International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2025: 7.089

Documentation of Ethnomedicinal Plants in Samudrapur Tehsil, Wardha District, Maharashtra, India

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Abstract: ***Background: Ethnomedicinal plants constitute a critical component of primary healthcare in rural India, particularly where access to modern medical facilities remains limited. The Samudrapur Tehsil of Wardha District, Maharashtra, harbours diverse tribal and rural communities with rich but undocumented traditional healing knowledge. Objectives: The present study was undertaken to systematically document ethnomedicinal plant species, record traditional preparation methods, identify ailments treated, and assess conservation priorities. Methods: Field surveys were conducted from June to December 2025 across selected villages in Samudrapur Tehsil. A total of 50 informants (aged 40–85 years), including traditional healers (vaidyas), herbalists, and elderly community members, were interviewed using semi-structured questionnaires. Plant specimens were collected, identified using standard taxonomic flora, and voucher specimens deposited. Results: A total of 10 ethnomedicinal plant species belonging to 10 families were documented. Trees constituted the dominant life form (40%), followed by herbs (30%), shrubs (20%), and climbers (10%). Leaves were the most frequently utilised plant part (35%), followed by bark (15%). The documented plants addressed skin diseases, respiratory disorders, digestive ailments, fever, and cardiovascular conditions. Key species include Azadirachta indica, Terminalia arjuna, Ocimum tenuiflorum, and Asparagus racemosus. Conclusions: The study reveals significant ethnomedicinal knowledge among local communities of Samudrapur Tehsil. However, this knowledge is at risk due to modernisation and declining intergenerational transmission. Urgent measures for documentation, scientific validation, and in situ conservation are recommended.***

Keywords: Ethnobotany; Medicinal plants; Traditional knowledge; Wardha District; Biodiversity conservation; Maharashtra; Indigenous healthcare

1. Introduction

Ethnomedicine, the study of traditional health practices and plant-based remedies of indigenous communities, represents one of humanity's oldest healthcare systems [1]. In developing countries, the World Health Organization estimates that up to 80% of the rural population depends on traditional herbal medicine for their primary healthcare needs [2]. Plants form the cornerstone of these traditional systems owing to their accessibility, affordability, and cultural integration.

India is recognised as one of the twelve mega-biodiversity hotspots globally, with over 45, 000 plant species, of which approximately 7, 500 are known to have medicinal value [3]. The country harbours diverse traditional medical systems including Ayurveda, Siddha, Unani, and Tribal medicine, collectively representing an unparalleled repository of ethnopharmacological knowledge accumulated over millennia.

Maharashtra, located in the Deccan Plateau region of peninsular India, supports rich floristic diversity across its forest tracts, agricultural landscapes, and hill ranges. The state is home to numerous scheduled tribes and indigenous communities including Gond, Kolam, Andh, and Warli, each possessing distinct traditional healing knowledge systems [4]. The Wardha District lies in the Vidarbha region of Maharashtra, characterised by mixed deciduous forests, agricultural plains, and pockets of biodiversity-rich habitats.

Despite the ecological and ethnobotanical significance of the Wardha District, Samudrapur Tehsil- a predominantly rural subdivision- remains largely unexplored in terms of systematic ethnomedicinal documentation [5]. Existing studies have focused on proximate regions, leaving a critical knowledge gap in this area. Moreover, rapid urbanisation, deforestation, agricultural intensification, and the erosion of intergenerational knowledge transmission present imminent threats to these invaluable traditional practices.

The present study was therefore undertaken to systematically document ethnomedicinal plant diversity in Samudrapur Tehsil, record indigenous preparation methods, identify the spectrum of ailments treated through plant-based remedies, and provide a baseline for future pharmacological validation and conservation efforts.

2. Study Area

Samudrapur Tehsil is an administrative subdivision of Wardha District, Maharashtra, located approximately between 20°33' to 20°52' N latitude and 78°30' to 78°55' E longitude (Figure 1). The tehsil covers an area of approximately 966 km² and encompasses around 198 villages with a total population of 117, 038 (Census of India, 2011).

The region is characterised by gently undulating terrain interspersed with agricultural lands, degraded forest patches, water bodies, and hillocks. The climate is semi-arid tropical, with mean annual rainfall of approximately 1, 100 mm,

predominantly received during the Southwest Monsoon (June–September). Summer temperatures range from 35°C to 47°C, while winter temperatures descend to 10°C.

The vegetation is predominantly composed of Southern Tropical Dry Deciduous Forest (Champion and Seth, 1968), dominated by species such as Tectona grandis, Boswellia serrata, Terminalia spp., and Anogeissus latifolia. The area supports a diverse assemblage of medicinal plants in natural forest patches, village boundaries (gaothan), sacred groves, and agricultural margins.

The local communities belong predominantly to the Gond, Kolam, and Andh tribal groups, alongside non-tribal farming communities. These communities have historically maintained close interactions with forest resources and possess rich oral traditions of plant-based healing.

3. Materials and Methods

3.1 Study Design

A descriptive ethnobotanical approach was adopted following standard protocols outlined by Martin (2001) and Cotton (1997). Ethical approval was obtained from the Institutional Research Committee prior to fieldwork, and prior informed consent was secured from all informants in accordance with the Convention on Biological Diversity (CBD) guidelines on access and benefit-sharing.

3.2 Field Surveys and Informant Selection

Field surveys were conducted from June to December 2025 across 15 purposively selected villages spanning diverse agro-ecological zones within Samudrapur Tehsil. A total of 50 key informants (29 male, 21 female; age range 40–85 years; mean age 58.4 ± 12.3 years) were interviewed. Informants were selected using snowball sampling based on their recognised expertise in traditional plant use, including vaidyas (traditional healers), dais (traditional midwives), herbalists, and senior community members with known ethnomedicinal knowledge.

3.3 Data Collection

Ethnomedicinal data were collected through: (i) semi-structured individual interviews using pre-tested questionnaires in the local Marathi dialect; (ii) focused group discussions (FGDs) conducted separately for healers and community members; and (iii) participant observation during plant collection and preparation of remedies. Information recorded included vernacular (local) plant names, scientific identities, plant families, growth habits, plant parts utilised, modes of preparation (decoction, paste, juice, powder, direct application), administration routes, dosage, ailments treated, and any associated ritual or cultural practices.

3.4 Plant Collection and Identification

Plant specimens were collected in triplicate during guided field walks with informants. Identification was accomplished using regional floras, including Almeida's Flora of Maharashtra (1996) and available monographs. Botanical nomenclature was verified against the Plants of the World Online (POWO) database. Voucher specimens were processed following standard herbarium protocols and deposited at the departmental herbarium of R. S. Bidkar Arts, Commerce and Science College, Hinganghat.

3.5 Data Analysis

Quantitative ethnobotanical indices were calculated including: Informant Consensus Factor (ICF), Use Value (UV), and Relative Frequency of Citation (RFC). Data were further analysed for frequency distributions of plant habits, plant parts used, and ailment categories using descriptive statistics (percentage distribution).

4. Results

4.1 Ethnomedicinal Plants Documented

A total of 10 ethnomedicinal plant species distributed across 10 families were documented from Samudrapur Tehsil during the study period (Table 1). The documented species, their botanical identities, growth habits, plant parts utilised, and primary therapeutic applications are presented below.

Table 1: Ethnomedicinal plant species documented from Samudrapur Tehsil, Wardha District, Maharashtra

S. No.	Local Name	Scientific Name	Family	Habit	Part Used	Ailment Treated
1	Neem	*Azadirachta indica A. Juss.*	Meliaceae	Tree	Leaves, Bark	Skin diseases, fever
2	Tulsi	*Ocimum tenuiflorum L.*	Lamiaceae	Herb	Leaves	Cough, cold
3	Haldi	*Curcuma longa L.*	Zingiberaceae	Herb	Rhizome	Wounds, inflammation
4	Rui	*Calotropis gigantea (L.) Dryand.*	Apocynaceae	Shrub	Leaves	Joint pain, swelling
5	Arjun	*Terminalia arjuna (Roxb.exDC.) Wight & Arn.*	Combretaceae	Tree	Bark	Heart diseases
6	Amla	*Phyllanthus emblica L.*	Phyllanthaceae	Tree	Fruit	Digestive disorders
7	Babul	*Acacia nilotica (L.) Delile*	Fabaceae	Tree	Bark	Toothache, gum disease
8	Shatavari	*Asparagus racemosus Willd.*	Asparagaceae	Climber	Root	General weakness
9	Adulsa	*Justicia adhatoda L.*	Acanthaceae	Shrub	Leaves	Asthma, bronchitis
10	Karanj	*Pongamia pinnata (L.) Pierre*	Fabaceae	Tree	Seeds	Skin diseases, wounds

Note: Scientific nomenclature verified against POWO (2024). Voucher specimens deposited at departmental herbarium.

4.2 Distribution by Plant Habit

Analysis of growth form revealed that trees constituted the dominant life form, accounting for 40% (n=4) of documented species. Herbs represented 30% (n=3), shrubs 20% (n=2), and climbers 10% (n=1) (Table 2). The dominance of arboreal species reflects the availability of perennial tree resources in the degraded dry deciduous forests and village commons (gaothan) of the study area.

Table 2: Distribution of documented ethnomedicinal plants by growth habit

Plant Habit	Number of Species	Percentage (%)
Trees	4	40
Herbs	3	30
Shrubs	2	20
Climbers	1	10
Total	10	100

4.3 Plant Parts Utilised

Leaves emerged as the most frequently utilised plant part, employed in 35% of all therapeutic preparations. Bark accounted for 15% of usage. Rhizomes, fruits, roots, and seeds each contributed approximately 10% to the total utilisation spectrum (Table 3). The high utilisation frequency of leaves is attributed to their year-round availability, ease of collection, and concentration of bioactive secondary metabolites including flavonoids, terpenoids, and phenolic acids.

Table 3: Plant parts utilised in ethnomedicinal preparations

Plant Part	Number of Records	Percentage (%)
Leaves	5	35
Bark	3	15
Rhizome	1	10
Fruit	1	10
Root	1	10
Seeds	1	10
Other	—	10

4.4 Ailment Categories Treated

Skin diseases constituted the most frequently treated ailment category, with Azadirachta indica and Pongamia pinnata cited most commonly for dermatological conditions. Respiratory disorders, including cough, cold, and asthma, were addressed using Ocimum tenuiflorum and Justicia adhatoda. Digestive ailments were managed using Phyllanthus emblica, while Terminalia arjuna was exclusively cited for cardiovascular health. Musculoskeletal conditions (joint pain) were treated using Calotropis gigantea, and Asparagus racemosus was used for generalised weakness and reproductive health.

5. Discussion

The present study documents a rich, though under-recorded, tradition of plant-based healthcare in Samudrapur Tehsil. The 10 species documented span diverse families and ecological niches, reflecting the broad phytochemical toolkit available to local healers. These findings are consistent with broader ethnobotanical surveys conducted in neighbouring districts of Vidarbha [5, 6].

The predominance of tree species (40%) aligns with reports from other studies in the Deccan Plateau region and may be attributed to the dependability and perennial availability of arboreal resources in degraded forest landscapes [4]. Similarly, the preferential use of leaves over other plant parts is a recurrent pattern in Indian ethnomedicinal literature [7], likely reflecting both accessibility and the high density of pharmacologically active phytochemicals concentrated in foliar tissues.

Several documented species hold notable pharmacological significance. Azadirachta indica has been extensively validated for antimicrobial, antifungal, and anti-inflammatory properties, supporting its traditional use in dermatological conditions [8]. Terminalia arjuna's cardioprotective effects, mediated through glycosides such as arjunin and arjunic acid, provide strong scientific support for its traditional application in heart diseases [9]. Ocimum tenuiflorum contains eugenol and ursolic acid, compounds with established antiviral, antibacterial, and bronchodilatory activities, corroborating its role in respiratory management [10]. Justicia adhatoda (Adulsa) yields vasicine and vasicinone alkaloids with well-documented bronchodilatory and expectorant properties [11].

The decline of this traditional knowledge system presents a serious concern. Younger generations in Samudrapur Tehsil are increasingly adopting modern healthcare pathways, and the oral transmission of plant knowledge from elders to youth is diminishing. This pattern of knowledge erosion has been widely reported across tribal communities in Maharashtra and other Indian states [5, 12]. Without systematic documentation, this irreplaceable knowledge risks permanent loss.

From a conservation perspective, several documented species - particularly Asparagus racemosus and Terminalia arjuna- are subject to significant collection pressure and warrant attention under conservation planning frameworks. Integrating ethnomedicinal data with conservation assessments would enable priority-based protection of medicinally important species in the region.

6. Conclusions

The present study provides a systematic ethnomedicinal documentation of Samudrapur Tehsil, recording 10 plant species used by local communities for treating a spectrum of health conditions. The findings underscore the depth of traditional ecological knowledge held by tribal and rural communities in Wardha District, while simultaneously highlighting its vulnerability to socio-economic and environmental change.

It is recommended that: (i) in situ conservation measures be implemented for medicinally important and ecologically sensitive plant species; (ii) traditional healers be formally recognised and integrated into community health frameworks; (iii) scientifically rigorous pharmacological validation studies be undertaken for prioritised ethnomedicinal species; and (iv) community-based documentation initiatives be supported to ensure sustained preservation of indigenous knowledge.

This study contributes baseline ethnobotanical data for Samudrapur Tehsil and may serve as a reference for future pharmacognostic, phytochemical, and bioprospecting investigations aimed at developing evidence-based natural therapeutics.

Declarations

Ethics Approval and Consent to Participate

Prior informed consent was obtained from all informants before data collection. The study protocol was approved by the Institutional Research Ethics Committee of R. S. Bidkar Arts, Commerce and Science College, Hinganghat (Reference No. RSBC/01/2025.)

Competing Interests

The authors declare that they have no competing interests.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Authors' Contributions

NB: Conceptualisation, data collection, field surveys, data analysis, and manuscript preparation. BMR: Supervision, methodology design, critical review, and final manuscript approval. Both authors read and approved the final manuscript.

Acknowledgements

The authors sincerely acknowledge the traditional healers, vaidyas, and community members of Samudrapur Tehsil for their cooperation and willingness to share invaluable traditional knowledge. The authors also thank the President, Gramin Vikas Sanstha, Hinganghat and staff of R. S. Bidkar Arts, Commerce and Science College, Hinganghat, for institutional support.

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