source of nutrition and economy in the backward state like Chhattisgarh.

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