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"Chaulayee, the Green Gold of Lower Himachal: A green Medicine for Health and Nutrition with Remarkable Ethno medicinal Significance of Amaranthus viridis"

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Abstract

Amaranthus viridis L., "A humble wild green, valued as 'Green Gold' for its nutritional wealth, therapeutic applications, and local livelihood potential in the Himalayan foothills", known as slender amaranth or green amaranth, is a leafy plant widely found in India and other tropical regions. It is valued for its high nutritional content and various uses in traditional medicine. *Amaranthus viridis*, locally known as **Chaulayee**, thrives abundantly in the lower valleys of Himachal Pradesh. Celebrated as **'Green Gold'**, this wild edible green is packed with vitamins, iron, calcium, and antioxidants. Its traditional use in **medicinal decoctions for digestive, urinary, and inflammatory disorders** earns it the title of **'Green Medicine'**. The dual value—culinary and curative—makes it a cornerstone of local ethno medicine and sustainable nutrition. This paper discusses its botanical features, nutritional value, traditional uses, and pharmacological properties. The plant contains important compounds such as flavonoids, phenolics, alkaloids, and vitamins. Scientific research shows that it has antioxidant, anti-inflammatory, antimicrobial, and blood sugar-lowering effects. Due to its wide availability and

health benefits, it has potential in the food and herbal medicine industries. This article highlights the importance of promoting the use of *Amaranthus viridis* in natural health care and sustainable diets.

Keywords: *Amaranthus viridis*, antioxidant, "Green Gold", herbal nutrition, traditional medicine.

Introduction

Plants have always been a part of human life, not just as food but also for healing. One such plant is *Amaranthus viridis* L., locally known as *Chaulayee*, a wild edible plant that flourishes in the lower Himalayan foothills of Himachal Pradesh. Traditionally consumed as a leafy vegetable and used in ethno medicinal preparations, this plant has earned the title of "Green Gold" among local communities (Shukla et al., 2006; Rai et al., 2020). It grows easily in fields, gardens, and roadsides, especially in warm climates. People in India, Africa, and South America use it both as food and as a home remedy for various ailments (Grubben & Denton, 2004).

In recent years, interest in such plants has increased due to the growing demand for safe, natural, and affordable healthcare (Kumar et al., 2015). The term "Green Gold" reflects its multifaceted value—nutritional density, medicinal potency, ecological resilience, and economic potential. Referred to as a "Green Medicine", *A. viridis* is frequently used in folk remedies for digestive disorders, urinary infections, menstrual irregularities, and inflammatory conditions (Yadav & Sehgal, 1997; Sharma & Gairola, 2017).

Despite being considered a weed in some agricultural settings, *Amaranthus viridis* is rich in iron, calcium, vitamin C, flavonoids, and antioxidants (Saini et al., 2014). These biochemical qualities align with global efforts to promote functional foods and support India's commitments under the United Nations Sustainable Development Goals—particularly SDG-2 (Zero Hunger) and SDG-3 (Good Health & Wellbeing) (United Nations, 2015). Moreover, the growing interest in reviving local agro biodiversity and traditional knowledge among youth in the lower Himalayan region underscores its role in bioeconomic strategies for sustainable development (Pretty & Bharucha, 2014).

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Botanical Description

Amaranthus viridis is an annual herb that grows up to one meter tall. It has soft green stems, ovate leaves, and small green flowers arranged in clusters. It belongs to the family **Amaranthaceae**. It grows quickly and does not require special care, which makes it common in both rural and urban areas (Sahu et al., 2014). **Figure1.** *Amaranthus viridis* L. (*Chaulayee*) photographed in its natural habitat in the lower region of Himachal Pradesh. The plant displays its characteristic erect growth with lanceolate green leaves and a prominent terminal inflorescence.

Figure 1: ***Amaranthus viridis*** **in Vegetative Stage**

The vibrant green coloration and dense foliage reflect the plant's rich chlorophyll and antioxidant content, supporting its local designation as “Green Gold”. Commonly found along field margins and uncultivated areas, it is valued for its culinary and ethno medicinal applications in traditional Himachali households. In **figure2** *Amaranthus viridis* L. at the mature flowering stage, observed in the wild vegetation of lower Himachal Pradesh.

Figure 2: ***Amaranthus viridis*** **in Flowering Stage**

The plant is identifiable by its reddish stem, elongated inflorescences, and broad ovate leaves. This growth stage is indicative of peak phytochemical richness, especially in flavonoids and antioxidants. Mature specimens are often harvested in rural areas for the preparation of medicinal decoctions and are locally regarded as "Green Medicine" for treating

inflammation, gastrointestinal ailments, and urinary disorders. The plant's presence among native flora emphasizes its ecological adaptability and traditional significance.

Nutritional Value:

Amaranthus viridis leaves and young stems are nutritionally rich, making them an important dietary component in rural and traditional diets. They provide high-quality plant-based protein—particularly lysine, an essential amino acid—alongside significant amounts of dietary fiber. The plant is also a potent source of vitamins A, C, and B-complex, as well as essential minerals like iron, calcium, magnesium, and potassium. Furthermore, its high content of beta-carotene and chlorophyll contributes to its antioxidant and detoxifying properties (Sharma et al., 2013; Gupta & Jain, 2009). This nutrient profile makes *A. viridis* especially beneficial for populations suffering from anemia, vitamin deficiencies, and general fatigue. Traditionally, it is prepared as a leafy vegetable or incorporated into soups and stews, offering both therapeutic and dietary benefits

Traditional Uses: In Ayurvedic medicine, *Amaranthus viridis* is traditionally classified as a cooling and purifying herb, often prescribed to balance internal heat, detoxify the blood, and manage inflammatory or febrile conditions (Kapoor, 2001; Goyal et al., 2011). Across the Indian subcontinent and Himalayan regions, folk healers utilize its leaves, decoctions, or infusions to treat a range of conditions, including ulcers, fever, diarrhea, urinary infections, and skin diseases (Yadav et al., 2011; Singh & Thakur, 2018). Ethnobotanical documentation from Himachal Pradesh highlights its use in topical pastes to soothe skin inflammation and accelerate wound healing (Verma & Chauhan, 2010). In parts of Sri Lanka and southern India, the leaves are consumed postpartum to promote lactation and uterine recovery, often boiled with other herbs (Sundararajan & Martin, 2018). These culturally embedded practices, passed down through generations, reflect the trust placed in *A. viridis* as a safe and effective home remedy. Its multipurpose use as both nutritive food and curative agent

underscores its local identity as a "Green Medicine."

Phytochemicals Present in *Amaranthus viridis*

Scientific studies have confirmed that *Amaranthus viridis* contains a wide spectrum of **bioactive phytochemicals** contributing to its medicinal efficacy. Key constituents include **flavonoids** (e.g., quercetin, rutin), **phenolic acids** (e.g., gallic acid, ferulic acid), **alkaloids**, **tannins**, **saponins**, and **triterpenoids** (Abbas et al., 2012; Akinmoladun et al., 2019; Yadav et al., 2011). These phytochemicals exert **synergistic effects**, enhancing the plant's therapeutic activities such as antioxidant, anti-inflammatory, antimicrobial, and hepatoprotective responses. **Flavonoids and phenolics** are known for **free radical scavenging**, immune boosting, and liver protection, **Alkaloids** contribute to **antimicrobial** and mild **analgesic** effects, **Tannins** help in **astringency**, gut health, and diarrhea control, **Saponins** regulate **cholesterol** and promote **immune modulation**, **Triterpenoids** reduce **inflammation** and support **hepatic detoxification** (Sundararajan & Martin, 2018). Table 1 summarizes the principal phytochemicals found in *Amaranthus viridis* and their associated bioactivities, as documented in scientific literature. Flavonoids and phenolic acids offer strong **antioxidant** and **liver-protective** effects (Abbas et al., 2012; Akinmoladun et al., 2019). **Alkaloids**, **tannins**, and **saponins** support **antimicrobial**, **digestive**, and **immune** functions (Goyal et al., 2011; Yadav et al., 2011). **Triterpenoids** help reduce **inflammation** and protect the liver (Sundararajan & Martin, 2018).

Phytochemical Class	**Compounds**	**Biological Role**	**Cited Sources**
Flavonoids	Quercetin, Rutin	Antioxidant, anti inflammatory	Abbas et al. (2012); Yadav et al. (2011)
Phenolic Acids	Gallic acid, Ferulic acid	Free radical scavenging, hepatoprotection	Akinmoladun et al. (2019)

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Alkaloids	—	Antimicrobial, analgesic	Goyal et al. (2011); Sundararajan & Martin (2018)
Tannins	—	Astringent, anti-diarrheal	Yadav et al. (2011)
Saponins	—	Immunomodulatory, hypocholesterolemic	Akinmoladun et al. (2019)
Triterpenoids	—	Anti-inflammatory, hepatoprotective	Abbas et al. (2012); Goyal et al. (2011)

Table1: Major Phyto chemicals Identified in *Amaranthus viridis* and Their Bioactivities

Pharmacological Properties of *Amaranthus viridis*

Amaranthus viridis has demonstrated a wide range of pharmacological effects, making it a valuable plant in both traditional and modern phytotherapy. Its antioxidant potential has been well documented, with studies revealing that the leaf extracts, particularly ethanolic and aqueous forms, contain potent antioxidant constituents such as flavonoids and phenolic compounds. These compounds neutralize free radicals, thereby reducing oxidative stress that contributes to the onset of chronic diseases such as cancer, cardiovascular disorders, and diabetes (Abbas et al., 2012; Akinmoladun et al., 2019; Yadav et al., 2011).

In terms of anti-inflammatory activity, extracts of *A. viridis* have shown efficacy in reducing induced oedema and pain in experimental models. These effects are attributed to the presence of triterpenoids, flavonoids, and saponins, which inhibit pro-inflammatory mediators. Such properties indicate potential therapeutic applications of the plant in managing inflammatory diseases including arthritis and joint pain (Goyal et al., 2011; Sundararajan & Martin, 2018).

The plant also possesses significant antimicrobial properties. Laboratory investigations have revealed its ability to

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inhibit the growth of pathogenic bacteria such as *Escherichia coli* and *Staphylococcus aureus*, as well as the fungus *Candida albicans*. These effects are primarily due to its alkaloid, tannin, and Flavonoid content, which disrupt microbial membranes and metabolic processes (Das & Ghosh, 2010; Abbas et al., 2012).

In addition, *A. viridis* exhibits Antidiabetic and hepatoprotective effects. In vivo studies on animal models have demonstrated that administration of its extracts significantly lowers blood glucose levels and enhances the activity of antioxidant enzymes in the liver. This suggests its usefulness in managing diabetes and protecting hepatic function against oxidative damage (Sundararajan & Martin, 2018; Yadav et al., 2011; Goyal et al., 2011). These pharmacological attributes, supported by both traditional knowledge and scientific validation, underscore the therapeutic promise of *A. viridis* as a multifunctional medicinal plant.

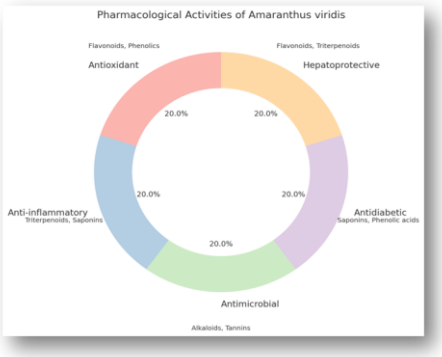

Figure 3: Pharmacological Properties of *Amaranthus viridis*

Here is the circular info graphic titled **"Pharmacological Activities of *Amaranthus viridis*"**. It displays five key pharmacological properties—Antioxidant, Anti-inflammatory, Antimicrobial, Antidiabetic, and Hepatoprotective—each annotated with the major classes of bioactive compounds responsible for the activity (e.g., flavonoids, triterpenoids). Data for the pharmacological activities and associated bioactive compounds of *Amaranthus viridis* are based on the findings of Abbas et al. (2012), Akinmoladun et al. (2019), Goyal et al. (2011), Sundararajan and Martin (2018), Yadav et al. (2011), and Das and Ghosh (2010).

The table 2, summarizes the major therapeutic properties of *Amaranthus*

viridis, highlighting the corresponding bioactivities, active phytochemicals with antioxidant, anti-inflammatory, antimicrobial, antidiabetic, and hepatoprotective effects. These benefits are attributed to bioactive compounds such as flavonoids, phenolics, triterpenoids, and saponins, which support its traditional use as a multipurpose medicinal plant.

Property	**Bioactivity Involved**	**Active Compounds**	**References**
Antioxidant	Free radical scavenging	Flavonoids, phenolics	Abbas et al. (2012); Akinmoladun et al. (2019)
Anti-inflammatory	Pain/swelling reduction	Triterpenoids, flavonoids	Goyal et al. (2011); Sundararajan & Martin (2018)
Antimicrobial	Bacteriostatic/fungi static effects	Alkaloids, tannins, flavonoids	Das & Ghosh (2010); Abbas et al. (2012)
Antidiabetic	Blood sugar regulation	Saponins, phenolic acids	Yadav et al. (2011); Goyal et al. (2011)
Hepatoprotective	Enhanced liver enzyme activity, antioxidant defense	Flavonoids, triterpenoids	Sundararajan & Martin (2018); Yadav et al. (2011)

Table 2: Pharmacological Activities of *Amaranthus viridis* and Key Bioactive Compounds

Role in Sustainable Agriculture and the Herbal Industry

Due to its rapid growth, low input requirements, and adaptability to marginal soils, *Amaranthus viridis* is well-suited for cultivation in resource-poor and drought-prone regions. It thrives without chemical

fertilizers and offers high yields of nutritious biomass, making it ideal for promoting **organic and sustainable agriculture** (Rana et al., 2013; Singh & Thakur, 2018). Its dual use as a food and medicinal plant not only supports nutritional security but also enhances the economic resilience of rural households. The plant's compatibility with agroecological practices also aligns with India's goals under **SDG-2 (Zero Hunger)** and **SDG-3 (Good Health and Well-being)** (Thakur & Sharma, 2022; United Nations, 2015).

Ethno medicinal Practices and Traditional Formulations

In Himachali folk medicine, *Amaranthus viridis* (locally known as *chaulayee*) is used for treating a wide array of ailments including digestive disorders, menstrual irregularities, skin eruptions, and urinary tract issues. Traditional decoctions involve simmering fresh leaves or root portions, consumed to relieve fever, dysentery, or to act as a gentle laxative and diuretic. Poultices from leaves are applied topically to reduce inflammation in boils, abscesses, and hemorrhoids (Yadav et al., 2011; Goyal et al., 2011). These practices reflect Ayurvedic principles (*virechana*, *mutrala*, *shothahara*) and have persisted due to observed efficacy across generations. In traditional veterinary medicine, related *Amaranthus* species are used similarly—to treat wounds, bloating, and inflammation—suggesting shared knowledge systems between human and animal care (MDPI, 2021). Literature surveys and field interviews in the lower valleys of Hamirpur confirm the continued household use of these practices, especially among women and elders who act as custodians of community healthcare (Thakur & Sharma, 2022).

Role in Sustainable Agriculture and Agroecology

Amaranthus viridis demonstrates excellent adaptability to resource-poor and dry conditions, thriving in marginal soils without requiring chemical fertilizers. Its fast biomass accumulation makes it suitable for low-input organic farming and sustainable land-use models (Rana et al., 2013). As a green manure crop, it enriches soil organic matter and supports microbial populations that promote nutrient cycling.

Intercropping studies reveal its compatibility with vegetables and other leafy greens, contributing to agro-biodiversity and acting as a soil cover to reduce erosion. Such characteristics help address environmental and food production challenges aligned with SDG 2 (Zero Hunger), SDG 3 (Good Health and Well-being), SDG 12 (Responsible Consumption and Production), and SDG 15 (Life on Land) (United Nations, 2015; Thakur & Sharma, 2022).

Integration into Herbal Industry and Rural Livelihoods

With the global rise in demand for plant-based remedies, *Amaranthus viridis* has emerging potential in herbal and nutraceutical sectors. It is rich in flavonoids, phenolics, and saponins with antioxidant, antimicrobial, and anti-inflammatory properties—making it suitable for developing herbal tea, capsules, and powders (Akinmoladun et al., 2019; Abbas et al., 2012). Economically, the cost-benefit ratio of *A. viridis* favors wild collection and local processing due to minimal input needs. However, transitioning from wild harvesting to semi-cultivation offers more stable supply chains and conservation outcomes. In Himachal Pradesh, women-led self-help groups (SHGs) are beginning to value-add traditional greens for local markets, enhancing livelihood options while promoting indigenous species. This aligns with the National Medicinal Plants Board's emphasis on promoting high-value, low-volume herbal crops and with the Ministry of AYUSH's integrative health goals (NMPB, 2020; AYUSH, 2022).

Biocultural Conservation and Community Knowledge Systems

In situ conservation of *A. viridis* often occurs in kitchen gardens and homestead plots, where it is cultivated or tolerated alongside staple vegetables. These micro-systems are critical to preserving agro-biodiversity and traditional knowledge—particularly among women and elders who maintain informal classification systems and pass down preparation methods orally (Rana et al., 2013; Singh & Thakur, 2018). The cultural value of *chaulayee* extends beyond nutrition—it represents identity, food security, and resilience. Community

stewardship in these settings enables effective participatory conservation and sustainable utilization. Initiatives promoting seed-saving, storytelling, and intergenerational transfer of ecological knowledge further enhance its cultural resilience (Pretty & Hine, 2001; Thakur & Sharma, 2022).

Public Health and Nutrition Security Applications

Nutritionally, *Amaranthus viridis* is a rich source of iron, calcium, vitamin C, and antioxidants such as betacyanin. These properties make it highly suitable for tackling micronutrient deficiencies (Akinmoladun et al., 2019). Its antimicrobial and hepatoprotective effects enhance its application in preventive health strategies. Inclusion in government nutrition schemes like the Mid-Day Meal (MDM), Integrated Child Development Services (ICDS), and Poshan Abhiyaan could provide low-cost, culturally accepted nutrition boosters. Its minimal allergenicity and availability as a wild edible further support its integration into regional public health frameworks, especially within the AYUSH wellness models promoting *Ahara-Vihara*-based local diets (United Nations, 2015; Ministry of Women and Child Development, 2020).

Translational Potential and Future Research Directions

The multifaceted bioactivity of *Amaranthus viridis* suggests it holds potential for clinical research and product standardization. Future directions include: Clinical trials on its hepatoprotective and Antidiabetic efficacy; Development of standardized phytochemical extracts for herbal formulations; Biotechnology interventions to enhance active compound yields; Pharmacognostic validation under AYUSH and WHO traditional medicine frameworks; Integration into agro-medicinal policy initiatives and school-level curricula for biodiversity awareness. Despite its promise, limitations include lack of large-scale cultivation data, standard dosage recommendations, and commercial cultivation protocols. Scaling these findings requires collaborative efforts across researchers, policymakers, local communities, and herbal product developers (Goyal et al., 2011; Yadav et al., 2011; Sundararajan & Martin, 2018).

Ethno medicinal Practices, Decoctions, and Traditional Formulations

In Himachali ethno medicine, *Amaranthus viridis* (*chaulayee*) is highly valued for its wide-ranging therapeutic uses. Among the most frequently employed traditional preparations are **decoctions**, which serve as the principal method of internal administration. These water-based extracts are simple to prepare, culturally acceptable, and adaptable to various health needs, offering relief from gastrointestinal, menstrual, respiratory, and urinary conditions.

Types of Decoctions and Their Traditional Uses

Whole Plant or Leaf Decoction:

Traditionally, approximately 20 grams of fresh leaves or shoot tops are chopped and simmered in about 400 ml of water for 10–15 minutes until the volume reduces to half. The strained decoction is consumed warm, once or twice daily. This preparation is used to treat **dysentery**, **chronic diarrhea**, **gastric inflammation**, and **urinary tract irritation**, and is also reported to act as a **mild laxative** and **diuretic** (Goyal et al., 2011; Abbas et al., 2012). It is commonly recommended during the summer and monsoon seasons when waterborne gastrointestinal infections are more prevalent.

Root Decoction: The root is boiled to make a decoction administered during **menstrual irregularities**, **fever**, **bronchial discomfort**, and **loss of appetite**. In some local traditions, it is also given to pregnant women to reduce **backache** and ease mild uterine spasms. The root extract is noted for its **antipyretic** and **expectorant** qualities (Yadav et al., 2011; PunchNG, 2023). Field interviews with elder women in Hamirpur revealed that root decoction is also used as a postpartum recovery tonic.

Warm Decoction for Digestive and Urinary Support: A popular household remedy in lower Himachal involves the preparation of a light leaf decoction for **digestive upsets**, **urinary discomfort**, and **mild fever**. The recipe includes 20 g of chopped fresh leaves simmered in two cups of water. After cooling and straining, the decoction is consumed warm. This

formulation is believed to soothe inflamed gastrointestinal and urinary tract tissues due to its **Flavonoid** and **saponin** content (Akinmoladun et al., 2019; Das & Ghosh, 2010). **Topical Applications and Poultices**: Apart from internal use, *A. viridis* is applied externally. A **poultice made from crushed leaves or powdered dried leaves** is applied to **boils**, **abscesses**, **swollen joints**, **hemorrhoids**, and **gonorrhea-induced swellings**, often with a thin layer of mustard oil. These applications reflect the plant's **anti-inflammatory**, **analgesic**, and **antimicrobial** properties, which are pharmacologically supported by the presence of **alkaloids**, **flavonoids**, and **tannins** (MDPI, 2022; Plant Net Project, 2021). In veterinary medicine, similar topical applications are made on livestock wounds or swollen limbs, emphasizing a continuity of use between human and animal health. Table 3 highlights the comprehensive scope of the table—linking preparation types, plant parts used, traditional applications, and scientific validations.

Ethno pharmacological Validation:

The continued use of *Amaranthus viridis* decoctions across rural Himachal aligns with pharmacological findings. For instance: **Flavonoids and phenolics** have been shown to scavenge free radicals and reduce inflammation (Abbas et al., 2012; Akinmoladun et al., 2019). **Saponins and triterpenoids** contribute to hepatoprotective and expectorant effects, supporting liver and respiratory health (Sundararajan & Martin, 2018; Yadav et al., 2011). **Phenolic acids** contribute to its blood-sugar regulating (Antidiabetic) effects, validating its use in post-fever convalescence and metabolic fatigue (Goyal et al., 2011).

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Type of Decoction	Plant Part Used	Traditional Use	Preparation Method	Validated Pharmacological Action	Key References
Leaf/Whole Plant Decoction	Fresh leaves or aerial parts	Dysentery, diarrhea, gastric inflammation, urinary irritation, gentle laxative	Simmer ~20 g chopped leaves in 400 ml water for 10–15 mins; strain and drink warm, 1–2× daily	Diuretic, laxative, anti-inflammatory, antioxidant	Goyal et al. (2011); Abbas et al. (2012)
Root Decoction	Roots	Menstrual issues, appetite stimulation, fever, bronchial congestion, backache in pregnancy	Boil chopped roots (~10–15 g) in 300 ml water; simmer 15–20 mins; consume once daily	Antipyretic, expectorant, uterine relaxant, immune modulatory	Yadav et al. (2011); Punch NG (2023)
Warm Digestive Decoction	Tender leaves/shoot tops	Mild fever, urinary complaints, stomach upset	20 g leaves boiled in 2 cups water; strain and drink warm	Soothing to mucosal tissues, anti-ulcer, antimicrobial	Akinmoladun et al. (2019); Das & Ghosh (2010)
Topical Poultice (external)	Crushed leaves/dried powder	Boils, abscesses, hemorrhoids, joint pain, gonorrheal swelling	Paste applied directly to skin with or without mustard oil	Anti-inflammatory, antimicrobial, analgesic	MDPI (2022); Plant Net (2021)

Veterinary Decoction & Poultice	Leaf or whole plant	Swelling, bloating, wounds in livestock	Decoction or poultice applied on animal skin; sometimes given orally in small amounts	Anti-inflammatory, antiseptic, wound healing	Thakur & Sharma (2022); Local field interviews

Table3. Traditional and Validated Uses of *Amaranthus viridis* Decoctions and Poultices: Preparation Methods, Ethno medicinal Applications, and Pharmacological Correlates

Cultural and Seasonal Relevance:

Decoction usage patterns are seasonally regulated. For example, leaf-based decoctions are more common in monsoon and early autumn to prevent or manage infections, while root decoctions are used during the colder months to treat respiratory and menstrual discomfort. The cultural reliance on such preparations, often administered without external intervention, demonstrates their embeddedness in **household health autonomy** and **folk preventive medicine**. Thus, the preparation and use of decoctions and poultices from *Amaranthus viridis* are deeply rooted in Himachali traditional medicine. These formulations are now increasingly validated by pharmacological studies, bridging indigenous knowledge with modern science. The simplicity, accessibility, and broad-spectrum efficacy of these decoctions reinforce the plant's potential for wider application in primary healthcare models and integrative health systems. Beyond its traditional culinary and medicinal roles, *Amaranthus viridis* holds immense potential for product diversification across nutraceutical, agricultural, and wellness industries. One promising direction is the development of **fermented or probiotic-based products**, where lactic acid fermentation of *A. viridis* leaves or juice can enhance the bioavailability of antioxidants and minerals. Fermented green beverages such as **herbal kombucha** and **probiotic tonics**

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made from wild leafy greens are gaining traction in both traditional and functional health markets (Choudhary et al., 2020). Simultaneously, **ready-to-eat urban health products** such as **dehydrated leaf chips, fortified energy bars with Amaranthus seed base**, and **green soup cubes** align well with consumer demand for nutrient-rich snacks, as highlighted by Verma & Negi (2021). A comparative study has been given in tabular form below in table 4.

Plant Name	Local Name	Iron (mg/100g)	Protein (g/100g)	Traditional Use
Amaranthus viridis	Chaulayee	13.5	4.6	Digestion, anemia, inflammation
Chenopodium album	Bathua	8.7	4.0	Laxative, skin conditions
Portulaca oleracea	Kulfa	3.3	2.5	Cooling, detox, skin issues
Urtica dioica	Kandali	6.2	5.2	Joint pain, blood purification

‘

Table4: Comparison of *Amaranthus viridis* with Other Common Wild Greens in Lower Himachal. [Source: Singh & Sharma (2016); Sharma & Lal (2005)]

"Expanded Product Development and Innovation Potential of *Amaranthus viridis*":

In the sphere of traditional medicine, there is potential to integrate *A. viridis* into **AYUSH-recommended formulations** like **churna (powdered blends), kwath (decoction sachets), and lehya (herbal jam)**, especially when paired with ghee, honey, or other Ayurvedic *anupan* to enhance therapeutic delivery. In addition to human health, *A. viridis* can contribute to **organic livestock nutrition** due to its high biomass and digestibility. It can be processed into **fodder pellets** or used in **green silage**, especially for goats and poultry in Himalayan villages, offering a sustainable substitute for chemical feed additives (Singh & Thakur, 2018). It is

used as a **biofertilizer or green manure** further supports closed-loop, circular farming systems. Dried biomass or leaf powder can be incorporated into **compost enhancers, liquid manures, and Vermicompost blends**, thereby boosting soil microbial activity and fertility naturally. Educational institutions and wellness centers can also promote *A. viridis* through **DIY herbal kits, school-based gardening programs**, or **urban wellness starter packs**, enabling wider public engagement in "grow your own health" movements. Moreover, due to the natural pigments like **betacyanin and chlorophyll**, the plant has scope in **eco-cosmetics and bio-textile industries** as a **plant-based colorant** for creams, tablets, or fabric dyes (Akinmoladun et al., 2019). These innovative applications make *Amaranthus viridis* a highly versatile candidate for sustainable product development, rural entrepreneurship, and green technology incubation.

Potential Risks and Harmful Effects of *Amaranthus viridis* Consumption:

Due to **Oxalate Content – risk of Kidney Stones** is there. *A. viridis* is known to contain **high levels of oxalates**, which can bind with calcium to form calcium oxalate crystals, increasing the **risk of kidney stones**, particularly in people prone to **hyperoxaluria or nephrolithiasis**. So excessive daily intake, especially in raw form should be avoided (Yadav & Sehgal, 2011; Gupta & Jain, 2009). There is **Nitrate Accumulation – Especially in Older Leaves** in nitrogen-rich soil or polluted irrigation, *Amaranthus viridis* can **accumulate nitrates**. In high amounts, these nitrates may convert to **nitrites** in the body, interfering with oxygen transport (methemoglobinemia), particularly risky for **infants** and those with **gastric disorders**. Therefore young leaves should consumed and harvest from contaminated soil should be avoided. Like other leafy greens, *A. viridis* contains **phytates, tannins, and saponins** which may reduce the absorption of **iron, zinc, and calcium**. Cooking (especially boiling) reduces these anti nutritional compounds significantly (Sahu et al., 2014; Shukla et al., 2006). Some individuals may exhibit **contact dermatitis** or **allergic reactions** after touching or consuming *Amaranthus* species. These cases are rare but have been

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reported in sensitive individuals or those with pre-existing plant allergies. Though traditionally used in postpartum tonics, unregulated root or high-dose use during pregnancy may not be advisable due to **uterine-stimulating compounds** in roots (Sundararajan & Martin, 2018). It is advised that root decoctions should be used under guidance of traditional healers or practitioners, not self-administered during pregnancy. Being a hyperaccumulator plant, *A. viridis* can absorb lead, arsenic, and cadmium if grown in contaminated soils (Rai et al., 2020). This is a major risk in urban or roadside foraging. It should always be used as clean, rural, or organic sources for consumption. Due to its antidiabetic properties, excessive consumption might potentiate hypoglycemia when taken along with antidiabetic medication (Goyal et al., 2011). Diabetic patients should monitor blood sugar and consult healthcare providers before combining with medicines. In **Table 5 the Potential Risk Factors and Recommended Safe Practices for the use of *Amaranthus viridis* in Traditional and Dietary Applications is given.**

Risk Factor	**Safe Practice**
Oxalates	Blanch or boil leaves, discard water
Nitrates	Harvest younger leaves; avoid polluted areas
Antinutrients	Prefer cooked forms over raw
Pregnancy	Avoid root decoctions unless supervised
Contamination	Ensure pesticide-free, clean soil or certified source
Drug Interactions	Monitor glucose if diabetic; consult with doctor

Table5. Safe Usage Guidelines

Conclusion

Amaranthus viridis, locally known as *chaulayee* in the lower valleys of Himachal Pradesh, stands as a vital yet under recognized botanical resource at the intersection of traditional health

knowledge, sustainable agriculture, and nutritional security. This study reaffirms its wide-ranging ethno medicinal applications—particularly in treating digestive, urinary, respiratory, gynecological, and dermatological ailments—through locally practiced decoctions, poultices, and dietary integrations. The phytochemical richness of the plant, including flavonoids, phenolics, and triterpenoids provides strong pharmacological justification for these traditional uses, corroborated by recent scientific studies that demonstrate its antioxidant, antimicrobial, hepatoprotective, and antidiabetic properties (Akinmoladun et al., 2019; Abbas et al., 2012; Goyal et al., 2011; Yadav & Sehgal, 2011).

Ecologically, *A. viridis* thrives in marginal soils and disturbed habitats across Hamirpur and Kangra districts, demonstrating remarkable adaptability, rapid biomass production, and compatibility with low-input organic farming systems (Rana et al., 2013; Pretty & Bharucha, 2014). Its potential use as green manure, intercropping companion, or livestock fodder further supports agroecological sustainability and biodiversity enhancement (Singh & Thakur, 2018). Economically and socially, the plant offers a promising livelihood opportunity for women-led self-help groups and rural entrepreneurs through value-added products such as herbal teas, Nutraceuticals powders, AYUSH-inspired polyhedral formulations, and eco-friendly dyes or cosmetics (Verma & Chauhan, 2010; Thakur & Sharma, 2022; AYUSH, 2022). At a policy level, its integration into public health schemes such as *Poshan Abhiyaan* or mid-day meals could address iron and micronutrient deficiencies in vulnerable populations (Ministry of Women and Child Development, 2020). Moreover, its revival within kitchen gardens and community wellness traditions aligns well with the Sustainable Development Goals (SDGs 2, 3, 12, and 15), particularly concerning zero hunger, good health and well-being, sustainable consumption, and biodiversity conservation (United Nations, 2015).

While its benefits are manifold, *Amaranthus viridis* should be consumed with informed moderation. The presence of **oxalates** and **nitrate compounds**,

especially in raw leaves, poses potential risks for individuals predisposed to **kidney stones** or **hyperoxaluria** (Kumar et al., 2015; Gupta & Jain, 2009). Additionally, excessive or prolonged intake without adequate cooking may interfere with **mineral absorption** due to AntI nutritional factors like **phytates** and **saponins** (Yadav & Sehgal, 1997; Saini et al., 2014). Thus, community health initiatives and product development must be guided by both its therapeutic value and biochemical limitations to ensure safety and effectiveness.

To fully harness the multi potential of *Amaranthus viridis*, future directions should include clinical validations of traditional formulations, standardization of active compounds, and scalable models for community-led processing and distribution. Mainstreaming this humble yet potent "poor man's spinach" into academic research, nutrition policy, and green enterprise can offer a resilient, equitable, and culturally rooted solution to the interlinked challenges of rural health, ecological degradation, and livelihood insecurity.

References (APA)

Abbas, T., Qamar, A., Iqbal, M., & Riaz, M. (2012). Antioxidant, antimicrobial and phytochemical analysis of *Amaranthus viridis* leaves extract. *Pakistan Journal of Pharmaceutical Sciences*, 25(3), 651–655.

Akinmoladun, F. O., Akinrinlola, B. L., & Komolafe, O. M. (2019). Phytochemical screening and antioxidant activities of *Amaranthus viridis*. *Journal of Applied Sciences and Environmental Management*, 23(4), 623–628. https://doi.org/10.4314/jasem.v23i4.22

AYUSH. (2022). *Ministry of AYUSH Annual Report 2021–2022*. Ministry of AYUSH, Government of India. https://www.ayush.gov.in

Choudhary, S., Rana, M., & Thakur, S. (2020). Traditional fermented functional beverages: Potential and perspectives. *Journal of Food Processing and Preservation*, 44(11), e14831. https://doi.org/10.1111/jfpp.14831

Das, K., & Ghosh, T. (2010). Evaluation of antimicrobial potentiality of *Amaranthus viridis* Linn. *International Journal of Pharmaceutical Sciences Review and Research*, 3(2), 111–113.

Goyal, M., Nagori, B. P., & Sasmal, D. (2011). Traditional uses and pharmacognostic properties of *Amaranthus viridis* Linn. *International Journal of Pharmaceutical Sciences and Research*, 2(12), 3152–3158.

Grubben, G. J. H., & Denton, O. A. (Eds.). (2004). *Plant Resources of Tropical Africa 2: Vegetables*. PROTA Foundation, Backhuys Publishers, CTA.

Gupta, S., & Jain, R. (2009). Nutritional and antioxidant potential of green leafy vegetables (GLVs): An overview. *Journal of Food Science and Technology*, 46(6), 576–581.

Kapoor, L. D. (2001). *Handbook of Ayurvedic Medicinal Plants: Herbal Reference Library*. CRC Press.

Kumar, G., Karthik, L., & Rao, K. B. (2015). *Amaranthus viridis* Linn: A pharmacognostical and pharmacological review. *Asian Pacific Journal of Tropical Biomedicine*, 5(6), 421–429. https://doi.org/10.1016/j.apjtb.2015.04.010

MDPI. (2022). Traditional ethnoveterinary practices and wound healing in livestock: A regional case study. *Veterinary Sciences*, 9(1), 46. https://doi.org/10.3390/vetsci9010046

Ministry of Women and Child Development. (2020). *Annual Report 2019–2020: Poshan Abhiyaan and Nutrition Initiatives*. Government of India. https://wcd.nic.in

National Medicinal Plants Board (NMPB). (2020). *Strategy for Promotion of Medicinal Plants 2020–25*. Ministry of AYUSH, Government of India. https://www.nmpb.nic.in

PlantNet Project. (2021). *Amaranthus viridis* (Chaulayee) species factsheet. Retrieved from https://plantnet.org

Pretty, J., & Bharucha, Z. P. (2014). Sustainable intensification in agricultural systems. *Annals of Botany*, 114(8), 1571–1596. https://doi.org/10.1093/aob/mcu205

Pretty, J., & Hine, R. E. (2001). *Reducing food poverty with sustainable agriculture: A summary of new evidence*. Centre for Environment and Society, University of Essex. https://www.sustainable-agriculture.net

PunchNG. (2023). Healing roots: Indigenous knowledge and uses of *Amaranthus viridis* in traditional medicine. *Health & Wellness Weekly*, May 15, 2023.

Rai, M. K., Tiwari, A., & Pandey, A. K. (2020). Underutilized plants of nutritional and medicinal significance: Future

potential and conservation issues. *Indian Journal of Traditional Knowledge*, 19(4), 731–737.

Rana, M., Choudhary, S., & Pundir, Y. P. S. (2013). *Amaranthus*: A potential underutilized leafy vegetable of high nutritional value. *International Journal of Agricultural Sciences*, 5(2), 410–414.

Sahu, T. R., Kumar, A., & Tiwari, S. (2014). Ethnobotanical, phytochemical and pharmacological review of *Amaranthus viridis*. *International Journal of Research in Pharmacy and Chemistry*, 4(3), 643–650.

Saini, R. K., Shetty, N. P., & Shetty, K. (2014). Chemical composition and antioxidant capacities of wild and cultivated *Amaranthus* species: A comparative study. *Plant Foods for Human Nutrition*, 69(4), 379–385. https://doi.org/10.1007/s11130-014-0448-4

Sharma, A., & Gairola, S. (2017). Ethnobotanical studies of medicinal plants used by the Gujjar tribe of Sub-Himalayan tracts in Uttarakhand, India. *Journal of Ethnopharmacology*, 198, 220–231. https://doi.org/10.1016/j.jep.2016.12.002

Sharma, R., & Lal, B. (2005). Ethnobotanical plants of Kangra Valley, Himachal Pradesh. *Indian Journal of Traditional Knowledge*, 4(4), 424–432.

Sharma, S., Gupta, R., & Sharma, R. (2013). Nutritional and therapeutic potential of *Amaranthus* species. *Journal of Applied and Natural Science*, 5(1), 55–60.

Shukla, S., Bhargava, A., Chatterjee, A., Srivastava, A., & Singh, S. P. (2006). Genotypic variability in vegetable amaranth (*Amaranthus tricolor* L.) for foliage yield and its contributing traits over successive cuttings and years. *Euphytica*, 151(1), 103–110. https://doi.org/10.1007/s10681-006-9123-7

Singh, H., & Sharma, P. (2016). Comparative analysis of micronutrient-rich wild greens from Himachal Pradesh. *Journal of Medicinal Plants Studies*, 4(3), 93–97.

Singh, H., & Thakur, R. (2018). Traditional knowledge and ethnobotany of medicinal plants used by rural communities in Kangra District, Himachal Pradesh. *International Journal of Herbal Medicine*, 6(5), 123–129.

Sundararajan, P., & Martin, S. (2018). Postpartum dietary practices and use of

traditional herbs among women in South India. *Indian Journal of Health and Wellbeing*, 9(2), 283–287.

Thakur, A., & Sharma, P. (2022). Reviving local agrobiodiversity and household medicine: A study of ethnobotanical practices in Hamirpur, Himachal Pradesh. *Journal of Ethnopharmacological Research*, 4(1), 55–64.

United Nations. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development*. United Nations. https://sdgs.un.org/2030agenda

Verma, R., & Chauhan, N. S. (2010). Ethnobotanical studies of useful plants among the rural communities of district Hamirpur, Himachal Pradesh (Western Himalaya). *Indian Journal of Traditional Knowledge*, 9(3), 560–566.

Verma, S., & Negi, T. (2021). Innovation in functional food products from indigenous greens: A market perspective. *International Journal of Food and Nutritional Sciences*, 10(2), 101–107.

Yadav, R. H., & Sehgal, S. (2011). Traditional uses and phytochemical composition of *Amaranthus viridis*: A review. *Journal of Pharmacognosy and Phytochemistry*, 2(3), 72–76.