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EXPLORING THE RICH TAPESTRY OF WILD EDIBLE PLANTS NUTRITIONAL, MEDICINAL, AND SOCIO-CULTURAL PERSPECTIVES: A COMPREHENSIVE REVIEW

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ABSTRACT

The data presented offers a comprehensive overview of wild edible plants, covering their nutritional content, traditional uses, therapeutic properties, socio-cultural significance, and conservation strategies. It highlights the immense diversity of these plants and underscores their critical role in traditional medicine, nutrition, food security and cultural heritage. To ensure the preservation and ongoing availability of these invaluable resources for future generations, the recommended conservation approaches prioritize sustainable management. These techniques encompass a range of strategies, including habitat preservation, cultivation of wild edible plants, community involvement in conservation efforts, promotion of traditional knowledge systems, policy interventions and awareness-raising initiatives. By implementing these measures, we can safeguard the rich biodiversity of wild edible plants, protect indigenous cultures, enhance food sovereignty and promote environmental sustainability.

Keyword: Wild Edible Plants, Traditional Food Systems, Nutritional Composition, Culinary Practices, Medicinal Properties, Socio-Cultural Significance, Conservation Strategies.

I. INTRODUCTION

Wild edible plants are essential for human nutrition, providing vital nutrients and medicinal benefits. They enrich culinary traditions, offering diverse flowers and serving as tea substitutes. Socio-cultural factors influence their use, and conservation efforts are underway to ensure their sustainable availability for future generations.

1. Wild edible plants

Native species that naturally grow and reproduce in their natural habitat without being cultivated are known as wild edible plants. Since the beginning of time, humans have been gathering wild edible plants, and they are now a common component of traditional food systems and the human diet (Motti *et al.,* 2022).

The edible wild plants of today are especially helpful in times of hunger and other scarcity. Even in normal times, the less developed segment of the human community-often referred to as tribal's or Adivasis in India-who typically live in mountainous and other inaccessible regions of both established and developing nations-finds resources for their nutrition from wild plants (Arora & Pandey 1996).

For tribes, wild foods are essential non-timber forest products. The entire area covered by forests and trees is 79.42 million hectares, or 24.16 percent of the coverall geographical area, according to the India state of forest report (ISFR) 2015. India has 8.6 million indigenous people according to the 2011 census. The tribal tribes of India rely on the forests for their subsistence. The tribe's people live in close proximity to the natural world and have a longstanding custom of using wild plants and their parts, such as fruits, shoots, leaves, and tubers, as nourishment. Despite their significant contribution to food security, these edible wild plants are often disregarded. Rich expertise on many applications of plant genetic resources can be found among India's tribal groups. The tribal populations need for nourishment is largely met by wild edible plants (Soni *et al.*, 2023).

Reddy (2011) focused on the investigation of various wild edible plant species utilized by rural and tribal communities in the state of Maharashtra's Chandrapur area. The edible portion of plant species, both dicots and monocots, such as corm, tubers, leaves, flowers, fruits, and seeds, are disclosed. Additionally, they concentrate on gathering and using wild edible plants to give locals a source of income and seasonal food security. Numerous plant species can be utilized to meet the nutritional needs of an expanding populace, according to

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researchers. Tribal people are part of nature; they obtain the majority of their supplies from natural resources and have historically learned how to eat wild flora.

Sarvalingam *et al*., (2014) identified 68 wild edible plants from 56 species and 39 families in maruthamalai hills, Coimbatore district that were consumed by the rules. Rhizomes, roots, and tubers from 14 plant species; fruits from 35 plant species; leaves from 11 plant species; seed and arils from 7 plant species; and stem pith from one plant species.

Ballabha *et al.*, (2013) documented the diversity, indigenous uses, and availability of wild edible plants in the Lohba range of the Kedarnath forest division, stating that the region is abundant in wild edible plant resources. They identified 82 species from 62 genera and 46 families, with 15 being abundant, 46 common, and 21 unusual to this area. Plant components such as leaves, branches, young twigs, roots, rhizomes, tubers, flowers, fruits, and seeds are utilized for food by the locals. The study will contribute to the creation of a complete database on wild plant resources, thereby improving food security and preserving traditional knowledge for the prosperity of the distant area.

2. Nutritional composition of wild edible plants:

Nutrition is the most crucial fundamental need, as it influences health, labor productivity, and brain development. Hunger and malnutrition are increasing in the majority of the world's developing countries as a result of population growth, a lack of fertile land, and rising food prices. Protein deficiency, for example, is ubiquitous and has been identified as the most common cause of malnutrition in underdeveloped nations. Green leafy vegetables are nutritionally significant due to their high protein content, calorie levels, and important vitamin and mineral content. They include high level of carotene, ascorbic acid, riboflavin, folic acid, and minerals like as calcium, iron, and phosphorus. There are numerous underutilized green in nature that have high nutritional content and can feed the worlds growing population (Mohammad Imran *et al.,* 2007).

Wild edible plants have high nutritional value and can be a good source of vitamins, fiber, minerals, and fatty acid; they may also have therapeutic characteristics. Wild edible plants have long been an important and common food source for food-insecure households living in poverty in developing countries. These foods are important for household food security and nutrition in rural areas, supplementing staple foods, addressing seasonal food shortages, and providing emergency food during famines. They are also vital to many rural and urban groups, particularly the impoverished and oppressed. Wild edible plants are critical in all parts of the world for sustaining the global food supply (Haile Tesfaye Duguma, 2020).

According to Lulekal *et al.,* around one billion individuals worldwide consume wild foods on a regular basis. Wild edible plants are nutritionally dense and can help supplement vitamins and micronutrients. They can also augment dietary needs because of their superior nutritional value.

Shelef *et al.,* (2017) suggest that wild edible plants can diversify global food production and improve sustainability and resilience.

Wild edible plants enhance a staple diet rich in fibers, carbs, irons, zinc, calcium, potassium, and vitamin C and E (Rana *et al.*, 2019; Shelef *et al*., 2017).

Morales *et al.,* (2013) investigated small shrubby edible fruits. What is traditionally consumed? They were investigated to determine their suitability for human nutrition, taking into account their bioactive components content. They investigated photochemical properties of lipophilic compounds such as fatty acids and tocopherols. Some hydrophilic antioxidants include vitamin C (ascorbic acid and dehydroascorbic acid). According to them, this is the first report on the plant under study. They view functional foods as potential sources of lipidic bioactive substances. This study gives useful and relevant information to support tocopherols role in the prevention of lipid peroxidation.

Anuradha *et al.,* (2013) nutritional analysis of fresh and dried Morinda tinctoria fruits. The researcher underlines the relevance of wild fruits and their nutrient value, as well as the issue of food security. They stated that all fruits are rich in minerals and vitamins. They investigated two medicinal properties of Morinda tinctoria. They concentrated on the ash, protein, carbohydrate, vitamin, and mineral content of this plant. They retain the distinction between dry and fresh fruits. Fresh fruits contain 4% ash, while dry fruit have 1.6% ash. They said this fruit has a rich supply of ascorbic acid and niacin, but dry fruits contain riboflavin and thiamine.

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Dry fruit has calcium, whereas fresh fruit contains iron and copper, therefore this fruit could be a source of nutritional nutrients.

Shah (2016) examined Smilex ovalifolia leaves for nutritional and phytochemical content. They investigated carbohydrates, protein, amino acid, saponin, alkaloids, steroids, terpenoids, phenol glycoside, flavonoids, and crude fibers. They discovered several inorganic minerals, including S, P, Mg, Ca, and Fe. The total statistic supports the conclusion that this plant is a viable dietary source and can be employed as a vegetable substitute for human consumption.

Table 1: The geographical distribution and pharmacological activity of wild edible plants

Plant species name	Geographical distribution	Growth form	Useful part	Pharmacological Activity	Contain	References	Photos
Achyranthus aspera L.	India, tropical Asia, Africa, Australia, America	Herb	Seeds, Roots, Shoots	Antipeperiodic, diuretic, antiasthmatic, anti-allergic	Saponin, Oleonolic acid, alkaloid,	Shrivastav *et al.*, 2011	
Amaranthus spinosus L.	India, and all tropical and subtropical region of Africa, Southeast Asia and USA	Annual and perennial herb	Leaves	anti-inflammatory,anti malarial, antiandrogenic, antidiabetic	2 to 3% P and Zn 1 to 4% Fe α-spinasterols and hentricontane Vitamin A and C	Olumayokun *et al.*, 2004; Hilou *et al.*, 2006; Murgan *et al.*, 1993; Sangameswaran Jayakar, (2008); Srivastava, (2011)	
Acalypha indica L.	India, Sri Lanka, Tropical Africa, Pakistan and many other country's	Small annual herb	Leaves	Antibacterial, antiparasiticide, antidiabetic, antioxidant activity, anti-cancer	Clitorin, nicotiflorin, biorobin, tannins, carbohydrates	Ruslan *et al.*, 2015; Batubara *et al.*, 2016; Teklani *et al.*, 2016	
Alternanthera sessilis L.	Tropical and subtropical area throughout the hotter region of India	Annual and perennial prostate herb	Leaves	Antibacterial, antioxidant activity	Calcium, magnesium, iron, potassium, zinc, sodium	Umaet SK & Marathe VR, (2018)	

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Cocculus hirsutus L.	India, Pakistan and tropical Africa	Invasive creeper	Leaves	antimicrobial, cardiotonic, hyperglycemic, Diuretic, laxative, epileptic activity	Isoquinoline alkaloid,cohirsinine, cohirsitinine, hirsutine and jamtin	Kumudini *et al.,* 2018; Madhavan *et al.*, 2008	
Cassia tora L.	India, Sri Lanka, West China and tropics	Shrub	Leaves, seed, root	Antifungal, antigenotoxic, antithepatotoxic, antimutagenic, antioxidant, antibacterial	Anthraquinone glycosides, palmatic acid, succinic acid, uridine, Flavonoid	Jain .s & Patil U.K, (2010)	
Oxalis corniculata L.	Tropical and subtropical area of world	Herbaceous	Leaves	Antimicrobial activity, anticancer, antifungal, antioxidant,	Alkaloid, glycoside, flavonoids, fatty oils, phenols, resins, calcium	Tanusree *et al.*, 2020; Chidambara *et al.*, 2003; Tibuhwa, 2016; Badwaik *et al.,* 2011	
Portulaca oleracea L.	India, America, Canada, Australia, New Zealand	Herbaceous weed	Whole plant	Anti-inflammatory, antimicrobial, antihypertensive, antifertility, antioxidant	Vitamins, steroids, minerals, fatty acid, alkaloids	Masoodi,et al., 2011	
Solanum nigrum L.	Southeast Asia, temperate to tropical region of Europe, America	Herb	Leaves, fruit, flowers	Antitumor, anti-inflammatory, antioxidant, antibacterial, hypotensive, neuroprotective	Flavonoid, coumarin, lignin, organic acid, volatile oil, polysaccharides	Chen x., *et al.*, 2022	
Sida cordifolia L.	Tropical and sub tropical plain all over India and Shrilanka	Herb	Leaves, Seeds, Roots	Analgesic and anti-inflammatory, antimicrobial, antioarkinson's disease	Ephedrine, fatty acid, saponine, sterculic, malvalic and coronaric acid	Jain, *et al.*, 2011	

3. Traditional uses of wild edible plants in culinary practices:

The term wild edible plant refers to 69 species spread across 40 families that fall into two categories; wild veggies and tea replacements. These vegetable can be cooked in a variety of ways; they are frequently stir-fried, boiled, turned into soups, served cold or covered with sauces. Stems, leaves, fruits, seeds, flowers, roots, and tubers are among the edible portions. Of them, wild vegetables of which there are 53 known edible species are most commonly consumed. Remarkably, some plants have more than one use; they can be used as fruits, spices, nuts, tea replacements, or vegetables. Pentaphragma spicatum, an indigenous species of china found in

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southern Guangxi and Guangdong as well as Hainan Island, is one example of this. It grows in the jungles of tropical valleys and was unknown to science as edible until shangsi villagers called it "jade vegetable" because of the way its leaves resemble jade. These leaves are frequently used in stir-fries and soups and may be kept for up to a month without going bad. In fact, at tourists at restaurants in Shangsi County, a popular dish named "Stir-Fried Jade vegetable" is given to guests, demonstrating the culinary importance of these wild plants in local cuisine (Liu *et al.*, 2023).

Tea substitutes have an important role in the Zhuang people's culinary customs, according for the second largest category of wild edible plants, with 42 species recognized. Ten of these species serve as both wild vegetables and tea substitutes, while three act as both oils/fats and tea substitutes. The complete plants of 21 wild species are most commonly used, followed by the leaves of 19 species. Preparation usually entails boiling or steeping in hot water. In the Fangchenggang region, tea substitute plants are divided into two categories: Linga cha, which is used to battle hot conditions, and flavour-enhancing alternatives. Linga cha contains 27 plant species, including Sarcandra glabra, Centella asiatica, and Gynostemma pentaphyllum, whereas flavour-enhancing substitute include 15 species, including Camellia petelotii, Camellia euphlebia, and Helixanthera parasitica, which are used by Zhuang people in remote areas to improve the flavour when tea is unavailable (Lius *et al.*, 2023).

4. Medicinal properties and traditional healing practices:

The traditional medical practitioner or traditional healer can be defined as "someone who is recognized by the community in which he lives as competent to provide health care by using vegetable, animal, and mineral substance and certain other methods based on the social, cultural, and religious backgrounds, as well as the prevailing knowledge, attitudes, and beliefs regarding physical, mental, and social well-being and the causation of disease and disability in the community." Traditional healers employed therapeutic formulae derived from various natural substances (animal, mineral, and vegetable). They have considerable understanding of how to use plants and herbs for medical and nutritional purposes (Rama Shankar *et al.*, 2021).

Acalypha indica leaf juice serves as an emetic for youngsters. Leaf decoction is used to treat earaches and headaches and is used locally to syphilitic ulcers. The leaves are also used as an antiparasiticide when applied externally with common salt, quicklime, or lime juice (Jayaprakasam & Ravi, 2012).

Table 2: List of plants documented along with their scientific name, habit, local name, part used and Traditional medicinal uses

SI. No.	Scientific name	Habit	Local name	Parts used	Uses	References	Photos
1.	*Achyranthes aspera Linn.*	Herb	Angedi	Whole plant	Cough, Bronchitis, Malarial fever, Diabetes	Bhosale *et al.,* 2012	
2.	*Acalypha indica L.*	Herb	Indian nettle	Leaves	Rheumatoid arthritis, Respiratory issues, Scabies, Skin infections	Amarnath *et al.,* 2014; Mahomoodally & Beeharry, (2013)	
3.	*Amarathus spinosus L.*	Shrub	Spiny amaranthus	Leaves, Stem	Constipation	Mousumi *et al.*, 2019	

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4.	*Alternanthera sessilis L.*	Shrub	Garundi	Leaves	Jaundice, indigestion	Mousumi *et al.*, 2019	
5.	*Boerhavia chinesis L.*	Herb	Pungali	Leaves, Roots	Jaundice, dyspepsia, improve and protect eye sight, gonorrhoea	Wajid *et al.*, 2017: Fosberg, (1978); Douglas & Manos, (2007)	
6.	*Boerhavia diffusa L.*	Herb	Punarnava	Leaves, Roots	Jaundice, kidney problem, skin troubles, eye disease, wounds	Mishra *et al.*, 2024	
7.	*Cocculus hirsutus L.*	Climber	Farid buti	Leaves	Stomach disorders, Skin disease, Urinary disease	Logesh *et al.*, 2020	
8.	*Chenopodium album L.*	Shrub	Bathuva/Bacon weed	Whole plant	Anaemia	Mousumi *et al.*, 2019	
9.	*Catharanthus roseus L.*	Shrub	Nayantora/Baarmasi	Flowers, Leaves	Diabetes	Mousumi *et al.*, 2019	
10.	*Cassia tora L.*	Shrub	Sickle Senna	Leaves, Seed, Root	Ringworm, Ophthalmic, Skin disease, Liver disorder	Harshal & Priscilla, (2011)	
11.	*Dactyloctenium aegyptium L.*	Grass	Makra	Whole plant	Cough, polyurea, fevers, smallpox, renal infection, gastric ulcers	Al-Snafi, (2017)	
12.	*Digera muricata L.*	Herb	Chanchali/Latmahuria	Flowers, seeds,	Urinary discharges, infectious	Mathad & Mety,(2010); Manimekalai	

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				Leaves	disease, kidney stones	*et al.,* 2020	
13.	*Ephorbia hirta Linn.*	Herb	Bara Dudhi/ Dudhi	Roots, Leaves	Diarrrhea, asthma, bronchitis, hay fever, skin disease, snake bites	Kumar *et al.,* 2010	
14.	*Lantana camara Linn.*	Shrub	Commmon lantana/Wild Sage	Whole plant	Bronchitis, high blood pressure, malaria, cancer, tumour, bilious fever	Kalita *et al.*, 2012	
15.	*Oxalis corniculata Linn.*	Herb	Amarul/Amboti	Flowers, Leaves	Indigestion, chronic disease, skin disease, quarten fever	Mousumi *et al.,* 2019; Sharma & Kumari 2014	
16.	*Parthenium hysterophorus L.*	Herb	Gajar Ghas	Whole plant	Migraine headaches, rheumatoid arthritis, insect bite, fever, anaemia, heart troubles	Bagchi *et al.*, 2016	
17.	*Portulaca oleracea L.*	Herb	Lunia	Leaves	Scurvy, liver complains, shortness of breath, skin disease	Khanam *et al.,* 2019	
18.	*Senna tora L. Robx*	Herb	Chakunda	Seeds, Leaves	Skin disease, Hepatoprotective, blood purifier	Shadab *et al.*, 2019	
19.	*Solanum nigrum Linn.*	Herb	Mokoi	Fruit	Treatment of dysentery, Stomach complaints, Fever	Aburjai *et al.,* 2014	
20.	*Sida cordifolia L.*	Herb	Barial	Leaves, Stems, Seeds	Gonorrhea, asthma, chronic dysentery, piles	Galal *et al.*, 2015	

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5. Socio-cultural significance of wild edible plants:

A community's beliefs, ritual, traditions, habits and norms, as well as the connection that result from the influence of this framework on individuals lives, are collectively referred to as its socio-culture. The socio-culture environment of a society is made up of social and culture perspectives, values, and customs. In other words, it refers to the institutions and society in which people engage with the culture in which they live (Karabak, 2017).

Since ancient times, Turkish people have known members of numerous other cultures, become neighbours, and coexisted with them. Rich cuisine has been cultivated as a result of numerous cultural exchanges as well as the wealth of food varieties, customs, and traditions. Human dietary habits are influenced by historical processes as well as cultural, regional, ecological, and economic factors. Nutrition culture encompasses the ways in which people choose what to eat, when to eat it, and how to prepare and cook it. It also differs based on the eating customs of the society in which the individual resides (Kose *et al.,* 2010).

Socio-cultural factors play a major role in the use and consumption of wild edible species, with regional differences in techniques of gathering, preparation, and consumption. While there is more cooperation between men and women in the Aegean Region, women are primarily responsible for the collection and sale of these species in the Black Sea Region. Consumption habits vary by area, with some people preferring salads and raw foods while others prefer major courses. Interactions between societies and cultures also have an impact; migration facilitates the sharing of culinary customs and information about untamed animals. Particularly in rural areas where consumption patterns are impacted by shifting demographics and cultural influences. Sustainable consumption habits depend on appreciating traditional knowledge and protecting it for coming generations (Karabak, 2019).

6. Edible biodiversity: strategy & conservation statute

The proposed strategy and action: According to Belem (2008), governments must first determine the restrictions, the applied strategy with its objectives, the approach to be employed, and the activities to be followed for the wild edible species management strategies.

The limitation: The three recognized barriers are the climate, the scarcity of funds, and the high level of interest in certain crop varieties.

The strategy: Ensuring the sustainable use and protection of edible wild species for human nourishment is the global objective. The following are the specific goals

a) Identify and become familiar with wild species that are edible for human consumption;
b) Guarantee the preservation and protection of wild species that are edible for human consumption;
c) Guarantee the sustainable use of wild species that are edible for human consumption.

Table 3: Synopsis of actions for improvement and sustainable management of wild edible species (Zongo, 2006).

Action topic	Action
Verification of the interest in plant preservation	Establishment both technological and financial setting of means
Activities to advance our understanding of plant genetic resources	Polls prospecting and collecting vouchers investigations on genetics plant domestication seed banks (in vitro experiments and cryopreservation) investigation of biochemistry studies in agronomy studies on physiology and ecology
Initiatives for the preservation and protection of plant resources	Combat desertification Défense against genetic degradation Défense against anarchic harvest strengthening The Défense population sensitization setting priorities botanic garden and arboretum

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Steps to ensure a sustainable use	Modification and preservation commercialization domestication Genetic advancement

II. CONCLUSION

The document you gave provides a thorough review of the relevance of wild edible plants, including their nutritional composition, traditional usage, therapeutic characteristics, socio-cultural significance, and conservation efforts. It is clear that these plants have an important role in food security, nutrition, and traditional medicinal practices, particularly among indigenous groups. Conservation and sustainable use emphasize the need of protecting these rich resources for future generations.

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