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Ethnic food culture of Chhattisgarh state of India

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Abstract

Chhattisgarh state is situated in the central part of India and is also known as the 'Bowl of rice.' Paddy is the principal crop of this state, and rice is the staple diet of the people. The state largely maintains its ethnic food culture as most of its population continues to live within rural and tribal areas. The state has nearly 44% of forest cover which serves as a decent source of food. People here prefer a vegetarian diet, and over 70 varieties of leaves, 25 varieties of tubers and roots are used here as vegetables. The present article is an attempt to explore the ethnic food culture of Chhattisgarh and to provide information about rice and non-rice-based traditional recipes, sweet dishes, leafy vegetables, tubers and roots which are consumed here. Irrespective of all the modern changes in food habits, the people of Chhattisgarh still preserve their traditional food culture.

Keywords: Food culture, Food ways, Traditional food practices, Indian diet, Vegetarian diet

Introduction

About Chhattisgarh and its food culture

Chhattisgarh is a state in the central part of India. The word 'Chhattis' means thirty-six and 'Garh' means fort, so the name Chhattisgarh symbolizes the number of forts in the region. It is also known as the 'Rice Bowl' of Central India, and nearly 70% of its population is engaged in agriculture. Paddy is the principal crop of the state [1] which also constitutes the main diet of people here. It is evident that with increase in urbanization there is a change from traditional eating behaviour of people towards the fast-food culture [2, 3]. But in Chhattisgarh, approximately 80% of the population lives in rural areas [4], as a result of which its traditional heritage is still alive and the food habits are majorly unchanged. Chhattisgarhi cuisine has a wide range of delicious dishes which are nutritious and healthy. As the state has a dense forest cover, the rural and tribal people also collect roots, tubers, leaves, flowers and fruits from the forest as their food supplements.

These give the traditional Chhattisgarhi cuisine a unique natural flavour and health benefits. More than 70 varieties of leaves and nearly 25 varieties of tubers and roots are consumed here as vegetables [5, 6]. This article explores the rice and non-rice-based traditional recipes of Chhattisgarh cuisine and provides details of leaves, tubers and roots which are consumed here. The food culture of Chhattisgarh is predominantly vegetarian, and it utilizes the available natural resources to fulfil the nutritional needs of the people and to make it delicious.

Advantages of traditional food culture

At present, about 90% of the global food production comes from less than 30 species [7]. Natural sources are not well utilized and gradually quite a few varieties of grains and vegetables are going out of cultivation. Because of non-utilization, the people are also losing knowledge about their dietary and medicinal properties. The existing food culture of Chhattisgarh indicates to us, the ways to look towards naturally available resources and how to make use of it for better nutrition and health status.

Most of the vegetables presently consumed by Indian people are not native to India, such as the tomato

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(*Solanum lycopersicum*) which is one of the most widely cultivated vegetable crops in India and the world, actually originated from the Andean region [8, 9]. It came to India through the Portuguese explorers during the early sixteenth century [10]. Similarly, the potato which is very popular vegetable in India actually has its origins in the border between Peru and Bolivia. By the end of the sixteenth century, potatoes were introduced in many European countries and from there arrived in India in the early seventeenth century [11]. Cauliflower, which is now cultivated throughout the country, was first introduced in 1822 by Dr. Jemson from England, who was in-charge of Company Bagh, Saharanpur, Uttar Pradesh [12]. Many other fruits and vegetables which are consumed now are foreign, but we have adopted them very well in to our present food culture. Chillies, spinach, cabbage are few examples and the list is long [13]. Many of these vegetables are now available throughout the year with the help of modern techniques. The practice of seasonal food consumption has practically vanished because of this. The consequences of this may not be visible immediately yet it is evident that it is not the right way to consume food. Traditional food is designed based on the seasonal changes after thorough understanding of the interaction between man and the environment.

Globally, majority of people consistently consume less than the daily recommended fruit and vegetable requirement [14]. The traditional Indian diet has a large number of fruits and vegetables in it. India ranks second in fruit and vegetable production in the world, after China [15]. Fruits and vegetables are a key food group providing essential vitamins and minerals, and their intake is particularly important in settings where micronutrient deficiencies are widespread, such as in India [16]. Chhattisgarh food culture is the way forward to adopt eco-friendly practices and utilize available natural resources to enrich our daily diet. The processing and preparation of ethnic foods not only validate the creativity and treasure of food heritage of the local population but also their incredible mastery in maintaining the existence of the ecosystem as a whole [17].

Public health status is largely dependent upon their dietary behaviours. Traditional food culture has gradually evolved along with the development of the human race. It is based on the geographical situation, climatic condition, seasonal changes, type of soil, source of water, forest region, agriculture, immigrants, influence of invaders and working patterns of the people of the region. Traditional food culture is an experiential system which takes generations to come to its shape. The role of food is not just limited to pacify hunger, but it has a broader significance and plays a vital role in almost every aspect of human life, be it family, social relations, festivals or

sacred rituals. Traditional food is wholesome for maintaining and protecting health and providing optimum nutrition to the people of that region. In the name of globalization, adopting food patterns that are foreign to this region is unscientific and could be harmful for health. The shift from traditional to the western dietary pattern has become the leading cause of the growing burden of non-communicable or lifestyle-related diseases and in the year 2015, the Global Burden of Disease study identified unhealthy diet as the leading cause of early mortality worldwide [18, 19]. Every traditional food culture carries a long history and is the safest food to be consumed by the people of that locality.

What is unique in Chhattisgarhi cuisine

Though rice is the staple food of Chhattisgarh people, a regular Chhattisgarhi meal also comprises of pulses, seasonal green leafy vegetables, tubers and roots. As the state is rich with natural forest cover, the rural and tribal people have developed the wisdom to fulfil their needs from the available forest resources. This is very evident in the ethnic food culture of Chhattisgarh.

Methods

An ethnographic study was conducted between February 2017 and February 2020, using face-to-face fieldwork, to understand food culture of Chhattisgarh in depth. Through semi-structured interviews, open-ended questions were asked regarding the type of food preferably consumed, how it is prepared, seasonal changes in food consumption and the expected health benefits of various food items. Wherever need was felt specific details were further asked. Re-visits were also done where ever required. In Chhattisgarh, 'Haats' (local village market) are held in villages, on different days of the week in a rotational pattern. Visits to these local markets and interacting with the people there provided a glimpse of various grains and vegetables cultivated or collected locally. School teachers and village officers helped to connect and friendly communicate with the local people. At least 124 villages were visited and 140 females and 120 males were interviewed after written informed consent. Both audio recording and transcribing were used as per the situations. The collected information was further cross-referenced for their botanical source and published scientific evidences both in modern and Indian system of medicines.

Rice-based traditional recipes of Chhattisgarh

Angakar Roti - It is a thick flatbread (Roti) made of rice flour and is cooked over burning charcoal. Angar is burning charcoal, and because of this cooking method, it derives the name 'Angakar Roti' (shown in Fig. 1).



Fig. 1 Angakar Roti

Alternatively, wheat (*Triticum aestivum*) flour is also used to prepare it and is a common dish in many northern states of India. In southern states Akki Roti is popular which is cooked on hot griddle (tawa) after smearing oil on it.

Chausela - Chausela (shown in Fig. 2) is salty poori made of rice flour. The dough is prepared by mixing rice flour, carom seeds, salt and warm water. Small flattened balls are made from the dough and rolled into round pooris that are to be fried in hot ghee or oil.



Fig. 2 Chausela

Cheela - Cheela (shown in Fig. 3) is a salted thin rice pancake prepared from rice batter. Freshly harvested rice is preferred. It can also be prepared with flour of Moong (green gram) or Urad (black gram) or Besan (Bengal gram) flour. It seems similar to the Dosa of South India and is often called Chhattisgarhi Dosa. Dosa is a fermented product prepared from rice and black gram batter [20], whereas Cheela is prepared without fermentation. Usually, it is consumed in the morning with spicy Chutney.

Dhuska - Dhuska is a thick Roti (shown in Fig. 4) made of rice, also called Mota Roti. The dough is prepared with one-part cooked rice, two parts of rice flour and salt to taste. A ball of dough is manually flattened and baked over a heated Tawa (iron pan). A small amount of ghee or oil is also used while cooking.

Faraa - Faraa is a steamed rice preparation (shown in Fig. 5). Rice flour is mixed with warm water and a pinch of salt to prepare the dough. Soaked black gram or green gram paste mixed with spices such as ginger, coriander, cumin, black pepper, turmeric can be used as stuffing. It can be made without the stuffing as well. For steam cooking, first heat 2 to 3 cups of water in a vessel, place a strainer over it and grease it with a little oil or ghee. Place some Faraa over the strainer and cook for 10 to 12 min on medium flame while covering it. It is an oil free and delicious food. To make it spicy and little crispy, Faraa can also be fried in a little oil along with mustard seeds, cumin seeds, sesame seeds, ginger, garlic and green chilli.



Fig. 3 Cheela



Fig. 4 Dhuska



Fig. 6 Muthia



Fig. 5 Fara



Fig. 7 Pej

Muthia - Muthia (shown in Fig. 6) is made of boiled rice, rice flour, sesame seeds, garlic, coriander leaves, spices and salt. Muthia means fist and the dish got its name from the cooking method that requires the hand to be held in a fist to prepare it. It is mainly prepared during the winter season and is made either by frying or steaming.

Pej - It is a liquid or semisolid preparation of rice similar to rice gruel (shown in Fig. 7). A small quantity of rice is cooked with a larger quantity of water and is

consumed with onion pieces and pickle or spicy chutney. The quantity of water varies as per the season, e.g., during summer, liquid portion is more to keep the person hydrated. This preparation is consumed throughout the year, especially in the morning hours. During ill health it is advised to consume Pej as it is easily digestible. Pej is very similar to the rice preparations

explained in Ayurveda texts in the name of Manda, Peya and Yavagu [21].

Non-rice preparations of Chhattisgarh

Aamat - Aamat (shown in Fig. 8) is considered as Sambhar (lentil-based liquid extract) of Chhattisgarh. Aamat means sour in local dialect. It is a sour and spicy soup, very popular in the Bastar district of Chhattisgarh. Aamat comprises of a variety of vegetables along with bamboo shoots and spices such as asafoetida, ginger, cumin, coriander and garlic. It is prepared on special occasions such as when guest or relatives visit home. It is a spicy, nutritious and delicious preparation and can be taken along with cooked rice or Roti/Chapati.

Bara - Bara (shown in Fig. 9) of Chhattisgarh is similar to the South Indian Vada/Vadai made from Urad (black gram) batter. Small quantities of chopped chillies, fresh ginger and coriander, chopped onion (occasionally) are mixed with Bara batter. Traditionally, it is served on Dona (leaves folded up in the shape of a cup) with spicy chutney made of green chillies, tomato and coriander leaves.

Bafauri - Bafauri (shown in Fig. 10) is a famous dish of Chhattisgarh state made from Chana Dal (split chickpeas) batter. Various spices such as chopped green chilli, ginger, onion, coriander leaves, garlic paste and a little turmeric powder are added to the mixture. The dough



Fig. 9 Bara

is mixed to prepare small balls and is steamed for 15 to 20 min.

Dubaki Kadhi - Kadhi is a sour and spicy curry made of buttermilk and Besan (gram flour) (shown in Fig. 11). It is popular in many Indian states such as Maharashtra, Punjab, Gujarat etc. In Dubaki Kadhi of Chhattisgarh, round balls of Urad paste are added to boiling Kadhi. Apart from Dubaki Kadhi, there are many other varieties of Kadhi popular in the state such as Bhindi (Okra/ladyfingers) Kadhi, Kochai or Aravi (tubers of *Colocasia esculenta* (L.) Schott) Kadhi, Lauki (bottle gourd) Kadhi.



Fig. 8 Aamat



Fig. 10 Bafauri



Fig. 11 Dubaki Kadhi



Fig. 13 Anarsa



Fig. 12 Thethari



Fig. 14 Dahrauri

Thethari - Thethari is a deep-fried snack made of gram flour and rice flour (shown in Fig. 12). It is mixed with salt and spices such as cumin seed, Ajwain and red chilli powder. The dough is kneaded and small pieces of it is taken and rolled into different spiral shapes and fried in oil.

Sweet Dishes of Chhattisgarh

Anarsa - Anarsa is a semi-hard, deep-fried dish made of rice flour, jaggery and sesame seeds (shown in Fig. 13). It is prepared by soaking rice in water overnight. This soaked rice is powdered when still moist and is mixed with jaggery to prepare a dough, and a small quantity of sesame seeds are added to it. The small flat and round pieces of dough are then fried in ghee.

Dehrauri - Dehrauri is a deep-fried soft ball made of rice, curd and jaggery (shown in Fig. 14). Rice is first soaked in water for a few hours and ground coarsely. Curd is then added, mixed well and left for slight fermentation. Flat disc or small balls are prepared and fried in ghee till they turn dark brown in colour. Jaggery syrup is



Fig. 15 Gulgula

prepared separately with little cardamom powder. The fried disc/balls are then soaked in jaggery syrup.

Gulgula - Gulgula (shown in Fig. 15) is a brown, deep-fried, sweet ball made of wheat flour, jaggery, grated coconut, cardamom powder, Saunf (*Foeniculum vulgare*) powder and ghee. Dough is prepared using jaggery syrup, wheat flour and all other ingredients. Small balls measuring 2 to 3 cm in diameter are prepared and fried in ghee. It is delicious but heavy for digestion and is mostly prepared during the winter season or festivals.

Khurmi - Khurmi (shown in Fig. 16) is a fried sweet snack made of wheat flour, jaggery or sugar and ghee. To make the dish, wheat flour is kneaded with little ghee and a dough is prepared by adding jaggery or sugar mixed water. Small pieces of dough are rolled and fried in ghee on moderate flame. It can be easily stored for 2 to 3 weeks and is prepared mostly during the Deepawali festival.

Tikhur Sweets - Tikhur (*Curcuma angustifolia*) is a rhizomatous herb also known as white turmeric or East Indian Arrowroot. The fresh rhizomes of *Tikhur* are used for preparation of starchy flour which also has medicinal value. The rhizome pulp is a remedy for fever, joint pain, leucorrhoea, renal stone, inflammatory conditions, bone fracture and abdominal diseases such as peptic ulcer, indigestion, stomach ache. It is even used as a



Fig. 16 Khurmi

supplementary diet for children in the Madhya Pradesh and Chhattisgarh states of India [22, 23]. Tikhur is used for preparation of various sweet dishes such as Barfi, Halwa, Jalebi. Barfi (shown in Fig. 17) is usually prepared with Tikhur starch, sugar and water cooked over medium to low flame. When it becomes thick, it is spread onto flat plate to cool down [24]. Jalebi is made by mixing Khoa (condensed milk) and Tikhur. The mixture is put on a specially woven jalebi making cloth, and the batter is then squeezed in to hot ghee on a circular frying pan. Fried jalebi is soaked in sugar syrup [25].



Fig. 17 Tikhur

Leafy vegetables of Chhattisgarh

Leafy vegetables are very popular in Chhattisgarh. There are several ways of cooking and consuming these leafy vegetables. The most common is to cut the vegetable into small pieces and cook it on a pan with little oil and adding spices such as mustard, cumin seed, asafoetida. Salt is added as per taste. Many of the leafy vegetables are cooked by mixing with pulses. Cut leaves are mixed with batter of Besan (gram flour) and fried in hot oil. This is commonly called Bhajiya or Pakoda. Cut leaves can also be mixed with rice or wheat flour and water to prepare a dough. Small pieces of this dough are rolled into flat round shapes and are cooked on a heated griddle (Tawa) by smearing oil on it. This dish is popularly known as Paratha in several Indian states. Local vegetables are mixed with flour or are used as stuffing to prepare Parathas. Poori can also be prepared with the same dough. A list of leafy vegetables that are commonly consumed in Chhattisgarh is shown in Table 1.

Tubers and roots of the plants used in Chhattisgarhi food:

Chhattisgarh has a large forest cover. Since majority of the state population lives in rural and tribal areas, people have learned to use wild tubers and root of plants. Some of the tubers cultivated are—*Amorphophallus paeoniifolius*, *Colocasia esculenta* (L.) Schott, *Curcuma amada* Roxb, *Curcuma angustifolia* Roxb, etc. Tubers are commonly boiled in water and cut into small pieces after removing the peel. It is then cooked on a pan with a little oil and spices such as mustard, cumin seed, asafoetida, ginger, coriander. Sweet dishes are also prepared from tubers such as *Curcuma angustifolia* Roxb and *Pueraria tuberosa* (Roxb. ex Willd). A list of tubers and root of plants consumed in Chhattisgarh is shown in Table 2

Discussion

India has a rich and highly diverse food, and its various diets are well closely linked to social identity, religion and other cultural influences [26] as well as local agricultural practices and wide range of food availability [27]. Rice is an important cereal crop that provides food for more than half of the world's population. It is grown in almost all Asian countries, and it is consumed by nearly half of the world's population [28]. Rice is the primary staple of every major Asian meal [29]. Rice is valued as a great emblem of auspiciousness, prosperity, and fertility in Indian culture because of its life-sustaining characteristics. It provides instant and fast energy. Brown and red rice are high in fibre, B vitamins, calcium, zinc, iron, manganese, selenium, magnesium and other nutrients [30]. In the Chhattisgarh state, 4.78 million hectares are cultivated, constituting 35% of the total geographical area. The state has about 3.7 million hectares under

rice cultivation which is mostly rainfed, covering both uplands and shallow lowlands [31].

44% of the Chhattisgarh state being forest land, for centuries its rural and tribal communities have played a pivotal role in nurturing and protecting the natural habitat through eco-friendly practices [32]. Cultivated or wild available leafy vegetables, tubers and root of plants are essential ingredients of food after cereals in this area. These not only enrich the diet of the people but also provide seasonal immunity, cure for the ailments and longevity with their medicinal properties. Because of the presence of functional components such as body-recuperating chemicals, antioxidants, dietary fibres and probiotics, Indian traditional foods are also considered as functional foods and these functional molecules help in management of the diseases and support the body's immunity [33, 34].

Health advantages associated with Chhattisgarh's ethnic food are also backed up by traditional medicine and recent medical researches. A number of these evidences about the leafy vegetables (listed in Table 1), tubers and roots (listed in Table 2) are given here further. Leaves of *Achyranthes aspera* Linn. which is regionally named as Chirchita Bhaji is used as remedy for piles, renal dropsy, pneumonia, cough, kidney stones, skin eruption, snake bite, gonorrhoea and dysentery, etc., within the Ayurveda, Siddha and Unani system of medicine [35, 36]. It is found to possess Gastroprotective [37] Cancer chemopreventive activity [38] and antinociceptive activity [39]. *Adhatoda zeylanica* Medikus (locally named as Adusa Saag) is a well-known remedy for the respiratory tract complaints [40]. Its leaves contain various alkaloids, including Vasicine, which has broncho dilatory properties, and Vasicine acetate, which has antimicrobial, antioxidant and anticancer properties [41–43]. Respiratory illnesses are very common during the changing season, and use of Adusa Saag helps the people to regain their health. The decoction made from leaves and shoots of *Alternanthera sessilis* L. (local name—Kurru Bhaji) has antihypertensive [44] and hepatoprotective properties, and in traditional medical system it is used for the treatment of wounds, flatulence, nausea, vomiting, cough, bronchitis, diarrhoea, dysentery and diabetes [45]. *Allium cepa* L. is one of the oldest cultivated vegetables and extensively used all over the world in all kinds of culture [46]. In Chhattisgarh state, the leaves of the *Allium cepa* L. are used in multiple ways such as—for making Bhajiya or Pakoda, in the form of salad, as vegetable, chutney, etc. Its leaves are good source of important antioxidants [47]. The leaves of *Amaranthus caudatus* L. (local name—Kedar chua Bhaji) are rich in calcium, iron, zinc, phosphorus and other minerals that can enhance human growth, health and resistance to diseases [48].

Table 1 The list of leafy vegetables used in Chhattisgarh State

SI.No	Name of Leafy vegetable	Family	Local Name
1	<i>Achyranthes aspera</i>	Amaranthaceae	Chirchita Bhaji
2	<i>Adhatoda zeylanica</i> Medikus	Acanthaceae	Adusa Saag
3	<i>Alternanthera sessilis</i> L	Amaranthaceae	Guduru/Kurru Bhaji
4	<i>Antidesma acidum</i> Retz	Euphorbiaceae	Derango Saag
5	<i>Allium cepa</i> L	Liliaceae	Gondali/Pyaj Bhaji
6	<i>Amaranthus caudatus</i> L	Amaranthaceae	Kedar chua Bhaji
7	<i>Amaranthus gangeticus</i> L	Amaranthaceae	Jadi/Jari Bhaji
8	<i>Amaranthus spinosus</i> L	Amaranthaceae	Chaulai Kata/Kanta Bhaji
9	<i>Amaranthus tricolour</i> L	Amaranthaceae	Lal Bhaji
10	<i>Amaranthus viridis</i> L	Amaranthaceae	Chaulai Bhaji
11	<i>Bacopa monnieri</i> (L.) Pennell	Scrophulariaceae	Brahmi Saag
12	<i>Basella rubra</i> L	Basellaceae	Poi Bhaji
13	<i>Bauhinia purpurea</i> L	Caesalpiniaceae	Koliari Bhaji
14	<i>Begonia picta</i> Sm	Begoniaceae	Patharchati
15	<i>Boerhaavia diffusa</i> L	Urticaceae	Patharri Bhaji
16	<i>Brassica compestris</i> L	Brassicaceae	Sarson Bhaji
17	<i>Brassica oleracea botrytis</i> L	Brassicaceae	Gobhi Bhaji
18	<i>Brassica oleracea var. capitata</i> L	Brassicaceae	Bandagobhi Bhaji
19	<i>Brassica oleracea var. caularpa</i> L	Brassicaceae	Gantha gobhi Bhaji
20	<i>Butomopsis latifolia</i> Kunth	Butomaceae	Chanti Bhaji
21	<i>Caesulia axillaries</i> Roxb	Asteraceae	Muchri Bhaji
22	<i>Capsicum annum</i> L	Solanaceae	Mirchi Bhaji
23	<i>Carthamnus oxycantha</i> L	Asteraceae	Kusum Bhaji
24	<i>Cassia mimosoides</i> L	Caesalpiniaceae	Jirhul Bhaji
25	<i>Cassia tora</i> L	Caesalpiniaceae	Charota Bhaji
26	<i>Celosia Argentina</i>	Amaranthaceae	Silyari/Phool Bhaji
27	<i>Centella asiatica</i> (L.)	Apiaceae	Beng Saag/Muskeni Bhaji
28	<i>Chenopodium album</i> L	Chenopodiaceae	Bathua Bhaji
29	<i>Chorchorus olitorius</i> L	Tiliaceae	Chech Bhaji
30	<i>Cicer arietinum</i> L	Papilionaceae	Chana Bhaji
31	<i>Cissus quadrangularis</i>	Vitaceae	Hadjod/Singari Saag
32	<i>Cleome viscosa</i>	Capparidaceae	Hurhuria Bhaji
33	<i>Coccinia grandis</i>	Cucurbitaceae	Kunduru Bhaji
34	<i>Colocasia antiquarum</i> Schott	Araceae	Kochai Bhaji
35	<i>Commelina benghalensis</i> L	Commelinaceae	Kaunaakeny Bhaji
36	<i>Corchorus acutangulus</i> Lam	Tiliaceae	Masaria Bhaji
37	<i>Corchorus- Fascicularis</i>	Tiliaceae	Lal Chench Bhaji
38	<i>Cordia myxa</i> Roxb	Boraginaceae	Bohar Bhaji
39	<i>Cucumis sativus</i>	Cucurbitaceae	Kakdi Bhaji
40	<i>Cucurbita maxima</i> Duch	Cucurbitaceae	Kumda Bhaji
41	<i>Daucus carota</i>	Brassicaceae	Gajar Bhaji
42	<i>Dolicus lablab</i>	Papilionaceae	Sem Bhaji
43	<i>Eretia laevis</i> Roxb	Ehretiaceae	Suruh matha Bhaji
44	<i>Emilia sonchifolia</i> (L.) DC	Asteraceae	Khapraban Bhaji
45	<i>Euphorbia microphlla</i> Heyne ex Roth	Euphorbiaceae	Lal chimti Bhaji
46	<i>Ficus religiosa</i> L	Urticaceae	Pipal Bhaji
47	<i>Hibiscus cannbinus</i> L	Malvaceae	Patawa Bhaji
48	<i>Hibiscus sabdariffa</i> L	Malvaceae	Amari Bhaji
49	<i>Ipomoea aquatica</i> Frosk	Convolvulaceae	Karmatta Bhaji

Table 1 (continued)

SI.No	Name of Leafy vegetable	Family	Local Name
50	<i>Ipomoea batatas</i> Lam	Convolvulaceae	Kanda Bhaji
51	<i>Lagenaria vulgaris</i>	Cucurbitaceae	Lauki Bhaji
52	<i>Lathyrus sativa</i> L	Papilionaceae	Lakhadi/Tivara Bhaji
53	<i>Lathyrus</i> sp.	Papilionaceae	Jillo Bhaji
54	<i>Leucas cephalotes</i> Spreng	Lamiaceae	Gumee Bhaji
55	<i>Marsilea vestita</i> Hook & Grev	Marsileaceae	Chunchunia/Sunsunia Bhaji
56	<i>Merremia emarginata</i> Burmf	Convolvulaceae	Muskeny Bhaji
57	<i>Momordica charantia</i>	Cucurbitaceae	Karela Bhaji
58	<i>Moringa pterygosperma</i> Lam	Moringaceae	Munga Bhaji
59	<i>Oxalis corniculata</i>	Oxalidaceae	Amrul/Tinpania Bhaji
60	<i>Portulaca oleracea</i> L	Portulacaceae	Gol /Kulfa Bhaji
61	<i>Phaseolus radiatus</i> L	Papilionaceae	Urad Bhaji
62	<i>Phaseolus vulgaris</i>	Papilionaceae	Barbatti Bhaji
63	<i>Raphanus sativus</i> L	Brassicaceae	Mooli/Murai Bhaji
64	<i>Solanum nigrum</i>	Solanaceae	Makoya/Kakamachi Bhaji
65	<i>Shorea robusta</i> L	Dipterocarpaceae	Hargi Bhaji
66	<i>Solanum tuberosum</i> L	Solanaceae	Alu Bhaji
67	<i>Spinacea glabra</i> L	Chenopodiaceae	Khatta Palak Bhaji
68	<i>Spinacea oleracea</i> L	Chenopodiaceae	Palak Bhaji
69	<i>Trianthema portulacastrum</i> L	Aizoaceae	Salsa Bhaji
70	<i>Trigonella foenum graceum</i> L	Papilionaceae	Methi Bhaji

Amaranthus spinosus L. commonly known as Kantabhaji is found in tropical and sub-tropical regions of India [49]. The plant is used as a diuretic, antidiabetic, analgesic, antipyretic, antileprotic and in the treatment of bronchitis and piles in the Ayurveda system of medicine [50]. In traditional medical systems, *Bacopa monnieri* (L.) Pennell (Brahmi) is a well-known herb as a brain tonic for promoting memory [51] and recommended for the management anxiety, poor cognition and lack of concentration [52]. *Basella rubra* L., popularly known as Malabar spinach, Indian spinach is widely consumed vegetable in India. Leaves and stem of *Basella rubra* L. are having mild laxative, demulcent, anticancer, antibacterial, anti-hyperglycaemic, anti-inflammatory and antiproliferative activity, and its fruits are used as natural colourant in ice cream product [53–57]. *Boerhavia diffusa* Linn. is a commonly used herb in traditional Indian Medicine. A number of studies have demonstrated its immunomodulatory, hepatoprotective, antifibrinolytic, anticancer, antidiabetic, anti-inflammation, antiviral, antimicrobial and diuretic effects [58–62]. In Ayurveda, fresh juice of *Centella asiatica* (L.) is used as Medhya (cognitive enhancer) drug [63]. It is having wide range of biological activities such as neuroprotective [64], anticonvulsant [65], antinociceptive and anti-inflammatory effects [66], immunostimulant [67], antidepressant [68], antigastric ulcer [69], wound healing [70].

Roots and tubers are important staples for over 1000 million people in the developing world [71]. Traditionally *Amorphophallus paeoniifolius* is useful in arthralgia, elephantiasis, tumours, inflammations, haemorrhoids, haemorrhages, vomiting, cough, bronchitis, asthma, anorexia, dyspepsia, flatulence, colic, constipation, helminthiasis, hepatopathy, splenomegaly, amenorrhoea, dysmenorrhoea, seminal weakness, fatigue, anaemia and general debility [72, 73]. In India, among the tribes, its tuber is most commonly used for the management of haemorrhoids [74]. In a study, *Amorphophallus paeoniifolius* has shown an anticolic effect through its anti-inflammatory and antioxidant activity in colon of Wistar rats [75]. *Asparagus racemosus* is used as a general health promoter in Ayurveda. It is a main drug for improving female reproductive health, and so only it is also known as the ‘Queen of herbs’ [76]. Various animal and clinical studies have demonstrated that *Asparagus racemosus* is having antileishmanial [77], antitumour [78], immunomodulatory [79], antidepressant [80], anti-hyperglycaemic [81] and anti-infertility [82] activities. *Costus speciosus* (Koenig) Sm. is used as vegetables in many Indian states and also widely used in traditional medicines in the management of several ill health conditions such as jaundice, diabetes, pneumonia, rheumatism and skin diseases. A number of studies reported that it is having anticancer [82], anti-inflammatory [83],

Table 2 The list of Tubers and roots of the plants used in Chhattisgarhi food

SI.No	Name of Tubers and roots	Family	Local Name
1	<i>Abelmoschus moschatus medic</i>	Malvaceae	Janglibhindi
2	<i>Amorphophallus paeoniifolius</i>	Araceae	Sirdikand, Surankand, Jimikand
3	<i>Asparagus racemosus</i>	Liliaceae	Satawar, Satmul
4	<i>Chlorophytum borivilianum</i>	Liliaceae	Korkota Kanda
5	<i>Colocasia esculenta (L.) Schott</i>	Araceae	Kochai, Arvi, Ghuiyan
6	<i>Costus speciosus (Koenig) Sm</i>	Costaceae	Kewkanda
7	<i>Curculigo orchioides Gaertn</i>	Amaryllidaceae	Kali musli, Musali kand
8	<i>Curcuma amada Roxb</i>	Zingiberaceae	Amahaldi
9	<i>Curcuma angustifolia Roxb</i>	Zingiberaceae	Tikhur, Batri
10	<i>Curcuma caesia Roxb</i>	Zingiberaceae	Kalihaldi
11	<i>Dendrocalamus strictus (Roxb.)</i>	Poaceae	Dongri bans
12	<i>Dioscorea alata (L.)</i>	Dioscoreaceae	Ratalu, Nagarkand, Uskakand
13	<i>Dioscorea belophylla Voigt ex Haines</i>	Dioscoreaceae	Genthi Kanda
14	<i>Dioscorea bulbifera (L.)</i>	Dioscoreaceae	Damgkanda, Lathikanda
15	<i>Dioscorea hispida</i>	Dioscoreaceae	Kuliakand
16	<i>Dioscorea oppositifolia</i>	Dioscoreaceae	Tagariyakand
17	<i>Dioscorea pentaphylla (L.)</i>	Dioscoreaceae	Suwarkanda, Barhakanda
18	<i>Dioscorea bulbifera var. pulchella</i>	Dioscoreaceae	Pitakand, Karukanda
19	<i>Dioscorea triphilla L</i>	Dioscoreaceae	Lakra kanda
20	<i>Hibiscus rugosus</i>	Malvaceae	Dhokrakanda
21	<i>Ipomoea batatas (L.) Lamk</i>	Convolvulaceae	Mitha aalu, Shakarkand
22	<i>Leea macrophylla (Roxb. ex Hornem)</i>	Leeaceae	Dhotelakand
23	<i>Pueraria tuberosa (Roxb. ex Willd)</i>	Fabaceae	Patal kumda, Bidari kand
24	<i>Scirpus grossus (L.f.)</i>	Cyperaceae	Kaseru Kand
25	<i>Urginea indica (Roxb.) Kunth</i>	Liliaceae	Bailagodri, Jangali-piyaz

antitubercular [84], antihyperglycaemic [85], antimicrobial [86], hepatoprotective [87], antioxidant and antihyperlipidemic [88] activities. *Curculigo orchioides* Gaertn (Kali Musali in Hindi) is well known for its immunomodulatory and rejuvenating effects [89]. In Ayurvedic system, it is specially used as a potent adaptogen and aphrodisiac medicine [90]. The medicinal plant has demonstrated a wide spectrum pharmacological activity, including antistress [91], immunostimulatory [92], hepatoprotective [93], antirheumatic [94], antihistaminic [95] and antiasthmatic [96], anti-inflammatory [97, 98], analgesic [99], antioxidant and anticancerous [100] activity. The rhizome of *Curcuma amada Roxb*, commonly known as mango ginger due to its characteristic raw mango aroma, is used as an appetizer, antipyretic, aphrodisiac and laxative in Ayurveda system of medicine [101]. It is reported to have antimicrobial, antioxidant, cytotoxicity and platelet aggregation inhibitory activity [102], CNS depressant and analgesic activity [103], antifungal [104], antitubercular activity [105], anticancer [106] and cytotoxic activity [107]. *Ipomoea batatas* (L.) Lamk is considered to be a major food crop worldwide, and it is delicious, sweet taste, nutritious vegetable with

high starch content [108, 109]. It is having anti-inflammatory and anticancer properties [110], antimutagenic [111], antidiabetic activity [112], hepatoprotective [111], antioxidant and probiotic activities [113]. *Pueraria tuberosa* (Roxb. ex Willd) is widely used in the treatment of fever, menorrhagia, skin diseases, wounds, bronchial asthma and jaundice in Ayurveda [114]. It is reported to have anti-inflammatory [115], hypolipidemic [116], antifertility [117], antidiabetic [118], nephroprotective [119], anticancer [120], anticonvulsant [121], antistress [122] cardioprotective [123] antioxidant and antiapoptotic effect [124].

Although leafy vegetables, tubers and roots are having vital roles to fulfil dietary need of the Indian tribes, still its nutritional value and medicinal uses are not very well explored [125]. Even without having proper access to the modern medical facilities, Chhattisgarh tribes are able to manage several health issues with their knowledge of using natural plant resources. Many tribal communities live in Chhattisgarh state such as Gond, Halba, Dhurvaa, Muria, Abujhmadia, Kavar, Binjwar who are having good knowledge about the utility of the locally available medicinal flora [126, 127]. In a recent publication, for the

treatment of jaundice, approximately 55 medicinal plants were documented which are used by rural and tribal people of different area of Chhattisgarh [128]. Such information can be helpful to provide better and cost-effective solution for the several challenging health issues. Chhattisgarh food culture is not just about satisfying the hunger but to take care the complete dietary and health need of the people.

Conclusion

The 'Rice Bowl' of Central India, Chhattisgarh, has a rich ethnic food culture. Rice is the principal crop and diet of the people here. The large forest cover of the region is a great storage bank of several leaves, edible wild tubers and roots which serve as a supplementary diet of the people and gives a unique flavour and medicinal value to the food. We see globally that many of the traditional dietary ingredients are slowly going out of the food plate and our diet is limited to only a few varieties of ingredients. In spite of this, Chhattisgarh is maintaining its traditional food practices remarkably well. This also indicates that we should not depend on food from elsewhere and learn to utilize the available natural resources. Nature has several ways to protect us, but we have to learn to protect nature and utilize its resources judiciously. Protecting, reviving and following the traditional food patterns can be one of the easiest and the best ways to create a healthy society.

Future prospects of ethnic food culture

The concept of ethnic food culture does not just refer to food types, cooking methods, and nutritional and medicinal values, but also to people's cultural heritage, religious practices and way of life. Historically, traditional foods carry knowledge transferred across generations for making them wholesome for consumption. A number of modifications may have been made before they were included in the food culture. Taking the popular South Indian food item Dosa as an example, in Chhattisgarh (Central India), a similar food item called Cheela is prepared without fermentation. It may have to do with the climatic conditions in south India, where fermentation occurs easily due to a warm and humid climate of various regions. These modifications can be seen in almost every traditional food culture. Traditional foods of the different islands reflect the island's ecology and biodiversity [129]. Throughout the world, food cultures face inevitability challenges caused by urbanization and social changes [130]. Unplanned urbanization has separated a large part of the world's population from the direct production of foods, which has produced changes in eating behaviour [131]. People who eat according to the rules of a traditional food culture are healthier than those who

are eating processed-food-based modern diet so-called fast food [132]. It is quite surprising that even without much medical facilities, people from rural areas are able to maintain their health across different situations of life. Food culture has a prominent role in this. In Chhattisgarh's food culture, it is clearly evident and available research data that also support the use of various plants and tubers for prevention and management of illnesses. There is a need to scientifically understand the principles behind the traditional food culture. Adopting to a new kind of food item which is not traditionally used must be based on the principles which are followed in the particular food culture. Violating the rules and blindly adopting to a new kind of food pattern may have adverse effects on the health of the population and also damaging for the whole traditional system. Traditional food culture can even enrich the present health science by knowing the use of various herbs and food modifications during ill-health.

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