Valorization of Wild Edible Plants as a Potential Source of Alternative Nutrition among the Tribal Communities of West Bengal

Abstract: Being very close to nature, tribal people extensively use non-cultivated naturally found plants for their alternative source of nutrition. The present study conducted for documenting the available wild edible plants used by tribal people located in the districts of Purulia, West Midnapur and Bankura. Using wild edible plant is economical, nutrient rich and promotes sustainable utilization. The ethnobotanical study surveyed the knowledgeable informants of the tribal population and found 27 plants that are majorly used for alternative source of nutrition. Different parts like leaves, stem, flower, fruit, tuber etc. are used as food sources. Apart from food source, the tribal people also earn their livelihood by selling these plants in the local market. However, the present generation of the tribal population is not very interested in acquiring the knowledge of these non-cultivated plants therefore documentation of the use of these plants becoming very important for future.

Key Words: Wild edible plants, Non-cultivated, Nutrient rich, Sustainable utilization, Tribal population.

Introduction

Nutrition is considered as an essential biological process for the existence of living beings. Throughout the world, food security is one of the major concerns as poor access and low intake of food may lead to health hazards and malnutrition in many underdeveloped countries [1,2].

The term Wild Edible Plants (WEPs) refers to those species of plants that are neither cultivated nor domesticated, though are available in the nature and extensively used as food sources. WEPs are usually collected from distinct habitats like cultivated fields, forests or even places like wastelands and roadsides by different traditions all over the world [3,4]. A variety of uncultivated wild plants along with their parts (fruits, flowers, leafy shoots, underground organs and seeds) are being ingested regularly and complement human adaptability. These plants improve the dietary quality and provide various nutrients like essential minerals, vitamins, micronutrients and dietary fiber[5,6].Wild Edible Plants are a fundamental part of traditional ethnic foods all over the world, as an emerging food crisis warrants exploiting all food resources along with WEPs, which are usually considered to be famine foods important among indigenous communities for their sensory acceptability, recreation, health benefits, spiritual and socio-cultural values[7].

Various studies have found that there are almost 550 tribal communities and 45,000 plant species harbour in India. There are 227 ethnic groups of the tribes who inhabit in various climatic and geographic zones with varied culture, wisdom, traditional knowledge and diversified plant species(Mallick et al. 2020).Ethno botanical studies conducted on wild plants show that around 7000 plant species have been utilised as human food from the time immemorable. Forests are considered as the chief source of wild foods for forest inhabitants and rural households [1,2]. In India, most of the tribal communities live within or near to the forest and mainly depend upon the biomass and wild products for energy needs, food and medicine [8,9]. These communities possess distinct food habits and socio-cultural traditions. Generally, rural and tribal people recognized and collected wild plants for medicine and food from forests and established various processing methods based on their needs. Traditional knowledge regarding wild edibleplants pass orally through the words of mouth from one generation to the other. Younger generation of the tribal community learns to recognize the wild plants and their parts collected by accompanying the knowledgeable person to forests [1,10].

Wild edible plants used in economic, edible and medicinal purpose by tribal people have a great impact against urbanization and deforestation. The main focus of this ethnobotanical survey is to gather information about the nutritional value and culinary use of the wild plants that are not much popular among the urban population. Therefore, the significant objectives are to analyse the beneficial effect of these uncultivated plants on the tribal population of West Bengal and to develop documents on these plants with their nutritive value. Another purpose of this research work is to review existing literature available on wild edible plants and their role in improving food security in West Bengal. The present work will also help to identify the existing gaps in research and information on wild edible plants grown in West Bengal.

Materials & Methods

Source of Data

The data for the present study has been collected by formulating structured questionnaire and interviewing the knowledgeable informants of the tribal population like elderly men, medical practitioner and house-wives. The questions were mainly based on the local plants that are used as food alternatives and the part of plants used for

culinary purpose. The survey has been conducted and gathered information extensively from different parts of Purulia, West Midnapur and Bankura districts of West Bengal. Reported plants were identified on account of literature and taxonomic workout [11,12].

Area of Study

Purulia

Prulia district is situated in the western most point of West Bengal in the plateau region. It lies between 23º 42′ and 22º43′ North latitude and between 86º 54′ and 85º 46′ East longitudes. Hills situated in Purulia are Bagmundi, Panchet and so on. The rock system of this district is consisting of granite. The main rivers of Purulia are Kasai, Dwarakeswar and Silai. Average temperature of this district in summer is 40ºC and in winter 10ºC. Average of annual rainfall is 1100mm to 1300mm. Laterite soil are mainly found in this district.

Figure 1: Map of Purulia District

West Midnapur

West Midnapur is situated in the southern part of West Bengal, lies between 22º 57′ and 21º36′ North latitude and between 88º 12′ and 86º 33′ East longitudes. Western and eastern part of this district lies in the plain region and in extended region of Chotonagpur plateau respectively. Average temperature in summer is 45ºC and in winter 9ºC.Average annual rainfall is 1450mm. Mainly alluvial and lateritesoil are found here.

Figure 2: Map of West Midnapur District

Bankura

Bankura,which is known as ‘ Jangle Mahal’ situated at western part of rahr region. Bankura lies between 22º 38′ and 23º38′ North latitude and between 86º 36′ and 87º 46′ East longitudes. The main physiography of this district is composed of alluvial and laterite soil. Archean rock system is found in western side of district. Annual average rainfall is 1430mm. Average highest temperature and minimum temperature is 48ºC and 10ºC respectively. The presence of forest is 21.65% of the total area of districts. Damodar,Dwarakeswar,Silai,Birai,Gandheswari rivers are flowing through this district.

Figure 3: Map of Bankura District

Result & Discussion

In the present work, wild edible plants of Purulia (7), West Midnapore (6) and Bankura (14) district are enumerated in the Table 1, 2 and 3 respectively. The plants are labelled according to their local names followed by their scientific names, habit, parts of the plants consumed and their uses along with medicinal properties. A variety of wild edible plants are abundantly available in the different states of West Bengal from which 27 plants are documented in this study along with their pictorial display.

The analytical study about the wild edible plants of Purulia, West Midnapore and Bankura district belonging to different habits and parts of plants used are presented in Figure 4 and 5. It is evident from the Figure 4 that herbsare predominant in Purulia and Bankura district where as treesare predominant in West Midnapore. It was analyzed from Figure 5 that the part of the wild edible plants majorly used as food are fruits of the plants followed by their leaves, shoot, tuber, seed, whole plant, flower, stem and rhizome etc.

The plants used were found growing and available in the vicinity and in most of the cases immediately available as therapeutics. However, as time goes on, traditional knowledge and its associated plants, which were developed for millennia, are subject to loss since they have been stored mainly in the memories of elderly people and handed down mostly by word of mouth over successive generations. Moreover, environmental degradation, deforestation, over–exploitation, over–grazing, agricultural land expansion, and acculturation continuously threaten traditional wild plants and the associated knowledge. Hence, it is a timely endeavour to investigate, document, and analyse traditional knowledge of these unconventional wild edible plants and the associated knowledge drivers so that sound plant utilization and management practices can be maintained. The majority of studied plants were obtained from the wild.

This reliance on wild edible plants by the tribals are not available in the modern written scripts. Some of these plants are used in connection with therapeutic treatments of various aliments by the local tribes, which are an important public health and social problem. The dominant use of medicinal plants for various ailments associated with different health problems might be related to their proven effectiveness over many years of trial and indigenous knowledge accumulated on the efficacy of such preparations. Furthermore, it provides the opportunity for recognition, promotion, management, and protection of indigenous plant knowledge of any community as a vital part of the nation’s heritage. This article might attract the attention of ethno botanists, phytochemists and pharmacologists for further critical investigation of plants present in these districts of West Bengal, India.

Table 1: Enumeration of different wild edible plant species of Purulia district

Sl. No.	Local Name	Scientific Name	Habit	Parts	Uses
1.	Bon karamcha	*Carissa spinarum*	Tree	Fruit	Used to treat stomach pain, indigestion and constipation. Leaf decoction is used to treat diarrhea, fever and earache, roots used as antihelminthic medicine.
2.	Kakmachi	*Solanum nigrum*	Herb	Fruits and leaves	Very useful for treating ulcer and acts as blood purifier. Helpful for liver and spleen enlargement and treat burns and earache.
3.	Bhuikumro	*Tricosanthes cordata*	Climber	Fruit	Helps to reduce GI problems and problems related with liver, reduce constipation, control blood cholesterol and sugar level.
4.	Khenchisak	*Alternanthera sessilis*	Herb	Leaves and tender shoot	Helps to reduce stomach problem, dysentery and diarrhea. Used as plaster for wounded skin and fever.
5.	Khuria	*Amaranthus spinosus*	Herb	Leaves and tender shoot	Very good source of vitamins and minerals, contributes in gluten-free diet, improves digestion, reduce constipation. Leaves increase haemoglobin content and RBCs, reduces

					blood pressure and heart related problems. Reduces free radical damage and formation of malignant cells, improves calcium deficiency related problems.
6.	Methe aloo	*Dioscoreabulbifera*	Climber	Tuber	Contains soluble dietary fibre and complex carbohydrates to reduce constipation, LDL levels. It has low glycaemic index, used for immunity booster, anti-ageing, wound healing and bone growth.
7.	Makhna	*Euryale ferox*	Herb	Seed	Reduces diarrhea, prevents inflammation, constipation and anaemia, improves appetite.

Wild edible plants as mentioned in Table:1

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Table 2: Enumeration of different wild edible plant species of West Midnapur district

Sl. No.	Local Name	Scientific Name	Habit	Parts	Uses
1.	Sabra kul	*Ziziphus mauritiana*	Tree	Fruit	Rich in antioxidant and have revitalizing capacity, helps in digestion, purifies blood, having cytotoxic activity against cancer cell, prevents influenza virus infection.
2.	Kendu	*Diospyros melanoxylon*	Tree	Fruit	Fruits possess an astringent and cooling effect, useful in skin, blood and urinary disease, decoction is used in treating diarrhoea.
3.	Jilipi	*Pithecellobium dulce*	Herb	Fruit	Used for venereal disease, indigestion; barks used for proper bowel movement and constipation; used for diabetes.
4.	Jackle berry	*Diospyros mespiliformis*	Tree	Fruit	Decoction of leaf used for fever, wound dressing and otitis; roots and barks used for infections like pneumonia, malaria and dermatomycoses; fruits have antioxidant property.
5.	Kusum kul	*Schleicheraoleosa*	Tree	Fruit	Used for pain, snake bite, dysentery, skin problems like

					itching, acne and burns; oil help to reduce rheumatism, bark has astringent properties; also used for ulcers, inflamed skin and protect from malaria.
6.	Chikni sag	*Polygonum plebejum*	Herb	Whole plant	Have astringent and anti-inflammatory properties; used as antibacterial agent.

Wild edible plants as mentioned in Table:2

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Table 3: Enumeration of different wild edible plant species of Bankura district

Sl. No.	**Local Name**	**Scientific Name**	**Habit**	**Parts**	**Uses**
1.	Telakochu	*Coccinia grandis*	Climber	Fruits	Promotes metabolism, protects

					nervous system; helps in reducing blood sugar; promotes heart and digestive health.
2.	Falsa	*Grewia asiatica*	Herb	Fruits	Unripe fruit reduces inflammation and used to treat fever, respiratory, heart and blood afflictions. Ripe fruit used to relieve heat conditions, stomachache, throat disorders. It also helps to reduce food aversion, headaches, pimples etc.
3.	Dhudul	*Luffa cylindrica*	Climber	Young fruits	Reduces triglycerides, LDL and cardiovascular disease. Helps in insulin secretion, reduces lipid peroxidation. Reduces symptoms of anaemia, macular degeneration; relieve muscle pain.
4.	Mahua	*Madhuca latifolia*	Tree	Fruits, flower, seed oil	Reduces cough and bronchitis; vapour of boiling leaves reduce pain; seed oil has laxative properties to reduce chronic constipation; seed and flower act as galactagogue for lactating mother.
5.	Lalputiya	*Nasturtium officinale*	Herb	Leaves	Contains omega-3 fatty acids to fight cancer cells, inflammation and cardiovascular disease. Improves calcium absorption

					and skin health; act as modifier of bone matrix protein.
6.	Nona sak	*Portulaca oleracea*	Herb	Leaves and young shoot, stem	Contains dietary fiber; helps in bowel motility and reduces constipation. Containsomega-3 fatty acids that fight against cancer cells, cardiovascular disease. Excellent source of Vitamin A, (1320 IU/100 g, provides 44% of RDA), Beta-cyanins and beta-xanthins pigments andrich antioxidants.
7.	Jastisak	*Cassia tora*	Herb	Young leaves	Used in treating hemorrhoids and piles, reduces indigestion, improves heart muscles and purifies blood; leaves are beneficial for treating rashes, skin ailments and allergies; Decoction of the fruit used in fever.
8.	Kansira	*Commelina benghalensis*	Herb	Young shoot and leaf	Soaked leaf water is consumed for treating diarrhea, decoction of root is used for stomach disorder; leaves used for infertility in women.
9.	Gandhi buuti	*Glinusoppositifolius*	Herb	Young leaf and shoot	Leaves are used for lowering blood sugar and lipids; has antioxidant properties.
10.	Amrul	*Oxalis corniculata*	Herb	Leaves	Boiled leaf juice used for treating chronic dysentery and

					diarrhoea; juice used for jaundice, bleeding in women, paste of leaf used for pain, induces sleep thereby healing insomnia.
11.	Kantanote	*Amaranthus spinosus*	Herb	Leaves and tender shoot	Good source of vitamins and minerals; contains protein, contribute to gluten free diet; improves digestion, reduce constipation; helps to increase haemoglobin and RBC count.
12.	Kumkum sak	*Boerhaaviadiffusa*	Herb	Young leaf and shoot	Reduces inflammation and pain; acts as diuretic and used in ayurvedic medicine for cystis, nephritis, and kidney stone; widely used for liver detoxification, stimulates the emptying of the gallbladder.
13.	Aam ada	*Curcuma amada*	Herb	Rhizomes	Used as aphrodisiac, diuretic, antipyretic, alexteric, emollient, laxative and expectorant; used to cure skin diseases, bronchitis, itching, inflammation, asthma and so on.
14.	Kham alu	*Dioscoreaalata*	Climber	Bulbil and tuber	Rich source of vitamin B6 that reduces homocysteine and risk of heart disease; good source of dietary fiber that helps bowel motility, prevents cardiovascular disease and constipation.

Wild edible plants as mentioned in Table:3

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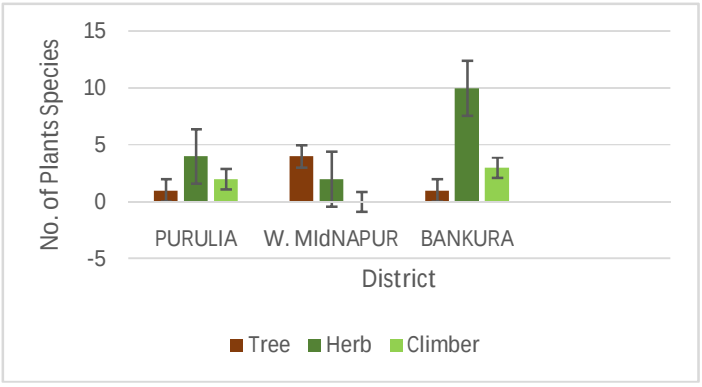

Figure 4: Analysis of different habits of plant species

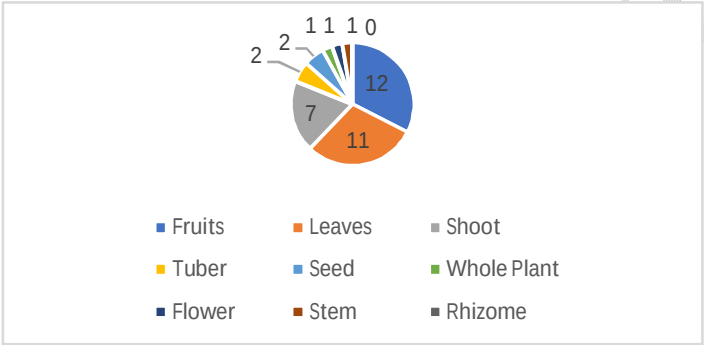

Figure 5: Different parts of wild edible plants used for food

Conclusion

The ethno botanical study conducted on the use of wild edible plants of West Bengal have found that the tribal population of the districts of Purulia, West Midnapur and Bankura depends on these non-cultivated plants as their food source because most of them are economically poor. The study has also found that apart from food source, the enlisted plants also useful in treating and preventing many physiological issues like cardio-vascular disease or diabetes which are mostly common among the urban population. 27 plants (tree-6, herb- 16 and climber-5) have been documented from the above-mentioned districts of West Bengal. Various parts like fruits, leaves, flowers, stem, rhizome, tuber and seeds of non-cultivated plants are used as food source. These are rich in various nutrients and fulfill the nutritional demand of the tribal population. The knowledge regarding the wild edible plants are transformed through one generation to the next though the recent generations are not very interested to keep the knowledge therefore the documentation of these plants and their uses is very important.

Apart from nutritional benefits, tribal people also use wild edible plants to earn their livelihoods. The advantage of growing these plants are that they can be grown with less investment and promotes sustainable utilization therefore conserving genetic diversity for future generations.

The present study influences other ethno botanical researchers to carry out further research on the socioeconomic importance, conservation status and nutritional content of different wild edible plants for future use.

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