# A REVIEW ON ETHNOMEDICINAL PLANTS AND THEIR TRADITIONAL USES IN INDIA

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**Abstract**
One of the oldest therapeutic systems in the world is the traditional medicine of India. In Indian traditional medical systems, medicinal and aromatic plants predominate. Many medicinal plants have historically been employed in India for their therapeutic value; as a result, they have also come to play an important part in Indian religion. Numerous of these plants have been shown to have antimicrobial, anti-asthmatic, and anti-ant illness properties. This study presents current knowledge on several Indian medicinal plants that have pharmacological value in preventing infections. The databases of Scopus, PubMed, Science Direct, Elsevier, Springer, and pertinent research articles were consulted for all material. In India, herbal treatments made from the mentioned medicinal plants are widely utilised. Research publications citing the ethnobotanical applications of these plants as well as their significant active principles and mechanisms of action in naturally occurring medicines serve as validation for their use.

**Keywords:** Ethnobotany, Traditional Medicine, Cancer, Anti-Microbial, Herbs, Allergy & Portal Hypertension

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## Introduction

Commercial exploitation threatens vital medicinal plants, risking their loss. Himalayan species with cultural and medical value are superior to synthetic drugs. Urgent documentation is needed for 51 significant Sikkim plants, their classifications, uses, and parts. (1) Botanical study examines Kumaran Kundru Hill's angiosperms, focusing on taxonomy, diversity, and ethnomedicine. Identified 114 genera, 56 families, and 126 species, preserved via herbarium methods. Varying species diversity noted. (2) An investigation revealed a checklist of 80 tree species spanning 67 genera and 34 families. Notably, Fabaceae dominated with 23 species, while four were Vulnerable and one Near Threatened globally. (3) Quantitative markers including ICF, FL, and JI were used during the Rhodopes Mountain ethnobotanical study. 114 plant species were discovered through analysis of data from 92 informants, mostly for neurological, respiratory, digestive, and cardiovascular problems. (4)

Exploratory study in Haryana's Mirka, Takas, and Patan villages highlights ethnobotanical knowledge's role in culture, biodiversity, and medicinal herb use. Identified 22 plants from 15 families with diverse chemical components, suitable for traditional and medical applications. (5) From Dec 2021 to June 2022, Hisar's Satrod Khurd and Dabra villages revealed 33 medicinal plants used for various ailments. The region's biodiversity supports local needs and environmental preservation, aiding sustainable resource use. (6)

Many plants, including Gymnema sylvestre, Withania somnifera, Curiculigo orchioides, Chlorophytum tuberosum, Plumbago zeylanica, Acorus calamus, Celastrus paniculatus, and others, were discovered to be extremely uncommon reported at Sonebhadra district. Deforestation, excessive grazing, and rising population are the key factors contributing to plant raring. (7) Indian folklorists utilize diverse Opuntia species for numerous medicinal purposes, thoroughly documented with details like names, uses, and administration methods. This study covers 85 applications across 16 states, potentially aiding reverse pharmacology research. (8) Ethnomedicinal plants in Haryana's Charkhi Dadri were documented, revealing 90 plants from 41 families. Herbs dominated (47.7%), with Leguminosae, Solanaceae, and others used to treat historical ailments like menorrhagia, typhoid, and diabetes. (9)

In West Bengal's East Midnapore region, 162 medicinal plants were studied using markers like

FL, ICF, and UV. Leaves (20.35%) were common, and decoctions (38.27%) were popular. Ricinus communis had the highest UV value (0.01595), emphasizing medicinal plants' role in healthcare. (10) Vindhyan highlands' Baiga, Kharwar, and Gond tribes employ 95 ethnomedicinal and edible plants. Climbers (12.64%), herbs (29.47%), and trees (44.42%) treat various disorders, with species like Cissus quadrangularis and Elaeodendron glaucum aiding musculoskeletal issues and bites. Calotropis procera and Cassia tora are prominent for ear and eye problems. Yet, 9.5% and 24.2% of species face extinction due to human impact. (11)

The strong agreement among the Monpa, Miji, Aka, and Bugun groups in district West Kameng, Arunachal Pradesh, India, on the usage of plants to treat the majority of common maladies points to positive cross-cultural contact. To ensure that medicinal plants continue to be available to future generations, they must be protected and propagated. (12) The majority of plants utilised were herbaceous (32 species, 54%), followed by trees (20 species, 33%), shrubs (20 species, 8%), and climbers (3 species, 5%) The most often utilised plant components were leaves, and the most popular medicine preparation among the locals was a decoction. In the research area, fidelity levels ranged from 11.53% to 100%, and the Informant consensus factor (ICF) was 0.88 to 0.97. (13)

Northeast Indian tribes utilize 56 plants from 29 families for remedies, aligning with prior research. Traditional healers effectively use plant parts for ailments, highlighting Piper betel's ethnomedical significance. This study emphasizes historical medicinal plants' value in treating diverse illnesses. (14) Throughout history, Zingiberaceae plants have been explored for treating deadly diseases. Labdane diterpene, abundant in A. nigra, holds significant bioactive potential for medical and industrial use, highlighting the importance of conservation for A. nigra. (15) Northeast Indian tribes use Clerodendrum colebrookianum Walp for its cardioprotective attributes. Extracts aid ailments like coughs, diabetes, and stomach issues. Biosynthesized AgNPs showcase antioxidant and antibacterial potential for bioactive uses. (17) Argemone mexicana plants contain alkaloids, flavonoids, terpenoids, and more. Detailed phytochemical, pharmacological, and ethnomedical insights provided, aiding subsequent research efforts. (18)

**Cure in Viral Infection**

COVID-19's rapid spread prompted research into Ayurvedic rasayana therapy's immune and adaptogen effects. Ashwagandha, Guduchi, and Shatavari's phytoconstituents were studied via network pharmacology and docking for anti-SARS-CoV-2 potential. 31 safe phytoconstituents were identified, highlighting Rasayana's potential as COVID-19 adjuncts. (19) Dengue drug research targets DENV's NS2B-NS3pro enzyme. Azadirachta indica's bioflavonoids, like rutin and kaempferol-3-O-rutinoside, showed strong viral inhibition against DENV-2, suggesting their potential for dengue treatment. (20) The COVID-19 pandemic brought a severe global health challenge. Computational analysis identified catechin and curcumin as potential agents that could disrupt the SARS-CoV2 virus's interaction with host receptors, offering treatment potential. (21)

Ammaiyar Koondhal Kudineer (Akk), a traditional Siddha remedy, contains chebulagic acid. This compound, among Akk's 16 active ingredients, exhibits strong binding to COVID-19 protease in various forms, suggesting protease inhibition potential. Further in silico study on different SARS-CoV2 targets is required for a comprehensive understanding. (22) Tulsi and neem extracts possess antiviral traits. Study evaluated their efficacy against SARS-CoV-2 targets, revealing superior binding compared to common drugs. Natural compounds from tulsi and neem show promise for SARS-CoV-2 treatment by targeting viral attachment and replication. (23) Yashtimadhu, an Ayurvedic herb, was investigated for COVID-19 prevention through molecular docking. The study evaluated its efficacy in inhibiting SARS-CoV-2's key proteins and human receptors, including ACE2 and furin protease. Pharmacokinetics and drug-likeness were also projected for its phytochemicals. (24)

**Ethno medicinal plants useful to prevent in some common diseases**

Dendrobium, a traditional medicinal herb rich in bioactive compounds, shows potential for liver protection and related issues. Mechanistic and pharmacokinetic research is needed. This review emphasizes its multifaceted medicinal applications. (25) Silymarin from milk thistle seeds traditionally treats liver issues. Eurosil 85 aimed to enhance its oral bioavailability. Clinical studies revealed benefits for diabetes, cirrhosis, and liver health, with high tolerance and safety. (26) Phytoalexins' biochemistry, synthesis, and breakdown by microbes have been studied. They find use in various plant and human health applications. Research suggests phytoalexins hold

potential for treating diabetes, cancer, brain damage, and heart issues. (27)

Botanical study among Bhil, Meena, Garasia, Kathodia tribes in Rajasthan identified 55 plant species from 52 genera and 35 families used to treat post-birth to age five mother-child ailments. Plants and their parts were documented for health and nutritional benefits during nursing. (28) Leaves were the primary part used from medicinal plants, followed by fruits, seeds, roots, bark, and flowers. Skin ailments (15 species) had the highest focus, followed by wounds, coughs, and stomach issues. Socioeconomic factors correlated with plant use. Plants with high FL and CI scores are potential drug candidates, providing valuable data for future pharmacological research. (29)

Spinacia oleracea leaves were extensively studied for their ethnobotanical, phytochemical, pharmacological, and physiochemical properties. Rich in constituents like alkaloids, flavonoids, and tannic acid, the extract exhibited strong antioxidant activity and medicinal potential. (30) Research highlights the medicinal potential of plants like Emblica officinalis, Withania somnifera, Swertia chirata, and more. These plants contribute to modern medicines after extraction, standardization, and safety testing. Traditional and modern medicine collaboration offers treatment for infections and paves the way for herbal remedies. (38) In Andhra Pradesh, India, S. bryopteris Linn. plant was ethanol-extracted. Phenolic, flavonoid concentrations were measured, and GC-MS analysis identified active metabolites. Antioxidant potential, improved recovery rates, and tissue regeneration support S. bryopteris as a promising wound treatment. (31)

Ethnic groups in Ahmednagar, India, use 62 plants from 32 families as fever remedies. Field study identified 71 plants locals employ. 23 common species from 17 families found between lists. Plant families (n=109) are ordered using APG IV Classification. (44) In Himachal Pradesh, 87 ethnomedicinal plants across 51 families treat jaundice. Notable plants include Emblica officinalis, Ricinus communis, Terminalia chebula, among others. Pharmacological validation could lead to potent jaundice treatments. (32) Herbal treatments effectively addressed amoebiasis, E. coli, GI infections, skin infections, and UTIs, backed by investigations. Demand stems from cost-effectiveness, cultural acceptance, and minimal side effects, highlighting Indian medicinal herbs' role in managing diverse viral disorders. (33)

Oral traditional knowledge was used to streamline medicinal plant usage for GI problems on Kishtwar plateau. Mentha longifolia had highest use value (UV) at 0.87, while Carpesium abrotanoides had 0.03. Artemisia maritima and Elwendia persica were reliable for diarrhea and stomachaches. Mentha longifolia was most frequently used for GI disorders. (34) In Telangana's Almuru district, 34 plant species from 19 families were identified. Notable families include Anacardiaceae, Annonaceae, Arecaceae, Moraceae, and Cucurbitaceae. Certain plants have anti-halitosis properties, showcasing local halitosis treatment knowledge. (35)

**In Preventing and Treatment of Cancer**

Selaginella bryopteris extract (SBE) demonstrated potential against liver cancer in cell and animal models, inducing apoptosis, reducing indicators in rats, and enhancing antioxidants. Molecular analysis and bioactive components support its HCC therapy potential after safety validation. (36) Picrosides' antioxidant and anti-inflammatory actions prevent oncogenesis. Effects on apoptosis, signal transduction, cell cycle, and detoxifying enzymes support picrosides as vital therapy against diverse cancers. (37)

Curcuma longa L. had the greatest user satisfaction ratings (50%) and Prunus armeniaca L. seeds received the highest user ratings (100%) respectively. Efficacy among regularly used herbs did not considerably differ. Lower socioeconomic class cancer patients benefited from herbal therapy. 16% of people reported experiencing negative symptoms, with Juniperus oxycedrus L. being the most hazardous. Patients who had cancer for more than a year saw worse side effects. (38)

**In Preventing and Treatment of Allergy & Portal Hypertension**

DSR therapy notably reduced inflammation, airway remodeling, and cell accumulation in allergic asthma. Histological analysis revealed bronchial epithelium thickening and reduced lung inflammation. DSR enhanced antioxidant defense and lowered pro-inflammatory cytokines, suggesting its potential as an effective allergic asthma treatment. (39) The investigation delved into cellular and molecular aspects of portal hypertension, particularly LSECs, HSCs, microvascular thrombosis, and extrahepatic vasculature. It also explored clinical advancements in portal hypertension understanding. (40) Traditional Ayurvedic plants in India offer potential for affordable phyto-therapeutics and novel anti-asthmatic drugs. The study aims to evaluate progress in research on

protective phytochemicals targeting immune responses in asthma. (41)

**Effective in treating skin disorders**

Plants like Emblica officinalis, Withania somnifera, Swertia chirata, Asparagus racemosus, and Vinca/Catharanthus roseus have valuable medicinal properties, informing modern drug development. Extracts are standardized and tested for safety, combining traditional knowledge and contemporary techniques. (42) The medicinal plants used by Bir Bara Ban locals in Haryana's Jind District for treating skin conditions were cataloged. 48 species from 29 families were identified, emphasizing the importance of conserving these plants for future use. (43)

Fieldwork in the Northwestern Himalayas found 64 ethnomedicinal plants from 34 families in 2020-2021. Herbs, particularly leaves, were commonly used, especially for wound healing and skin issues. Traditional use of plants like Jurinea dolomiaea and Rheum spp. reflects the ongoing reliance on medicinal herbs. (44) In Pangi Valley, 61 plant species from 30 families effectively treat conditions like burns, itching, and wounds. Details including botanical names, uses, and preparation methods are documented. (45)

Research across five villages gathered data on over thirty plant species, used effectively in treating various illnesses. Despite conservation efforts by the Vantangiya tribe, younger generations' disinterest threatens preserving this valuable knowledge. (46) The Gowda community in isolated areas of Sullia Taluk relies on traditional medicine due to lack of modern access. They use 214 plant species for 13 illness categories, with skin conditions commonly treated by Breynia vitis-idaea, Indigofera tinctoria, and others. (60)

Ulceration results from imbalanced aggressiveness and mucosal resistance. Ayurveda and conventional medicine practitioners use polyherbal remedies and plants to treat ulcers, focusing on symptom relief, healing, and prevention. (47) A mathematical model assessed the financial impact of Lumpy Skin Disease (LSD) in India, estimating nationwide losses of INR 18337.76 crores (USD 2217.26 million) due to morbidity and mortality.(48)

**Anti-Microbial and Anti-Oxidant Nature**

Illicium verum extracts were tested against avian viruses, revealing antiviral potential. Pure methanol and aqueous extracts showed inhibitory effects against various tested viruses, suggesting herbal antiviral potential. (49) In Uganda, malaria treatment resistance is growing, prompting exploration of over 126 plant species for alternatives. Artemisia annua and Vernonia amygdalina stand out, and combining them with Microglossa pyrifolia shows promise against recrudescence.(50)

Exploring Catharanthus roseus as a cancer treatment, researchers assessed its alkaloid-rich parts (shoot, flower, root) for total phenol, flavonoid content, and free radical scavenging activity. Promising antioxidant properties suggest cancer treatment potential.(51) Phytochemical screening of Vinca rosea extracts revealed beneficial compounds. The shoot extract displayed notable antimicrobial effects against various pathogens, attributed to saponins, tannins, and flavonoids present.(52) Ginger extract demonstrated potential anti-chikungunya effects on Vero cells in an animal cell culture model, suggesting its therapeutic potential against the virus, especially in the absence of vaccines or antiviral drugs.(53)

Calendula arvensis L. possesses anti-inflammatory, antibacterial, and antioxidant properties. This comprehensive study explores its taxonomy, distribution, medicinal uses, phytochemicals, and pharmacological traits, suggesting its potential for traditional medicine pending further safety evaluation. (54) Gloriosa superba's whole plant extract was screened for antibacterial and antifungal properties. Phytochemical analysis revealed various compounds, with tuber extracts showing stronger antibacterial and antifungal potential, attributed to flavonoids and tannins. (55) Calotropis gigantea extracts were tested for antibacterial activity against pathogens. Ethyl acetate leaf extract exhibited the strongest inhibition zones and low Minimum Inhibitory Concentration values, suggesting potential medicinal use for bacterial infections. (56)

**Conclusion**

This systematic review primarily focuses on documentations of the traditional medical practises practised by indigenous populations in remote locations of India. It also compiles several prior scientific investigations on the pharmacological characteristics of medicinal plants and their diverse bioactive elements. The understanding of the traditional uses of medicinal plants paves the way for the future efficient application of herbal remedies. Most of the newly found plants have at least a few noteworthy medical qualities that are consistent with most

accepted theories. Drawing on this historical understanding of utilising plants to heal a variety of ailments and conditions may also be beneficial in prospective pharmaceutical and medical research projects that might result in breakthroughs. Furthermore, research into traditional knowledge and practises may contribute to the preservation of fast disappearing local information, customs, and medicinal plants for use by future generations.

Researchers were able to create basic phyto-medicinal extracts using Indian traditional knowledge that could be utilised to treat a variety of illnesses, from straightforward ones like the common cold to more complex ones like diabetes and cancer. Traditional ceremonies, rituals, and beliefs are frequently included into these herbal medicines. Before being given for the therapy of various Hepatobiliary disorders, medical medications are usually always blessed employing archaic beliefs and traditions. Results from earlier research indicating traditional local healers had a good grasp of how to employ various plant parts and medicinal plants for a range of ailments and disease kinds were validated and corroborated by the current review.

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**Table-1 Plant Species Used for Cure of Diseases**

| S.No | Medicinal Plants | Used against | Reference |
|---|---|---|---|
| *1.* | *Phyllanthus amarus Schumach. & Thonn.* | AIDS | Notka *et al*., 2004 |
| *2.* | *Phyllanthus niruri L.* | Hepatitis B | Venkateswaran *et al*., 1987 |
| *3.* | *Emblica officinalis Gaertn.* | Influenza A | Liu *et al*., 2011 |
| *4.* | *Andrographis paniculata (Burm. f.) Nees* | Dengue fever | Tang *et al*., 2012 |
| *5.* | *Curcuma longa L.* | HIV | Sui *et al*., 1993 |
| *6.* | *Curcuma zanthorrhiza Roxb.* | Hepatitis B | Devaraj *et al*., 2010 |
| *7.* | *Zingiber officinale Rosc* | Chikungunya | Kaushik *et al*., 2020 |
| *8.* | *Tinospora sinensis (Lour.) Merr.* | SARS-CoV-2 | Sagar *et al*., 2020 |
| *9.* | *Azadirachta indica A. Juss.* | Dengue virus | Dwivedi *et al*., 2021 |
| *10.* | *Illicium angustisepalum A.C. Sm.* | Newcastle disease | Alhajj *et al*., 2020 |
| 11. | *Justicia adhatoda* | leprosy, and diabetes | Mondal et al 2014 |
| 12. | *Artemisia vulgaris* | asthma | Hussain et al 2007 |
| 13. | *Terminalia belerica* | piles | Singh et al 2007 |
| 14. | *Butea monosperma* | Tuberculosis | Siwakoti et al 2010 |
| 15. | *Syzizium cumini* | Dysentery | Siwakoti et al 2010 |
| 16. | *Myrica esculenta* | Sinusitis | Gautam 2013 |
| 17. | *Sesamum orientale* | ringworm | Rai 2004 |
| 18. | *Hordeum vulgare* | skin diseases | Marwat et al 2012 |
| 19. | *Shorea robusta* | small pox | Singh et al 2012 |
| *20.* | *Amaranthus spinosus L.* | Antipyretic | Okujagu 2008 |
| *21.* | *Carica papaya L.* | Anthelmintic, fungal infaction | Gill 1992 |
| *22.* | *Mallotus oppositifolius (Geisel) mull. Arg* | Malaria | Farombi et al., 2001 |
| *23.* | *Artocarpus heterophyllus Lam* | Ulcer | Lawal et al, 2010 |
| *24.* | *Piper nigrum L* | Tumour | Shaba et al. 2012 |
| *25.* | *Capsicum annum* | Stroke | Odugbemi 2006 |
| *26.* | *Ricinus communis L.* | Skin diseases, | Tripathi and Srivastava 2010 |
| *27.* | *Bambusa vulgaris Schrad.* | Skin rashes | Balamurugan et al. 2019 |
| *28.* | *Azadirachta indica A. Juss.* | Leprosy | Sen et al. 2011 |
| *29.* | *Calendula officinalis L.* | Acne | Kumar et al. 2005 |
| *30.* | *Curculigo orchioides Gaertn.* | Itching | Singh et al. 2002 |
| *31.* | *Bischofia javanica Blume* | Insect bite | Saikia et al. 2006 |
| *32.* | *Rhinacanthus nasutus (L.) Kurz* | Ringworm | Sankaranarayanan et al. 2010 |
| *33.* | *Crinum viviparum (Lam.)* | Tinea cruris | Kingston et al. 2009 |
| *34.* | *Aristolochia indica L.* | Wart | Harsha et al. 2003 |
| *35.* | *Globba marantina L.* | Leukoderma | Jeevan Ram et al. 2004 |
| *36.* | *Scleria lithosperma (L.)* | Eczema, | Chendurpandy et al. 2010 |
| *37.* | *Abrus precatorius L.* | Dandruff | Poonam and Singh 2009 |
| *38.* | *Bombax ceiba L.* | Cattle wounds | Kshirsagar and Singh 2001 |
| *39.* | *Tabernaemontana undulata* | Syphilis | Sharma and Kumar 2011 |
| *40.* | *Lawsonia inermis L.* | Heal cuts and wounds | Policepatel and Manikrao 2013 |
| *41.* | *Rotheca serrata (L.)* | Eye-lid inflammation | Kumar and Bharati 2014 |
| *42.* | *Cymbopogon citratus (DC.) Stapf* | Sprain and toothache | Silja et al. 2008 |

Fig.- 1 *Clerodendrum colebrookianum Walp*

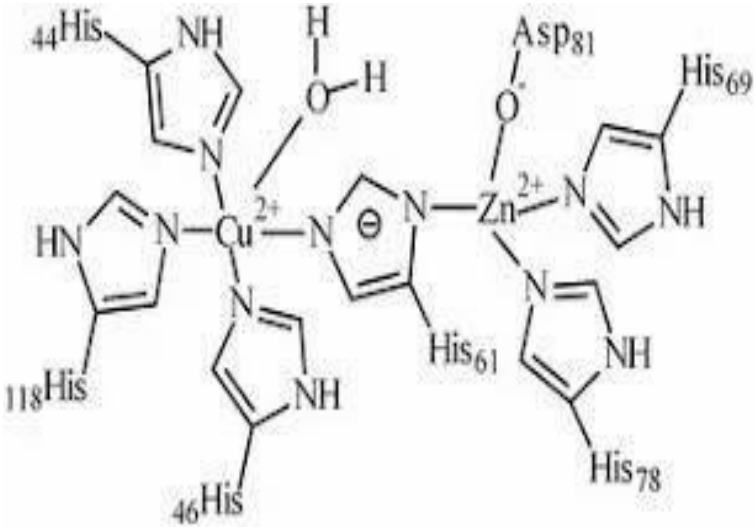


**Fig. 2-** Superoxide dismutase

**Fig- 3.** *Justicia adhatoda*


**Fig. 4-** *Ricinus communis*

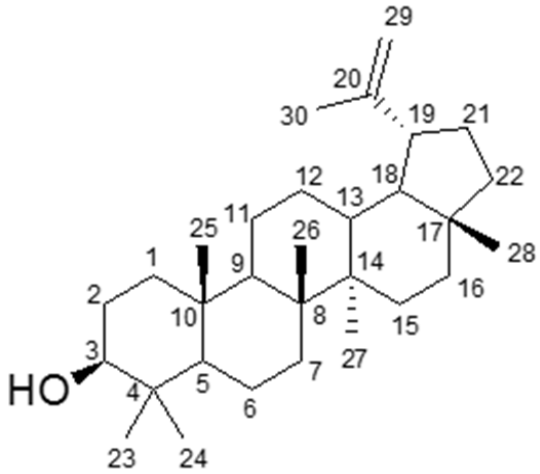


**Fig- 5** Structure of Lupeol

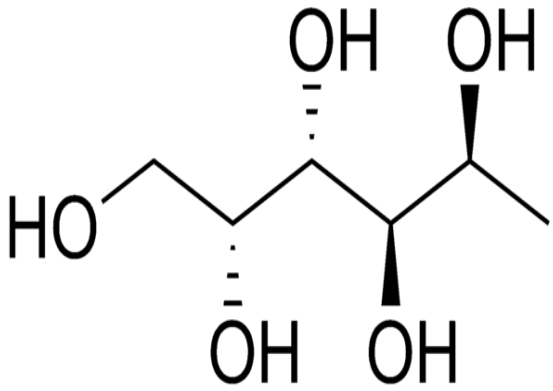


**Fig 6-** Structure of L-Fucitol