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MEDICINAL PLANTS OF PUNJAB: A REVIEW

Manpreet [1], Navdeep Kaur [2], Shveta [3*]

[1]Department of Botany, Sri Guru Teg Bahadur Khalsa College, Sri Anandpur Sahib, Punjab – 140118
[2]Department of Botany, Sri Guru Granth Sahib World University, Fatehgarh Sahib, Punjab – 140407
[3*]Department of Botany, Sri Guru Granth Sahib World University, Fatehgarh Sahib, Punjab – 140407, Email: shvetakaushal07@gmail.com

ABSTRACT
Medicinal plants are a key part of Punjab's nature and culture, historically used for rural healthcare and supporting local livelihoods. This is crucial to review information on the variety, geographic distribution, traditional uses, chemical properties, and farming potential of regional ethnomedicinal flora found across the Shivalik hills and river areas—such as Phyllanthus emblica, Withania somnifera, Tinospora cordifolia, and numerous herbs and trees used for conditions ranging from digestive disorders to respiratory issues. Furthermore, the need of the hour is to address human-induced threats to these plants and emphasizes how combining traditional knowledge with lab testing and better agricultural practices can safeguard regional biodiversity and ensure sustainable use.

KEYWORDS: Ethnomedicine; Phytochemical screening; Pharmacological validation; Shivalik foothills; Agricultural diversification; Conservation.

1. INTRODUCTION

For millennia, plants have served as humanity's primary pharmacy, offering incredible solutions for disease management and physiological maintenance. Even amidst the dominance of modern clinical medicine, plant-derived therapies remain foundational for vast populations across the developing world, where herbal remedies offer accessible, culturally resonant, and economically viable healthcare options. According to global health figures, nearly 80 percent of rural populations in developing nations continue to depend directly or indirectly on traditional botanical remedies for primary care (Singh *et al* ., 2018; Gajarmal *et al* ., 2020; WHO, 2013).

India stands out globally for its exceptional botanical diversity, anchored by established traditional systems like Ayurveda, Siddha, and Unani, alongside countless localized oral traditions. These paradigms rely on thousands of indigenous plant species, many of which contain potent bioactive secondary metabolites that have historically inspired modern drug design. As modern research pivots toward reverse pharmacology and natural product optimization, rigorous investigation into phytochemical composition, safety margins, and molecular mechanisms has elevated the standing of traditional botanicals within mainstream pharmaceutical science (Sidhu & Sharma, 2013; Naphade & Jadhav, 2025; Fabricant & Farnsworth, 2001; Atanasov *et al* ., 2021).

While Punjab is globally recognized as the epicenter of India's intensive agrarian Green Revolution, its varied micro-topography—encompassing the undulating Shivalik foothills, seasonal rivulets, wetlands, and forest patches harbors a surprisingly resilient wealth of medicinal flora. Local communities have long leveraged these plants to manage everything from common gastrointestinal upsets and respiratory distress to chronic inflammatory conditions and metabolic disorders. Field surveys across the state have consistently documented this rich knowledge, though much of it remains scattered across localized reports (Singh *et al* ., 2018; Kaur *et al* ., 2020; Kumar *et al* ., 2026).

Simultaneously, shifting economic pressures and agricultural sustainability concerns have sparked interest in crop diversification. Cultivating high-value medicinal plants offers Punjab's farmers an attractive alternative to conventional wheat-paddy rotations. However, realizing this potential requires strict adherence to Good Agricultural and Collection Practices (GACP), quality planting material, and sound market linkages (Singh, 2023; Singh & Baldi, 2023; WHO, 2003). This review brings together these disparate threads, synthesizing floristic, phytochemical, and socioeconomic literature to offer a comprehensive assessment of Punjab's medicinal plant wealth.

2. METHODOLOGICAL FRAMEWORK IN REGIONAL ETHNOBOTANY

Research into Punjab's medicinal flora requires methods that incorporated field ethnography with laboratory phytochemistry and agricultural science. Over recent decades, investigators have relied on several core methodologies:

2.1 Ethnobotanical Fieldwork and Interviews

Direct engagement with village elders, traditional healers (Vaids), and farming communities remains the bedrock of local data collection. Through semi-structured interviews and participatory walks, researchers document local nomenclature, plant parts utilized, preparation methods, and therapeutic indications. Because this lore has largely been preserved through oral transmission, systematic documentation protects it against generational erosion (Singh *et al* ., 2018; Kaur *et al* ., 2020; Jain, 1991).

2.2 Floristic Surveys and Herbarium Inventories
Taxonomic field surveys identify wild species within their native habitats ranging from scrub forests to agricultural margins (Singh *et al* ., 2018; Kumar *et al* ., 2026).

2.3 Synthesis of Phytochemical and Pharmacological Data
Rather than repeating established laboratory screens, contemporary reviews critically evaluate published bioactivity assays. Aligning traditional uses with modern pharmacological metrics—such as antioxidant capacity, enzyme inhibition, or antimicrobial potency—lends credibility to historical claims (Gajarmal *et al* ., 2020; Heinrich *et al* ., 2020).

2.4 Agronomic and Socio-Economic Evaluations
Evaluating the viability of medicinal plant cultivation involves analyzing soil parameters, micro-climates, input costs, and market demand. Farmer-centric surveys illuminate supply chain bottlenecks, helping extension agents design feasible crop diversification models (Singh, 2023; Singh & Baldi, 2023).

3. Biogeographic Diversity and Distribution Across Punjab
Punjab's position within the Trans-Gangetic plains yields distinct agro-climatic zones that govern plant distribution. The north-eastern districts, bestowed by the Shivalik hills, feature higher precipitation and cooler thermal regimes, fostering moisture-dependent species. Conversely, the south-western districts experience semi-arid extremes, favoring drought-hardy xerophytic taxa (Singh, 2023; Kumar *et al* ., 2026).
The Shivalik belt represents the state's primary biodiversity reservoir. Undulating terrain and fertile forest soils support native populations of high-value taxa like *Phyllanthus emblica*, *Withania somnifera*, and *Tinospora cordifolia*. Meanwhile, in the intensively farmed plains, medicinal species persist along field bunds, village commons, and canal banks, or are increasingly integrated into planned agroforestry systems (Singh *et al* ., 2018; Gajarmal *et al* ., 2020).

4. Ethnomedicinal Heritage and Traditional Systems
Traditional healing in Punjab operates at the intersection of codified classical frameworks (Ayurveda, Unani) and pragmatic household folk remedies. Decoctions, fresh leaf juices, and root powders are routinely used to manage seasonal fevers, digestive issues, and dermatological complaints. While modern clinics are widely accessible, cultural familiarity and cost-effectiveness ensure that herbal self-care remains an active pillar of rural life (Singh *et al* ., 2018; Patel *et al* ., 2020).
However, this living archive faces severe pressure. Rapid modernization, land-use conversion, and the diminishing status of traditional practitioners threaten to sever the intergenerational transfer of botanical knowledge. Systematic documentation serves as an essential defense against this cultural and biological amnesia (Kaur *et al* ., 2020).

5. Major Medicinal Plants of Punjab
The state's flora encompasses diverse life forms ranging from annual herbs to towering trees harboring rich secondary metabolite profiles including alkaloids, flavonoids, glycosides, and essential oils. Table: 1 outlines some prominent medicinal species documented in Punjab, detailing their botanical identities, traditional uses, pharmacological activities, and primary references.

S. No.	Botanical Name	Hindi/Punjabi name	Major Phytochemicals	Traditional uses/ Pharmacological activities	References
1	*Abelmoschus moschatus* (Malvaceae)	Musk Mallow / Mushkdana	Farnesol, flavonoids, sterols, tannins	Cough, digestive disorders, skin diseases Antioxidant, antimicrobial, anti-inflammatory	Kapoor (2001); Khare (2007)
2	*Achyranthes porphyristachya* (Amaranthaceae)	Prickly Chaff Flower / Apamarga / Putth Kanda	Achyranthine, saponins, flavonoids	Wounds, dysentery, cough, joint pain Anti-inflammatory, antimicrobial, diuretic	Chopra *et al* . (1956); Khare (2007)
3	*Allium sativum* (Amaryllidaceae)	Garlic / Lahsun / Lasan	Allicin, ajoene, diallyl sulfides	Hypertension, infections, hyperlipidemia Antimicrobial, cardioprotective, antioxidant	Rivlin (2001); Duke (2002)
4	*Aloe vera* (Asphodelaceae)	Aloe vera / Gwarpatha	Acemannan, aloin, barbaloin	Burns, wounds, gastric ulcers, constipation Wound healing, antimicrobial, gastroprotective	Benzie & Wachtel-Galor (2011); Khare (2007)
5	*Amaranthus polygamus* (Amaranthaceae)	Dwarf Amaranth / Chaulai	Betalains, flavonoids, vitamins A & C	Anemia, nutritional deficit, indigestion Antioxidant, anti-inflammatory,	CSIR (1948–1976); Khare (2007)

				antidiabetic	
6	*Azadirachta indica* (Meliaceae)	Neem	Azadirachtin, nimbin, nimbidin	Skin diseases, fever, diabetes, wounds Antimicrobial, anti-inflammatory, antidiabetic	Biswas *et al* . (2002); Khare (2007)
7	*Boerhavia diffusa* (Nyctaginaceae)	Spreading Hogweed / Punarnava / It-sit	Punarnavine, boeravinones, alkaloids	Edema, kidney disorders, liver ailments Diuretic, hepatoprotective, nephroprotective	Kapoor (2001); Khare (2007)
8	*Bryophyllum pinnatum (Crassulaceae)*	Miracle Leaf / Patharchatta / Zakhm-e-Hayat	Bufadienolides, flavonoids, malic acid	Kidney stones, wounds, burns, ulcers Nephroprotective, wound healing, antimicrobial	Khare (2007); Kirtikar & Basu (1935)
9	*Calendula officinalis* (Asteraceae)	Pot Marigold / Calendula / Gulsarfi	Triterpenoids, carotenoids, phenolics	Wounds, burns, dermatitis, mouth ulcers Wound healing, antimicrobial, antioxidant	Bown (1995); Duke (2002)
10	*Centella asiatica* (Apiaceae)	Gotu Kola / Brahmi	Asiaticoside, madecassoside, saponins	Memory enhancement, anxiety, wounds Neuroprotective, wound healing, anxiolytic	Benzie & Wachtel-Galor (2011); Kapoor (2001)
11	*Cicer arietinum* (Fabaceae)	Chickpea / Chana / Chholay	Proteins, isoflavones, phenolic acids	Weakness, digestive issues, anemia Antioxidant, hypoglycemic, cardioprotective	CSIR (1948–1976); Khare (2007)
12	*Coriandrum sativum* (Apiaceae)	Coriander / Dhaniya	Linalool, terpinene, flavonoids	Indigestion, flatulence, diabetes Antioxidant, antimicrobial, hypoglycemic	Duke (2002); Kapoor (2001)
13	*Cuminum cyminum* (Apiaceae)	Cumin / Jeera	Cuminaldehyde, terpenes, flavonoids	Indigestion, flatulence, diarrhea, cough Carminative, antioxidant, antimicrobial	Kapoor (2001); Khare (2007)
14	Curcuma longa (Zingiberaceae)	Turmeric / Haldi	Curcumin, demethoxycurcumin, turmerones	Wounds, arthritis, digestive disorders Anti-inflammatory, antioxidant, anticancer	Kapoor (2001); Kirtikar & Basu (1935)
15	*Cuscuta reflexa* (Convolvulaceae)	Giant Dodder / Amarbel	Flavonoids, coumarins, cuscutin	Skin diseases, hair disorders, urinary ailments Anti-inflammatory, antimicrobial, hepatoprotective	Chopra *et al* . (1956); Khare (2007)
16	*Cymbopogon schoenanthus* (Poaceae)	Camel Grass / Gandhatrina	Citral, geraniol, essential oils	Fever, digestive disorders, muscle pain Antimicrobial, antioxidant, anti-inflammatory	Duke (2002); Handa *et al* . (2008)
17	*Cynodon dactylon* (Poaceae)	Bermuda Grass / Doob / Takri	Flavonoids, glycosides, terpenoids	Wounds, urinary disorders, skin diseases Antioxidant, antimicrobial, diuretic	Khare (2007); Kirtikar & Basu (1935)
18	*Eclipta alba* (Asteraceae)	False Daisy / Bhringraj / Bhangra	Wedelolactone, demethylwedelolactone	Liver disorders, hair loss, skin diseases Hepatoprotective, antioxidant, neuroprotective	Kapoor (2001); Khare (2007)
19	*Emblica officinalis* (Phyllanthaceae)	Indian Gooseberry / Amla	Ascorbic acid, emblicanin A & B	Cough, digestive disorders, diabetes Antioxidant, hepatoprotective, anti-inflammatory	Scartezzini & Speroni (2000); Duke (2002)
20	*Glycyrrhiza glabra* (Fabaceae)	Licorice / Mulethi / Jethi Madh	Glycyrrhizin, liquiritin, saponins	Cough, sore throat, gastric ulcers Expectorant, antiviral, anti-inflammatory	Duke (2002); Kapoor (2001); Khare (2007)
21	*Mentha arvensis*	Field Mint /	Menthol,	Indigestion, nausea, cold, headache	Kapoor

	(Lamiaceae)	Pudina	menthone, limonene	Carminative, antimicrobial, antispasmodic	(2001); Duke (2002); Khare (2007)
22	*Mollugo cerviana* (Molluginaceae)	Thread-stem Carpetweed / Parpataka	Orientin, vitexin, alkaloids, saponins	Fever, urinary disorders, skin diseases Antipyretic, diuretic, antioxidant	Chopra *et al* . (1956); Khare (2007)
23	*Moringa oleifera* (Moringaceae)	Drumstick Tree / Sehjan / Soanjhna	Quercetin, kaempferol, glucosinolates	Malnutrition, anemia, inflammation Antioxidant, anti-inflammatory, antidiabetic	Anwar *et al* . (2007); Fahey (2005)
24	*Ocimum tenuiflorum* (Lamiaceae)	Holy Basil / Tulsi	Eugenol, ursolic acid, rosmarinic acid	Cough, cold, fever, respiratory disorders Adaptogenic, antimicrobial, immunomodulatory	Prakash & Gupta (2005); Kapoor (2001)
25	*Oxalis corniculata* (Oxalidaceae)	Creeping Wood Sorrel / Changeri	Oxalic acid, flavonoids, vitamin C	Diarrhea, dysentery, indigestion, wounds Antioxidant, antimicrobial, anti-inflammatory	Khare (2007); Magna Scientia (2022)
26	*Pimpinella anisum* (Apiaceae)	Anise / Vilayati Saunf	Anethole, flavonoids, coumarins	Dyspepsia, flatulence, cough, bronchitis Carminative, antimicrobial, expectorant	Bown (1995); Duke (2002)
27	*Portulaca oleracea* (Portulacaceae)	Common Purslane / Kulfa	Omega-3 fatty acids, betalains, vitamins	Urinary disorders, digestive ailments, fever Antioxidant, anti-inflammatory, cardioprotective	CSIR (1948–1976); Khare (2007)
28	*Ranunculus muricatus* (Ranunculaceae)	Spiny-fruited Buttercup / Jal-dhaniya	Ranunculin, protoanemonin, flavonoids	Rheumatism, skin diseases, joint pain Rubefacient, antimicrobial, anti-inflammatory	Khare (2007); Kirtikar & Basu (1935)
29	*Seseli indicum* (Apiaceae)	Wild Ajwain / Banajwain	Limonene, p-cymene, essential oils	Indigestion, abdominal cramps, flatulence Carminative, antimicrobial, antispasmodic	Brindha *et al* . (1981); Khare (2007)
30	*Teramnus labialis* (Fabaceae)	Wild Horse Gram / Mashparni	Flavonoids, alkaloids, polysaccharides	Weakness, fatigue, reproductive disorders Adaptogenic, antioxidant, anti-inflammatory	CSIR (1948–1976); Khare (2007)
31	*Terminalia bellirica* (Combretaceae)	Belleric Myrobalan / Baheda	Gallic acid, ellagic acid, tannins	Cough, digestive disorders, eye diseases Antioxidant, antimicrobial, hepatoprotective	Khare (2007); Duke (2002); Kapoor (2001)
32	*Terminalia chebula* (Combretaceae)	Chebulic Myrobalan / Harad / Harar	Chebulagic acid, chebulinic acid, tannins	Constipation, indigestion, sore throat Antioxidant, antimicrobial, laxative	Bag *et al* . (2013); Khare (2007)
33	*Tinospora cordifolia* (Menispermaceae)	Guduchi / Giloy	Tinosporaside, berberine, cordifolioside	Fever, diabetes, liver disorders Immunomodulatory, antioxidant, hepatoprotective	Upadhyay *et al* . (2010); Khare (2007)
34	*Trachyspermum ammi* (Apiaceae)	Bishop's Weed / Ajwain	Thymol, carvacrol, γ-terpinene	Indigestion, flatulence, cough, asthma Antimicrobial, antioxidant, bronchodilatory	Duke (2002); Kapoor (2001); Khare (2007)
35	*Tribulus alatus* (Zygophyllaceae)	Winged Caltrop / Jangli Gokharu	Steroidal saponins, diosgenin, flavonoids	Urinary disorders, kidney stones Diuretic, antioxidant, aphrodisiac, nephroprotective	Chandrashekhar *et al* . (2012); Kaushik (2013)
36	*Trigonella foenum-graecum* (Fabaceae)	Fenugreek / Methi	Trigonelline, diosgenin, saponins	Diabetes, hyperlipidemia, lactation support Hypoglycemic, hypolipidemic,	Duke (2002); Kapoor (2001); Khare

				antioxidant	(2007)
37	*Urginea indica* (Asparagaceae)	Indian Squill / Jangli Piyaz	Scillaren A & B, bufadienolides	Bronchitis, cough, edema, cardiac ailments Expectorant, cardiotonic, antimicrobial	Khare (2007); Kirtikar & Basu (1935)
38	*Viola cinerea* (Violaceae)	Grey Violet / Banafsha	Flavonoids, alkaloids, violacin	Cough, sore throat, fever, skin disorders Antitussive, anti-inflammatory, antioxidant	Khare (2007); Kumar *et al* . (2009)
39	*Withania somnifera* (Solanaceae)	Ashwagandha / Asgandh	Withanolides, sitoindosides, alkaloids	Weakness, stress, arthritis, insomnia Adaptogenic, anti-inflammatory, neuroprotective	Mirjalili *et al* . (2009); Khare (2007)

6. Cultivation and Commercialization Prospects

Incorporating medicinal crops into Punjab's agricultural matrix offers a timely buffer against ecological degradation linked to intensive monoculture. Species such as *Aloe vera*, *Withania somnifera*, *Mentha arvensis*, and *Ocimum tenuiflorum* adapt readily to regional soils, providing profitable yields when supported by structured extension services and transparent procurement channels (Singh, 2023; Singh & Baldi, 2023).

7. Conservation Challenges and Future Directions

Wild populations of medicinal flora face mounting threats from habitat fragmentation, over-harvesting, and land conversion. Mitigating these pressures necessitates a two-pronged approach: establishing in-situ protected micro-reserves in the Shivalik belt while scaling up ex-situ cultivation among farming communities. Concurrently, bridging indigenous ethnobotany with rigorous clinical validation will ensure that Punjab's botanical heritage endures for future generations (WHO, 2003; Atanasov *et al* ., 2021).

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