RESEARCH PAPER

Ethnomedicinal Knowledge and Consumption of Leafy Vegetables of Family Amaranthaceae

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ABSTRACT

The family Amaranthaceae encompasses a wide range of leafy vegetables, both wild and cultivated, that are of significant nutritional, ethnobotanical and pharmacological importance. This study investigates the diversity, ethnomedicinal relevance and local usage of leafy vegetables belonging to Amaranthaceae family in the Chandrapur district of Maharashtra, India. Field surveys, herbarium consultations and interviews with local tribal and rural communities were conducted to gather information on taxonomy, morphology, seasonal availability, ethnobotanical and pharmacological uses. The findings highlight that these plants are not only rich in nutrients such as iron, calcium and vitamins A and C, but also possess a wide range of medicinal properties. A total of eight species were documented, including commonly cultivated types such as *Amaranthus cruentus* (FI=87%), *Amaranthus tricolor* (FI=89%), and *Chenopodium album* (FI=84%), as well as wild species like *Achyranthes aspera* (FI=57%), *Amaranthus spinosus* (FI=83%), *Amaranthus viridis* (FI=78%), *Celosia argentea* (FI=64%), and *Digera muricata* (FI=89%). Many species are traditionally used for treating digestive disorders, inflammation, wounds and anemia. The study emphasizes the importance of wild and cultivated vegetables of Amaranthaceae family in supplementing household nutrition and draws attention to the declining use and awareness of these resources due to modern agricultural and dietary transitions. Documenting these practices can provide valuable insights into sustainable food sources, medicinal plant conservation and potential applications in modern healthcare.

Keywords: Amaranthaceae, Traditional user, Ethnobotany, Pharmacology, Biodiversity conservation.

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INTRODUCTION

The family Amaranthaceae, commonly known as the amaranth family, comprises a significant group of flowering plants within the order Caryophyllales. With approximately 175 genera and over 2,500 species, this family includes a wide array of herbs, shrubs, and small trees known for their ecological versatility and nutritional value (Kadereit et al., 2003). Among these, a notable number are used as leafy vegetables, both wild and cultivated, and have played an important role in traditional food systems across the globe. In India, particularly in semi-arid and tropical regions like Chandrapur district of Maharashtra, species belonging to this family are not only a usual part of local diets but also serve as an accessible source of essential nutrients for rural and tribal communities. Members of Amaranthaceae are widely distributed across diverse habitats and are especially prevalent in tropical and subtropical climates (Townsend, 1993). Several species, such as *Amaranthus cruentus, Amaranthus viridis, Amaranthus tricolor, Amaranthus spinosus, Celosia argentea* and *Chenopodium album,* are extensively consumed as leafy vegetables. Others, like *Achyranthes aspera* and *Digera muricata*, are wild species commonly used during periods of food scarcity or as part of indigenous culinary practices. These plants are rich in

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essential micronutrients, such as iron, calcium, vitamin A and dietary fiber and are recognized for their potential to alleviate nutritional deficiencies among low-income populations (Rastogi & Mehrotra, 1993; Gupta et al., 2005).

The use of wild edible plants, including wild amaranths, is a longstanding tradition among tribal and rural communities, often passed down through generations. However, with the growing reliance on commercial crops and shifting food habits, the knowledge and consumption of these wild leafy vegetables are gradually declining. The present study attempts to document and compare both wild and cultivated leafy vegetables of the Amaranthaceae family found in the Chandrapur district, focusing on their taxonomy, distribution, local uses and availability throughout the year. Previous botanical and ethnobotanical surveys have highlighted the importance of local flora in supplementing diets and enhancing food security, especially in regions prone to seasonal food shortages (Jain, 1991; Ved & Goraya, 2008). Understanding the diversity and utilization of these species is crucial for promoting sustainable food systems, conserving plant genetic resources and encouraging the consumption of underutilized but nutritionally valuable leafy greens. Moreover, some species in this family have also demonstrated pharmacological properties, including antioxidant, anti-inflammatory and hepatoprotective effects, which further enhance their significance in traditional medicine and potential for nutraceutical development (Saha & Verma, 2012).

This research thus aims to provide a comprehensive account of selected Amaranthaceae species in the region, shedding light on their ethnobotanical relevance, morphological characteristics, distribution and ecological presence. It helps to contribute to the conservation and popularization of these valuable plant resources in both local and wider contexts.

METHODOLOGY

STUDY AREA:

The present investigation was undertaken across several villages in Jiwati Tehsil, situated within Chandrapur District of Maharashtra, India (Figure 1A–E). Chandrapur, located in the eastern part of Maharashtra, is recognized for its ecological richness, diverse topography and historical importance. Covering an area of approximately 11,443 square kilometers, the district lies between latitudes 19°30′ and 20°45′N and longitudes 78°46′ and 80°E. It experiences a predominantly dry to semi-humid climate, receiving an average annual rainfall of around 1300 mm (Geological Report, 2018). The winter season is relatively mild, with temperatures ranging from 18°C to 30°C. Forests cover about 37% of the district's area, forming part of the Deccan Plateau and supporting dry tropical deciduous vegetation. Physiographically, Chandrapur is divided into two major regions: the Upland Hilly Zone and the Plain Zone (Figure 1C). The plains, mainly concentrated around the Wardha River, are characterized by flat terrain and scattered settlements. In contrast, the northern Wainganga Valley (particularly in Brahmapuri Taluka) features vast alluvial floodplains, while the southern valley transitions into undulating hills. The Penganga Valley in the southwestern region presents a more fragmented landscape with limited flatlands. Between the Wardha and Wainganga rivers lies the Upland Hilly Zone, marked by rugged topography and elevated terrains (Shende, 2023).

Jiwati Tehsil (Figure 1D), where this study was conducted, covers an area of 559 km² and has a population of 61,820, resulting in a density of approximately 110.6 individuals per km² (Census 2011, VillageInfo.in). The tehsil comprises around 82 villages, most of which are rural and rely heavily on subsistence agriculture and the collection of wild plant resources. The region exhibits a climatic gradient ranging from temperate to subtropical, allowing for a diversity of crops and wild edibles. Fieldwork for the study was carried out in 15 representative villages across Jiwati Tehsil (Figure 1E), including Pudiyal-Mohda, Gudsela, Wani Bk., Wani Kh., Yellapur, Lambori, Kumbhezari, Dhonda-Arjuni, Tekamandwa, Shengaon, Asapur, Pallezari, Jiwati, Kusumbi and Ambezari. The primary aim was to collect and document wild leafy vegetables belonging to the family Amaranthaceae. These villages are predominantly inhabited by tribal communities such as the Gond, Kolam, Pradhan and Andh, who possess rich ethnobotanical knowledge. Their long-standing traditions of utilizing wild plants for food and medicine contribute significantly to biodiversity conservation and sustainable livelihoods in the region.


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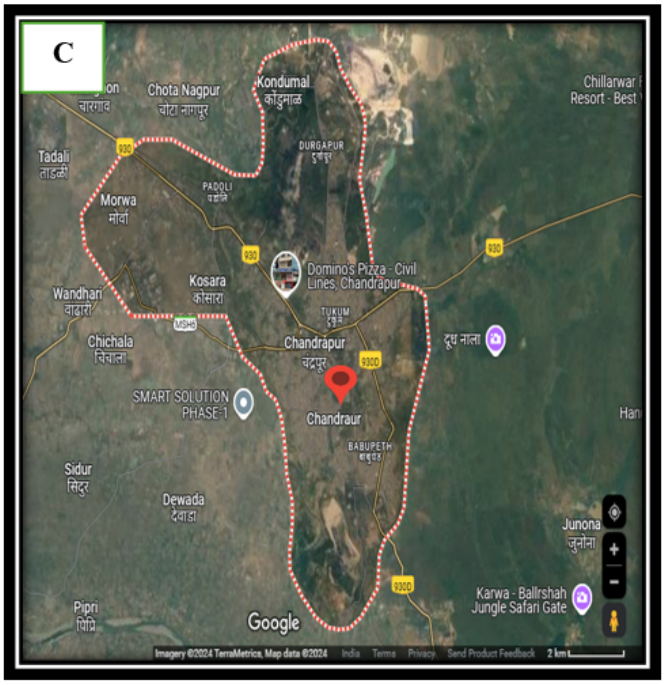
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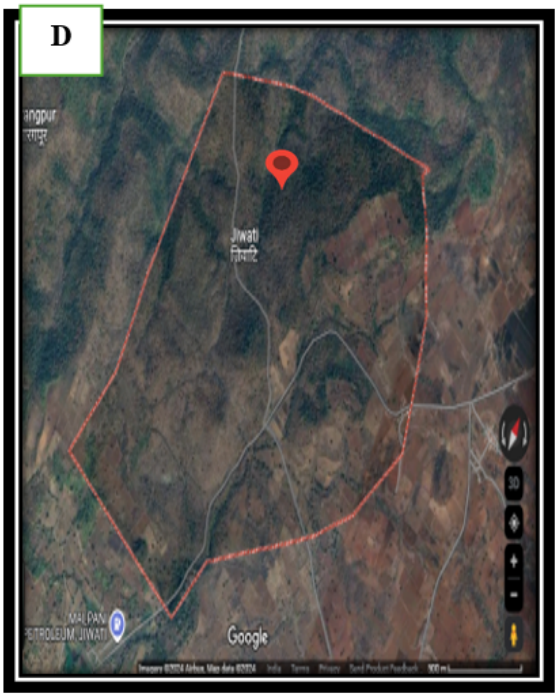
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Figure 1: Map showing the study area (A-India, B-Maharashtra State, C-Chandrapur District, D-Jiwati Tehsil, and E-Fields visited during the study).

PLANTS, DATA COLLECTION AND ANALYSIS

In the present study, eight leafy vegetable species belonging to the family Amaranthaceae were investigated (figure 2). The detailed taxonomic classification of these species follows the descriptions provided by Naik (1998).

Achyranthes aspera L.

An erect herbaceous plant reaching 30–90 cm in height, characterized by a stiff stem and obtusely 4-angled, striate and pubescent branches. The leaves are ovate to broadly elliptic, measuring 2.5–6 × 2–3.5 cm, with an acute apex and a base that is rounded or subcordate. Margins are entire or undulate, with surfaces finely pubescent on both sides. Petioles range from 0.5 to 2 cm in length. The flowers are numerous and borne on a long, pubescent rachis of elongating terminal spikes; initially erect, the spikes become strongly reflexed with age. Bracts are broadly ovate, 2.5–3 mm long, acuminate-aristate and persistent; bracteoles are similar in form but typically fall off with the fruiting perianth. The perianth measures 4–6 mm, is glabrous and glossy, with subequal, ovate-oblong tepals that possess narrow scarious margins and finely pointed tips. There are five stamens, with filaments united at the base and alternating with truncate, fimbriate pseudo-staminodes. The fruit is an oblong-cylindrical capsule, 3–4 mm long, truncate at the apex, thinly membranous and enclosed in a hardened perianth. Seeds are subcylindrical, truncate at the apex and brown in color. The flowering and fruiting period extends from August to January (Naik, 1998).

Amaranthus cruentus L.

An erect, annual herb reaching 1–1.5 meters in height, with striate stems that are branched primarily in the upper regions. The stem coloration varies from greenish to purple and may be either glabrous or sparsely hairy at the tips. Leaves are ovate-oblong to broadly lanceolate, ranging from 4–30 × 1.5–12 cm, with an acute apex and a shortly decurrent base. They gradually taper towards the tip, are obtuse and mucronate and possess hairs on both surfaces. Petioles vary from 2–15 cm in length. Flowers are borne in dense clusters along axillary and terminal panicles, which may extend up to 40 cm in length. Bracts and bracteoles are ovate, measuring 3–5 mm, and are distinctly long-aristate. Tepals are oblong, 2–2.5 mm long, green to reddish-purple in color and mucronate at the apex. Stamens are longer than the tepals. The ovary is oblong with recurved styles. Fruits are urceolate, measuring 2.5–3 mm in length, pale green in the lower portion and purple in the upper and dehisce circumscissilely. Seeds are globose, 1–1.2 mm in diameter, dark brown and glossy. The species flowers and fruits from September to December (Naik, 1998).

Amaranthus spinosus L.
An erect, much-branched annual herb, attaining a height of 30–60 cm. The stem is terete and either glabrous or covered with minute hairs. Leaves are ovate, measuring 3–8 × 1.5–3.5 cm, with an acute base and entire margins. The apex is either acute or obtuse, often slightly notched. Leaf surfaces are glabrous or may have pubescence along the lower surface nerves. Petioles range from 2–6 cm in length. Flowers are borne in dense axillary clusters as well as in terminal and axillary interrupted spikes. Bracts and bracteoles are linear, 3–3.5 mm long and terminate in bristle-like points. Tepals are ovate-oblong, 1.5–3 mm long; those in male flowers are longer than in female flowers and all tepals are acute and bristle-pointed. Stamens are approximately equal in length to the tepals. Capsules are ovoid, 1–1.5 mm long, thickened at the apex and dehisce circumscissilely around the middle. The capsule wall is membranous and rugose. Seeds are shiny, brown, discoid and approximately 1 mm in diameter. The flowering and fruiting season extends from July to December (Naik, 1998).

Amaranthus tricolor L.
An erect, robust, annual herb, reaching a height of 60–200 cm. The stem is angular and glabrous throughout. Leaves are broadly ovate, measuring 4.5–10 × 2–9 cm, with a cuneate base that often extends decurrently into the petiole. Leaf apices vary from acute, obtuse, rounded to emarginate and surfaces are entirely glabrous. Leaf coloration ranges from green to pink-tinged or deep red in cultivated varieties. Petioles are 1–6 cm in length. Flowers are arranged in dense axillary clusters on the lower leaves, while upper flowers are borne in thick, simple or branched terminal spikes. Bracts and bracteoles are shorter than the perianth and characterized by a long awned emerging from a broad base. Tepals are similarly awned at the base, green with broad scarious (papery) margins and measure 3.5–6 mm in length. Staminal filaments are equal in length to the perianth. The fruit is flask-shaped, 2–3 mm long, with a broad seedless apical portion, rugulose and membranous in texture and dehisces circumscissilely below the middle. Seeds are discoid, 1–1.2 mm in diameter, shiny and brown in color. The species flowers and fruits from August to January (Naik, 1998).

Amaranthus viridis L.
An erect or diffusely spreading annual herb, with striated stems measuring 30–80 cm in length, glabrous or thinly pubescent. Leaves are ovate, 2–6 × 1.5–3.5 cm, with bases that may be obtuse or cuneate; margins entire; apices varying from acute, obtuse, rounded, to retuse. Leaf surfaces are either glabrous or sparsely pubescent along the veins beneath. Petioles measure 1–4 cm in length. Inflorescences consist of flowers arranged in axillary clusters and terminal spikes or panicles. Bracts and bracteoles are ovate, 1–1.5 mm long and minutely mucronate. Tepals are oblong-linear to oblong-spathulate, 1.5–2 mm long, with short mucronate, featuring a green midrib and white scarious (papery) margins. Stamens are equal in length to the tepals. The ovary is oblong, bearing 2–3 stigmas. Fruits are ovoid, 1–5 mm long, shortly beaked and prominently rugose, dehiscing irregularly at maturity. Seeds are subtrigonous, approximately 1 mm in length, black, smooth and shiny. Flowering and fruiting occur from August to December (Naik, 1998).

Celosia argentea L.
Erect annual herbs, reaching 30–150 cm in height, with strongly ribbed stems that are green or red in coloration. Leaves are oblong-lanceolate to linear-lanceolate, measuring 4–15 × 0.7–6.5 cm, with acute to acuminate apices, green or sometimes tinged with red. Petioles are short, ranging from 0–2 cm in length. Inflorescences are terminal, solitary or paired, cylindrical spikes measuring 2–20 cm in length, terminating in a conical apex; peduncles are 2–20 cm long. Bracts and bracteoles are ovate-oblong, 3–7 mm long, translucent (pellucid), single-nerved and persistent. The perianth comprises five distinct tepals, 6–10 mm long, initially pink and fading to white upon withering. There are five stamens with filaments united at the base; pseudo-staminodes are minute. The style is purple. Seeds are 3–5 mm in diameter, biconvex, black, shiny and finely tuberculate. Flowering and fruiting occur from September to March (Naik, 1998).

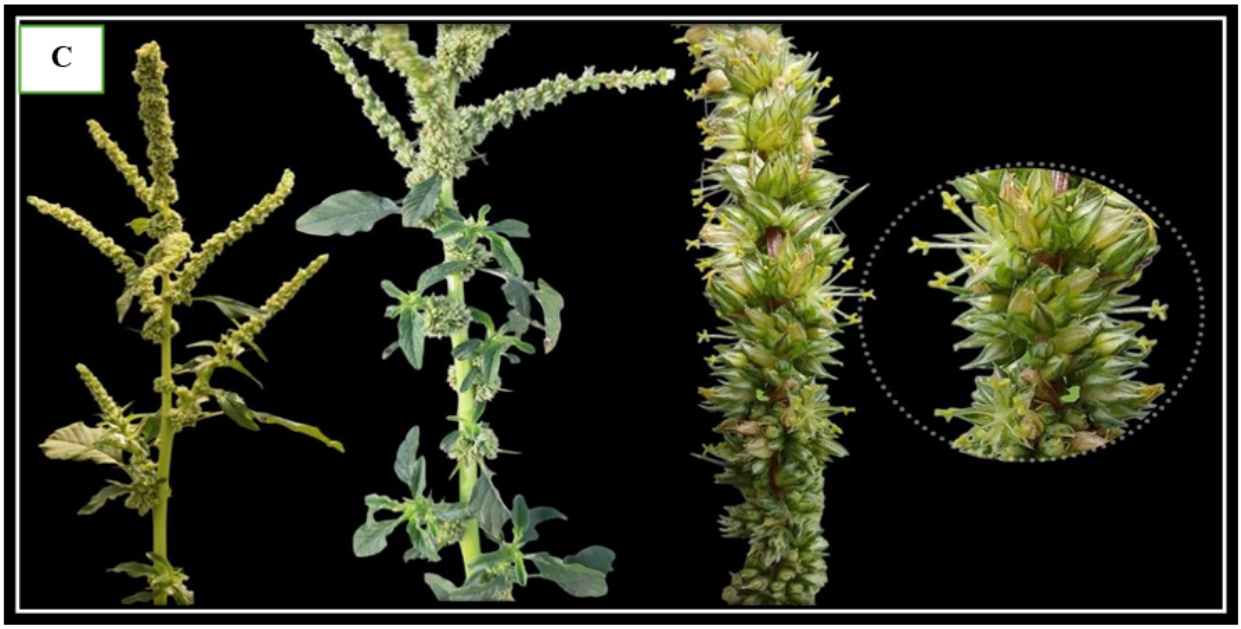
Chenopodium album L.
Erect, annual, and often profusely branched herbs, reaching 30–90 cm in height. Stems are angular, striate, green or tinged with red, with young parts covered in white, powdery vesicles. The lower leaves are ovate-rhomboid, measuring 2–15 × 1.5–12 cm, acute at the base, coarsely dentate to serrate along the margins and terminate in acute apices. Petioles are 1–10 cm long. Flowers are arranged in panicled clusters and are 5-merous. The perianth is green, with ovate tepals measuring 1.5–2.5 mm in length, connate at the base, obtuse at the apex and marked by a prominent midrib. Stamens slightly exceed the tepals in length. The fruits are entirely enclosed within the persistent tepals, depressed globose and 1.5–2 mm in diameter. Seeds are glossy black or brown, measuring 1.2–1.7 mm in diameter. Flowering and fruiting occur from November to March (Naik, 1998).

Digera muricata L.
Erect or procumbent herbs, ranging from 20–120 cm in height, with stems often slightly flexuous, either glabrous or pubescent. Leaves are ovate, measuring 2.5–7 × 2–5 cm, with cuneate, obtuse, rounded, or subcordate bases; margins entire or faintly crenulate; apices acute or obtuse; surfaces glabrous. Petioles are 0.7–3 cm long. Flowers are borne in subaxillary, extra-axillary, or axillary simple spikes, somewhat lax, reaching up to 20 cm in length, with peduncles 0.4–7.5 cm long. Bracts are spreading, ovate-lanceolate, 2.5–3 mm long, concave, glabrous, persistent,

with a pronounced midrib and scarious margins. Bracteoles are oblong, 2.2–5 mm long, with scarious margins. Sterile flowers are flat and palmatifid, absent in the upper part of the spike. Tepals are ovate and unequal: the two outer tepals are 3.5–4.5 mm long, green with white or pink margins; the three inner tepals are shorter, narrower, and pink. There are five distinct stamens; pseudostaminodes are absent. Fruits are compressed-globose, measuring 2–2.2 mm in diameter, two-horned at the apex and depressed between the horns, bearing a persistent style base. Seeds are compressed. Flowering and fruiting occur from June to February (Naik, 1998).



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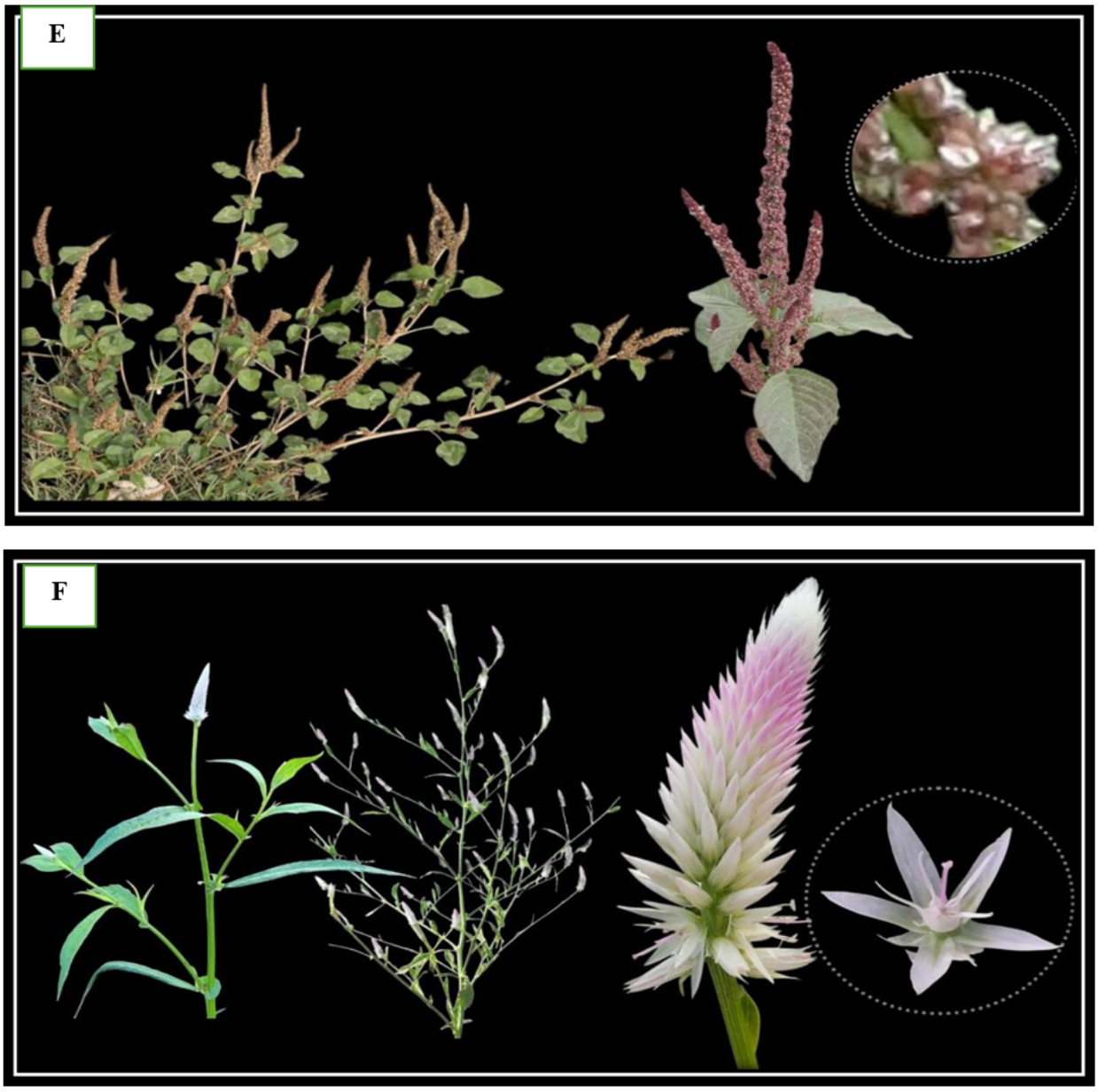
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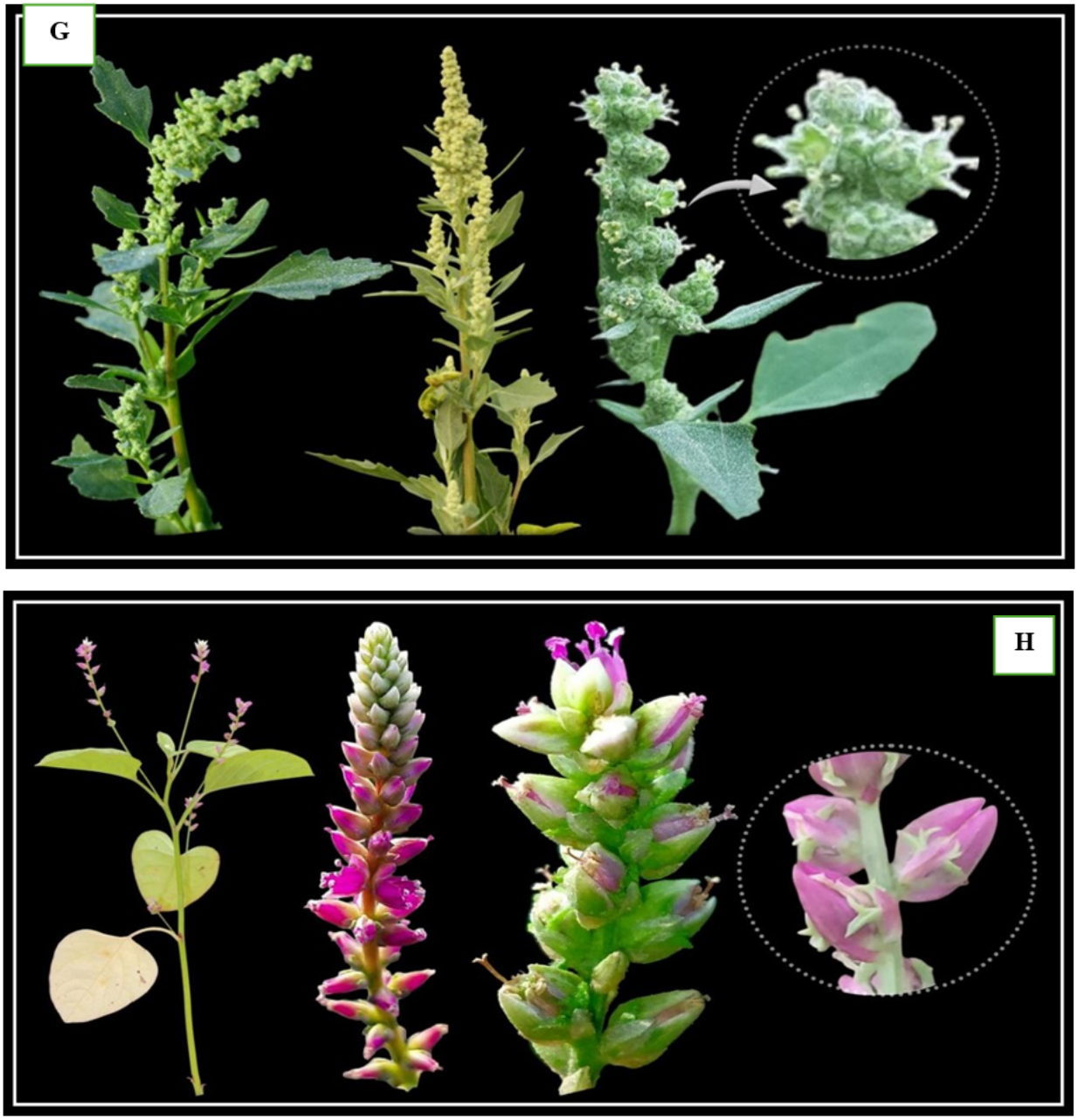

Figure 2. A Plant Habitat with Inflorescence and flowers: *Achyranthes aspera L. (A), Amaranthus cruentus* L. *(B), Amaranthus spinosus* L. *(C), Amaranthus tricolor* L. (D), *Amaranthus viridis* L. (E), *Celosia argentea* L. (F), *Chenopodium album* L. (G), *Digera muricata* L. (H).

To document the vegetable species utilized by tribal communities in the study area, a comprehensive ethnobotanical survey of Amaranthaceae leafy crops was conducted across multiple villages in Jiwati Tehsil, Chandrapur District, between June 2024 and February 2025. The study involved systematic field visits to various villages, where data was collected from indigenous groups, including the Gond, Kolam, Pradhan and Andh communities. Additionally, individuals familiar with these vegetables or actively involved in their collection and trade were interviewed. A semi-structured questionnaire was employed to facilitate data collection, ensuring a balance between guided inquiry and open-ended discussions. Before each interview, verbal consent was obtained from participants, respecting ethical research practices and ensuring voluntary participation. The interviews involved 346 informants in all, with ages ranging from 20 to 90, including 112 males and 234 females. The majority of participants (n = 178) were over 60 years old, followed by individuals aged 36–59 years (n = 110), while the youngest

group, aged 20–35 years, comprised the smallest portion (n = 58) as shown in table 1. Participants were questioned about the regional names of widely used leafy vegetables, preparation and traditional recipes—whether cooked alone or in combination with other ingredients—their taste, role in the local food system, ethnomedicinal applications and other practical uses (Table 2).

Collecting plant specimens helped reduce confusion arising from the use of multiple common names for a single species or the application of a single name to different species. In some cases, local informants referred to the same species using two or more commonly used names, leading to inconsistencies in identification. The pressing plant specimens were placed in the college Department of Botany following verification. Additionally, Plants of the World Online (POWO) (https://share.google/EL04mulfPJzIoTlwf),World Flora Online (https://wfoplantlist.org/taxon/wfo-0000516177-2025-06), International Plant Name Index (IPNI) repository (http://www.ipni.org/ipni/simplePlantNameSearch.do), Indian Flora Online (https://indiaflora-ces.iisc.ac.in/herbsheet.php?id=513&cat=13) and The Flora of Marathwada (Naik VN, 1998) were used to confirm the botanical nomenclature of the discovered species. The geographical coordinates of the studied vegetables are Latitude-19.60518' and Longitude-79.072647'. The plant specimens of these vegetables are identified from POWO, WFO and IPNI database, *Achyranthes aspera* L. (WFID-0000516177), *Amaranthus cruentus* L. *(0000530168), Amaranthus spinosus* L. *(WFID-0000530495), Amaranthus tricolor* L. (D-0000530523), *Amaranthus viridis* L. (E-WFID-0000530552), *Celosia argentea* L. (F-WFID-0000593019), *Chenopodium album* L. (G-WFID-0000600897), *Digera muricata* L. (H-WFID-0000647244). (World Flora Onlinehttps://wfoplantlist.org/taxon/wfo-0000516177-2025-06). The mathematical technique modified by Madikizela et al (2012) was used to calculate the frequency index (FI) of species utilization. The following formula was applied: FI=(FC÷N) ×100, where N is the overall number of respondents, FC is the total number of people who participated that specified a specific species, and FI is the frequency index that was computed.

Information on the medicinal uses of leafy vegetable species from Amaranthaceae family was obtained from various tribal communities, including the Gond, Kolam, Pradhan and Andh, as well as the local population in the study area. Furthermore, databases of scientific literature including Springer, Web of Science, SciFinder, PubChem, PubMed, ScienceDirect, Google Scholar and Scopus were searched to supplement and validate the findings. Relevant data were also collected from published research articles, books and master's and doctoral theses.

RESULT AND DISCUSSION

INFORMANTS DEMOGRAPHIC PROFILE

Among the 346 respondents surveyed, the majority were over 60 years old (n = 178), followed by individuals aged 36–59 years (n = 110). The youngest age group, 20–35 years, was the smallest (n = 68). The findings indicated that older individuals consumed wild and cultivated vegetables more frequently than younger age groups. Women constituted a larger proportion of the respondents (n = 234) compared to men (n = 112), as illustrated in Figure 3. In terms of educational background, 11% of the respondents had completed secondary education, 10% had attained tertiary education, 30% had primary education and 49% had no education (Table 1).

Table 1: Participant demographics.

Parameter	Specification	Frequency	Percentage (%)
Gender	Male	112	32
	Female	234	68
Status	Youth (20–35)	58	17
	Community adult (36–59)	110	32
	Elder (>60)	178	54
Education	None	168	49
	Primary	104	30
	Secondary	39	11

	Tertiary	35	10

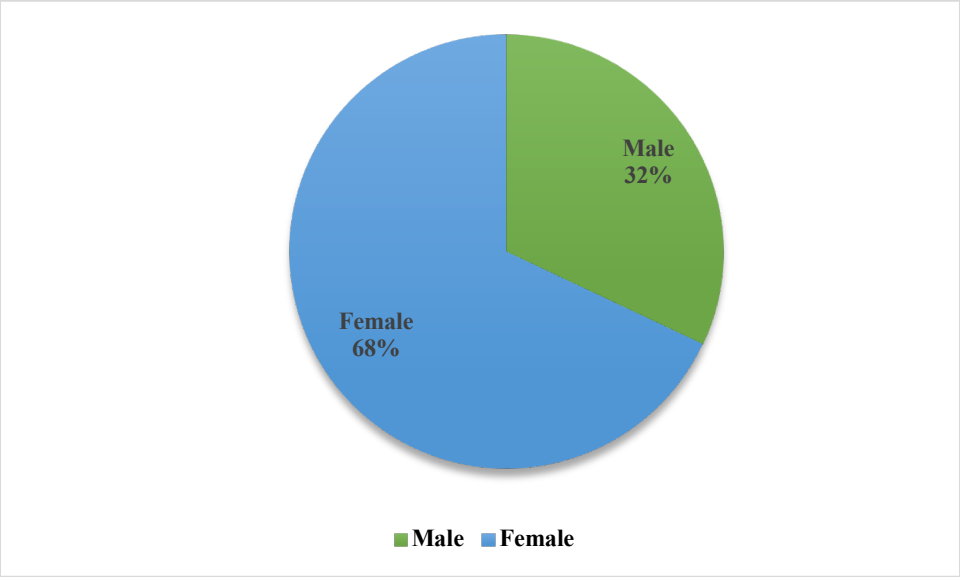

Figure 3: Respondents involved in the study

GEOGRAPHICAL DISTRIBUTION IN INDIA

The Amaranthaceae, commonly known as the amaranth family, is a diverse group of flowering plants within the order Caryophyllales, comprising approximately 175 genera and over 2,500 species, primarily consisting of herbs and subshrubs (Stevens, 2023). Members of the Amaranthaceae family exhibit a widespread and cosmopolitan distribution, with the greatest abundance found in tropical, subtropical and warm-temperate regions. They are notably absent from alpine and arctic zones. The principal centers of diversity for this family are located in southwestern North America, Central and South America and sub-Saharan Africa, with the majority of species occurring in tropical Africa and North America (Townsend, 1993).

The wild leafy vegetables *Achyranthes aspera* L., *Amaranthus cruentus* L., *Amaranthus spinosus* L., *Amaranthus tricolor* L., *Amaranthus viridis* L., *Celosia argentea* L., *Chenopodium album* L., and *Digera muricata* L. are widely distributed across various agro-climatic zones in India and are commonly found in rural, tribal and peri-urban landscapes where they serve as important components of traditional diets. *Achyranthes aspera* is prevalent throughout India, especially in dry and semi-arid regions such as Rajasthan, Gujarat, Maharashtra and Madhya Pradesh, where it grows in wastelands and roadside habitats (Kirtikar & Basu, 2005). *Amaranthus cruentus* is found in the northeastern states, Uttar Pradesh, and parts of South India, including Tamil Nadu and Karnataka, where it is both cultivated and grows wild (Rana et al., 2015). *Amaranthus spinosus* and *Amaranthus viridis* have a pan-India distribution and thrive in moist, disturbed soils across states like West Bengal, Odisha, Kerala, Telangana and Bihar, commonly appearing in fallow lands, fields and along water channels (Rastogi & Mehrotra, 1993). *Amaranthus tricolor* is cultivated and found wild in regions like Assam, Manipur, Jharkhand and southern states due to its adaptability to warm, humid climates (Shukla et al., 2006). *Celosia argentea* is commonly seen in fields and grasslands across Andhra Pradesh, Chhattisgarh, Odisha and Maharashtra, where it is used both as a food plant and medicinal herb (Burkill, 1985; Reddy et al., 2008). *Chenopodium album* is primarily a winter season leafy vegetable, growing abundantly in the northern states such as Punjab, Haryana, Himachal Pradesh, Uttar Pradesh and Delhi, particularly in cultivated fields and kitchen gardens (Bora & Sharma, 2011). *Digera muricata* is widely distributed in dry and semi-arid zones, frequently found in Gujarat, Rajasthan, Madhya Pradesh, Maharashtra and parts of Telangana and Karnataka, often growing as a weed in kharif crop fields and along roadsides (Ali et al., 2012). These leafy greens form an essential part of local food systems and are especially important in tribal and subsistence farming communities for their nutritional and therapeutic benefits.

TAXONOMIC DIVERSITY, PLANT PARTS USED AND MEDICINAL APPLICATIONS

The wild leafy vegetables *Achyranthes aspera L., Amaranthus cruentus L., Amaranthus spinosus L., Amaranthus tricolor L., Amaranthus viridis L., Celosia*

argentea L., Chenopodium album L. and Digera muricata L. represent significant taxonomic diversity, primarily from the family Amaranthaceae. These species are widely distributed and utilized across various Indian states, including Maharashtra, Madhya Pradesh, Odisha, Chhattisgarh, Tamil Nadu and Andhra Pradesh. In Chandrapur district of Maharashtra, particularly among tribal communities such as the Gonds, Kolams and Pardhans, these plants serve as vital sources of nutrition and medicine, especially during food-scarce seasons (Meshram & Upadhyay, 2009; Warude & Patil, 2019). The commonly used plant parts are young leaves and tender shoots, occasionally including stems and inflorescences. These are typically boiled, sautéed, or cooked with lentils and spices and consumed as part of the daily diet.

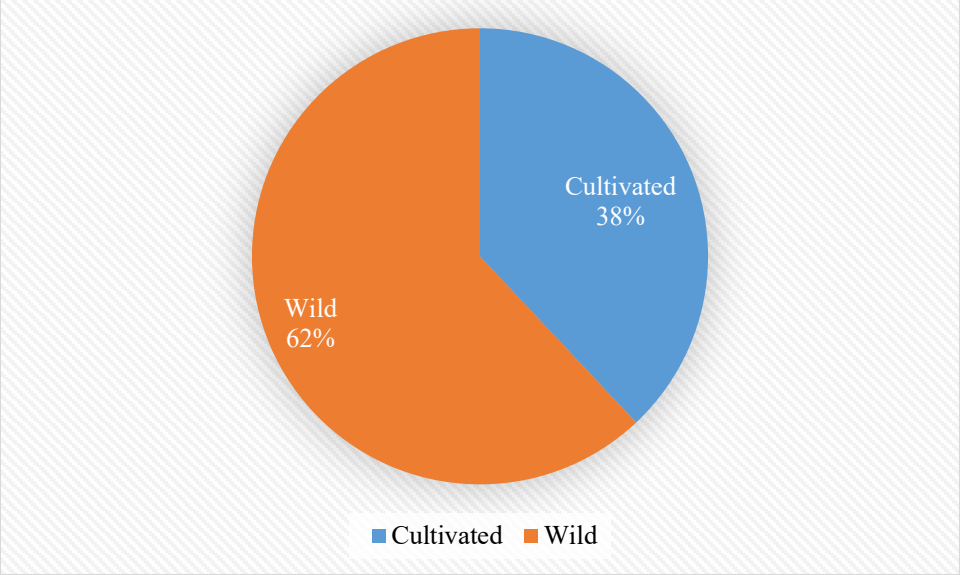

Figure 4. Habit of Leafy Vegetables of Amaranthaceae family.

In light of these nutritional and medicinal benefits, this study examined eight wild and cultivated leafy vegetables from Amaranthaceae family, as listed in Table 2. These species were identified and documented through ethnobotanical surveys involving 346 tribal individuals from the study area. Among them, species that are most commonly cultivated types such as *Amaranthus cruentus* (FI=87%), *Amaranthus tricolor* (FI=89%), and *Chenopodium album* (FI=84%), as well as wild species like *Achyranthes aspera* (FI=57%), *Amaranthus spinosus* (FI=83%), *Amaranthus viridis* (FI=78%), *Celosia argentea* (FI=64%), and *Digera muricata* (FI=89%) as shown in figure 4 and 5 respectively.

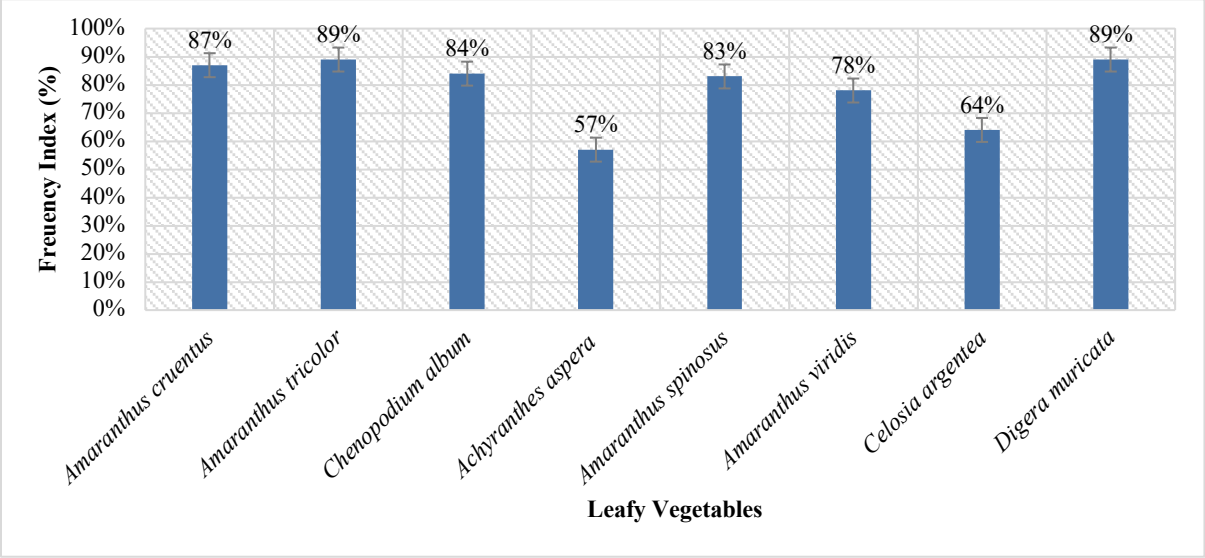

Figure 5: Frequency Index of Wild and Cultivated Leafy Vegetables of Amaranthaceae.

For instance, *Amaranthus tricolor, A. cruentus* and *A. viridis* are consumed for their high content of iron, calcium and provitamin A and are used traditionally to treat anemia and weakness (Goyal et al., 2011). *Achyranthes aspera* leaves are used in decoctions to manage cough, fever and wounds, due to their anti-inflammatory and antimicrobial properties (Sharma & Chaudhary, 2015). *Celosia argentea* is used in urinary disorders and to treat inflammation, owing to its cooling and diuretic properties. *Chenopodium album* is a rich source of antioxidants and dietary fiber, used traditionally to improve digestion and relieve intestinal worms (Pandey et al., 2006). *Digera muricata* leaves are known for their digestive and mild laxative action and are also used for their anti-inflammatory effects in tribal medicine (Tembhurne & Patil, 2011). These plants are not only valued for their nutritional richness but also for their phytochemical diversity, including flavonoids, saponins, phenolic compounds and alkaloids, which contribute to their medicinal efficacy. Their continued use in both daily diets and home remedies by rural and tribal populations highlights the deep-rooted ethnobotanical knowledge and emphasizes the need to conserve traditional food systems alongside biodiversity.

Table 2: Ethnomedicinal and Pharmacological uses of Wild and Cultivated Leafy Vegetables from Amaranthaceae family.

Sr. No.	Botanical and Local Name	Family	Distribution in India	Habit	Edible Part	Season of Availability	Commercially Sold	Frequency Index (FI)	Method Of Consumption	Ethnomedicinal and Pharmacological Uses
1.	*Achyranthes aspera* L. (Aghada)	Amaranthaceae	AP, KA, KL, MH, OR, TN, JH, MP, UK, HP, AR, ML, AS, NL, UP, PB, RJ, JK, MZ, AN, MN, TR, LD.	Wild	Leaves	Rainy	Yes	57	Tender leaves are lightly cooked and consumed as part of traditional vegetable dishes, often mixed with spices to balance their slightly bitter taste.	Leaves are to treat digestive aid, purgative, medicine for internal inflammation, itching, haemorrhoids, cervical gland hypertrophy and abdominal enlargement (Sharma et. al. 2015), treatment of asthma, indigestion, bronchitis, flatulence and menstrual disorders, expectorant, analgesic, purifying, anthelmintic, diaphoretic and gastric suppressant (Basu NK et al., 1957).
2.	*Amaranthus cruentus* L. (Rajgira)		AP, MH, TN, HP, DL, UP, LD.	Cultivated		Rainy and Winter	Yes	87	Leaves are washed, chopped, and sautéed with oil, garlic, onions, and spices. Leaves are boiled or steamed and then mixed with salt and lemon juice. Used as a side dish or salad in many cultures.	Leaves are used to treat gastrointestinal disorders such as diarrhea and dysentery, and they are also applied to soothe inflammation and skin infections. In India, they are consumed to alleviate anemia and boost overall vitality due to their high iron content. Additionally, their antioxidant and antimicrobial properties contribute to wound healing and immunesupport (Yadav & Panghal, 2010; Oboh et al., 2008; Fekadu et al., 2019),
3.	*Amaranthus spinosu*		AP, TN, KA, KL, MH, OR,	Wild		Rainy and Winter	Yes	83	Widely consumed as a nutritious leafy vegetable. Leaves can be consumed	In Indian and Southeast Asian traditional practices, leaf extracts are applied topically to treat eczema and inflammation, and orally to manage dysentery,

	s L. (Katemath)		TN, WB, AP, DL, UP, PB, LD.						by boiling, steaming, stir-frying, or cooking in soups and stews.Also mixed with lentils or added to curries to increase the nutritional value of the dish.	diarrhea, and excessive menstrual bleeding (Kirtikar & Basu, 2005). Leaves possess anti-inflammatory, antioxidant, antimicrobial, hepatoprotective, and antidiabetic properties. (Shukla et al., 2010; Patel et al., 2012).
4.	*Amaranthus tricolor* L. (Tandulja/Chaulai)		AP, TN, KA, KL, OR, TN, AR, DL, UP, PB.	Cultivated		Rainy and Winter	No	89	The leaves are frying with spices, garlic, or onions. In many traditional cuisines, they are added to lentil soups, stews, or mixed with other vegetables. The leaves can also be steamed or boiled and seasoned with salt and oil for a simple, nutritious side dish.	The leaves are rich in bioactive compounds, including flavonoids, phenolics, betalains, and vitamins, which contribute to its antioxidant, anti-inflammatory, hepatoprotective, and antimicrobial activities. Methanolic extracts of leaves exhibit significant free radical scavenging activity, suggesting potential in managing oxidative stress-related disorders (Kumar et al., 2010).
5	*Amaranthus viridis* L. (Math)		AP, TN, KA, KL, MH, OR, TN, MP, AR, DL, UP, PB, RJ,LD.	Wild		Rainy and Winter	Yes	78	The most common method of consumption is as a stir-fried or sautéed vegetable, often cooked with onions, garlic, green chilies, and regional spices.A. viridis leaves are frequently added to lentil-based dishes or used in curries and soups.	The leaves are used to treat inflammation, wounds, boils, diarrhea, dysentery, and respiratory conditions.Leaf preparations are also applied externally to treat eczema, insect bites, and burns, while decoctions are taken orally to relieve fever, constipation, and urinary tract infections (Kirtikar & Basu, 2005).Leaves are rich in bioactive compounds, which contribute to its antioxidant, anti-inflammatory, antimicrobial, and hepatoprotective properties (Srinivas et al., 2014).
6	*Celosia argentea* L. (Kurdu)		AP, TN, KA, MH, OR, TN, MP, AR, DL, UP, PB, RJ.	Wild		Rainy and Winter	No	64	The young, tender leaves are especially valued for their soft texture and mild, slightly spinach-like flavour. Common methods of preparation include boiling, steaming, or stir-frying the leaves, often with onions, tomatoes, garlic, and traditional spices.	In Indian Ayurvedic and folk practices, leaf extracts are applied externally for sores, ulcers, and skin eruptions, while decoctions are taken orally to relieve gastrointestinal issues and excessive menstrual bleeding. The leaves are consumed to treat malaria, fatigue, and to improve blood health, particularly in pregnant women due to their high iron content (Akinmoladun et al., 2010). Leaves contribute to antioxidant, anti-inflammatory, antimicrobial, hepatoprotective, and antidiabetic properties(Chakraborthy & Verma, 2013).
7	*Chenopodium album L.* (Chil)		AP, KL, MH,OR,TN, MP,UK,AR,DL,UP, PB, RJ.	Cultivated		Winter	Yes	84	Leaves are commonly used during the winter season in dishes such as parathas (stuffed flatbreads), saag (leafy green curry), and soups. The leaves are often boiled or sautéed with spices, garlic, and onions to make a flavourful side dish or combined with other greens like spinach.	Traditionally,leaves have been used to treat digestive disorders, intestinal worms, rheumatism, skin diseases, and respiratory issues. In Indian folk medicine, decoctions or pastes of the leaves are used to alleviate constipation, improve appetite, and relieve piles and liver disorders (Kirtikar & Basu, 2005).The plant is also used as a poultice for treating insect bites, burns, and inflammation. Leaf extracts possess significant antioxidant, anti-inflammatory, antimicrobial, and anthelmintic activities (Verma & Satsangi, 2012).
8	*Digera muricata* L. (Kunjar)		AP, KA, KL, MH, OR, TN, ML, AS, NL, DL, UP, PB,	Wild		Winter and Summer	Yes	89	The tender leaves and young shoots are eaten and valued for their mild taste and cooling properties.Digera muricata leaves are cooked with lentils,	The leaves are used as a cooling agent and are consumed to relieve heat-related ailments, constipation, and indigestion. In traditional Ayurvedic and Unani practices,leaves are recommended for treating inflammation, urinary tract infections, and as a mild laxative. They are also used as a vegetable to improve

			RJ, MZ, MN, TR, LD.						garlic, onions, and regional spices to make a nutritious curry.	digestion and appetite, particularly during the summer months due to their cooling and soothing effects on the gastrointestinal system (Kirtikar & Basu, 2005; Ali et al., 2012).

CONCLUSION:

The present study highlights the significant ethnomedicinal and pharmacological relevance of wild leafy vegetables (WLVs) such as *Achyranthes aspera L., Amaranthus cruentus L., Amaranthus spinosus L., Amaranthus tricolor L., Amaranthus viridis L., Celosia argentea L., Chenopodium album L. and Digera muricata L.* among the tribal communities of Chandrapur district, Maharashtra. These species, often overlooked in modern diets, form an integral part of the local food culture and traditional healing practices. Tribal groups including the Gond, Kolam and Pardhan utilize these plants not only as seasonal greens but also as remedies for common ailments such as digestive disorders, skin infections, respiratory issues and inflammation (Meshram & Upadhyay, 2009; Sharma & Chaudhary, 2015). Pharmacological studies support many of these traditional uses, with several species demonstrating antioxidant, anti-inflammatory, antimicrobial and anti-diabetic properties (Goyal et al., 2011; Kumar et al., 2015). For instance, *Achyranthes aspera* is used for wound healing and cough, *Amaranthus viridis* for fever and constipation and *Chenopodium album* for improving digestion and deworming (Panda, 2011; Warude & Patil, 2019). These plants, rich in vitamins, minerals and bioactive compounds, can serve as valuable dietary supplements and low-cost therapeutic agents, especially in underserved rural regions. Given the erosion of traditional knowledge and the loss of biodiversity due to modernization, the documentation and promotion of such ethnobotanical resources are urgently needed. Integrating these wild species into local and national nutrition and health programs could contribute to food security, sustainable health solutions, and cultural preservation. Future pharmacological validation and value addition of these wild greens will pave the way for their inclusion in nutraceutical development and sustainable rural livelihoods.

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AUTHORS CONTRIBUTIONS

SSS, NPZ and DNU are responsible for the collection of data and SSS, KBN and LRS did writing of research manuscripts and SDR and LHK are responsible for revising, final drafting and approval of present research manuscript.

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