

# Identification and Documentation of Medicinal Plants used in Traditional Medicine for Treating Various Respiratory Ailments in Nawalgarh Tehsil, Rajasthan

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**Abstract:** *This study aims to identify and document medicinal plants utilized in traditional medicine for treating viral diseases and respiratory ailments within Nawalgarh Tehsil, Rajasthan. Ethnobotanical investigations were conducted to gather indigenous knowledge on the utilization of plant-based remedies for managing these health conditions. The study involved field surveys, interviews, and participatory observations within local communities known for their reliance on traditional healing practices. A total of 17 informants, including traditional healers, herbalists, and community members knowledgeable about medicinal plants, were interviewed to compile a comprehensive list of plant species used in the region. Information regarding the vernacular names, parts used, preparation methods, and modes of administration of medicinal plants was documented. The findings reveal a rich diversity of medicinal plants employed for addressing viral diseases and respiratory ailments in Nawalgarh Tehsil. Plant species such as *Adhatodavasica*, *Asparagus racemosus*, *Azadirachtaindica*, *Bacopamonniari*, *Moringaoleifera*, *Oscimum sanctum*, *Sesamumindicum* and *Solanum virginianum* were commonly cited for their therapeutic properties against conditions such as asthma, common cold, cough, and respiratory infections. Various plant parts, including leaves, roots, fruits, and seeds, were utilized in the preparation of decoctions, infusions, pastes, and poultices. Furthermore, the study highlights the cultural significance and traditional knowledge embedded within local communities regarding the use of medicinal plants for healthcare needs. Despite the availability of modern medical facilities, traditional herbal remedies continue to play a vital role in healthcare practices among the inhabitants of Nawalgarh Tehsil. The documentation of medicinal plants and traditional healing practices serves as a valuable resource for conservation efforts, as many of these plant species face threats due to habitat loss and overexploitation. Moreover, the pharmacological screening of these plant extracts could provide insights into their potential therapeutic efficacy and contribute to the development of new antiviral and respiratory medications. This study underscores the importance of preserving and promoting traditional medicinal knowledge for sustainable healthcare practices in the region.*

**Keywords:** Viral diseases, Respiratory ailments, medicinal plants, Nawalgarh, Rajasthan

## I. INTRODUCTION

Since the dawn of human civilization, plants have been a major source of medicinal prescriptions. Despite significant advancements in the field of allopathy in the twentieth century, plants continue to be a crucial source of medications in both modern and traditional medical systems worldwide. Two enduring living traditions, Traditional Chinese Medicine (TCM) and Ayurveda, the traditional Indian medicine (TIM), have contributed significantly to the current understanding of medicinal plants (Goldman, 2001; Patwardhan et al., 2005). In TCM and TIM, herbal medicines were traditionally prepared as teas, tinctures, poultices, powders, and other formulations (Balick and Cox, 1996; Samuelsson, 2004). The expertise in selecting the appropriate plants, methods of drug preparation, and their specific uses was

initially passed down orally from one generation to the next until it was eventually documented (Kinghorn, 2001; Samuelsson, 2004). It is estimated that 70-95% of people in developing nations still utilize traditional medicines (Robinson and Zhang, 2011). Currently, medicinal herbs are described as plants that possess valuable substances with therapeutic or beneficial effects for healing and preventing various diseases in humans and animals. Herbal products, including plant extracts, dry powders, and parts of plants, fungi, and algae, have been employed as complementary treatments alongside conventional medications (Li, 2002; Robinson and Zhang, 2011). Today, it is estimated that approximately 25–28% of all modern medicines are directly or indirectly derived from higher plants, showcasing the vast medicinal potential that plants have been known to possess for thousands of years in traditional medicine (Samuelsson, 2004; Chin et al., 2006). Over the past few decades, there has been a notable rise in the approval and prescription of new plant-derived substances as medicines (Balunas and Kinghorn, 2005; Chin et al., 2006).

Historically, medicinal plants have been used to combat viral infections, with the Boots drug company's 1952 initiative in Nottingham, England, marking the first systematic screening of 288 plants for anti-influenza properties (Chantrill et al., 1952). Since then, more than 90 antiviral drugs have been approved for treating viruses like HIV, HBV, HCV, and influenza (DeClercq & Li, 2016). The development of new and safer antiviral drugs has become crucial due to the high costs and adverse effects of synthetic alternatives. Herbal extracts are now seen as a promising source for creating antiviral drugs that target various stages of the virus replication process. A significant portion of current medications for microbial infections are plant-derived, with about one-fourth containing at least one active plant-based compound (Farnsworth & Soejarto, 1991). Additionally, ethnobotanical studies confirm that traditional Indian medicine predominantly relies on medicinal plants (Shi et al., 2021).

The use of medicinal plants to treat respiratory diseases has a long and rich history. This study explores various plant species known for their healing properties, particularly in relation to respiratory health. Medicinal plants have been essential in providing ingredients for medications and synthesizing drugs. Worldwide, over 35,000 plant species are used for medicinal purposes, especially in developing countries where traditional medicine, mostly plant-based, is a primary healthcare source. This paper underscores the importance of some medicinal plants in treating various common respiratory ailments. These plants are rich in bioactive compounds like tannins, alkaloids, sugars, terpenoids, steroids, and flavonoids, which have a wide range of therapeutic applications. Some medicinal plants, show promise as supportive treatments for respiratory conditions like chronic obstructive pulmonary disease (COPD), bronchitis, asthma, the common cold, cough, and whooping cough. The leaves of plants like *Acacia torta*, *Ocimum sanctum*, *Mentha haplocalyx*, *Lactucavirosa*, *Convolvulus pluricaulis*, and *Acalypha indica* are commonly used to treat pneumonia, bronchitis, asthma, colds, and coughs. This paper aims to highlight specific medicinal plants with therapeutic value, offering valuable insights for researchers in herbal medicine. These plants have the potential to become new therapeutic agents in treating viral and respiratory diseases.

## II. MATERIAL AND METHODS

Nawalgarh is a town located in Jhunjhunu district of Rajasthan. It forms a significant part of Shekhawati region, and lies 30 km from Sikar and 39 km from Jhunjhunu. Nawalgarh is best known for its fresco and havelis; it is famous as the Golden City of Rajasthan. Nawalgarh Tehsil, located in the Jhunjhunu district of Rajasthan, India, is situated at an approximate altitude of 379 meters (1,243 feet) above sea level. The latitude of Nawalgarh, Rajasthan, India is approximately 27.862146, and the longitude is 75.254288.

Nawalgarh, is known for its distinctive geography characterized by semi-arid conditions, typical of the Shekhawati region. The climate of Nawalgarh is characterized by hot summers with temperatures often exceeding 40°C (104°F) and mild winters with temperatures ranging between 10-20°C (50-68°F). The region receives limited rainfall, primarily during the monsoon season (July to September), with annual precipitation averaging around 450-500 mm. The soil in Nawalgarh is predominantly sandy loam, suitable for the cultivation of crops like bajra (pearl millet), mustard, and pulses. Despite being relatively less fertile compared to alluvial soils, the sandy loam is well-drained, which supports agriculture in the region. The natural vegetation is sparse, consisting mainly of thorny shrubs, xerophytic plants, and scattered trees like khejri (*Prosopis cineraria*), babul (*Acacia leucophloea*), and neem (*Azadirachta indica*). The wildlife in the region includes various species of birds, reptiles, and small mammals adapted to the arid environment.

Intensive exploration trips were conducted to document the ethno-medicinal plants of the Nawalgarh area. These field trips were initially made twice a week and later reduced to once a week, spanning the period from July 2022 to June 2024. Information was meticulously gathered through direct field observations and interviews with knowledgeable villagers, folk healers, and other practitioners of traditional medicine. During these periodic visits, numerous plants were located, and efforts were made to ascertain their local and scientific names, families, and ethnobotanical distributions. The collected specimens were then identified taxonomically with the aid of several authoritative resources, including the "Flora of India" (Sharma and Balakrishnan, 1996), "Flora of Indian Desert" (Bhandari, 1990), "Flora of North East Rajasthan" (Sharma and Tiagi, 1979), "Flora of Upper Gangetic Plain and the Adjacent Siwalic and Sub Himalaya Tract" (Duthie, 1903-1929), and "Flowers of Himalaya" (Polunin and Stainton, 1984). To ensure accuracy, the verification and authentication of the collected data were conducted in light of standard literature, including works by Jain (1963, 1991) and Nadkarni (1992). These extensive efforts not only contributed to a comprehensive understanding of the ethno-medicinal flora in the area but also underscored the significance of traditional knowledge and its application in modern botanical and medical research.

### III. RESULTS AND DISCUSSIONS

In the realm of drug development, ethnobotanical and ethnomedical knowledge has consistently been one of the most dependable methodologies. Leveraging this information, a variety of active compounds have been successfully isolated from plants, as demonstrated by the studies of Carney et al. (1999), Fabricant and Farnsworth (2001), and Ajibesin et al. (2008). Nonetheless, the discipline encounters numerous obstacles. The swift transition to allopathic medicine, overharvesting of plant resources, modern agricultural methods, cultural transformations within communities, construction of new small dams, and the expansion of housing developments and modern education systems all contribute to the destruction of habitats for medicinal plant species. This not only endangers these critical plants but also results in the loss of traditional knowledge concerning their use. The erosion of this traditional knowledge is particularly troubling, as it encompasses centuries of empirical understanding regarding the medicinal properties of plants. As contemporary society advances, there is a pressing need to strike a balance between development and the preservation of ethnobotanical heritage. Efforts to document and maintain this knowledge are essential, as it serves as a cornerstone for the discovery of new drugs and treatments. Sustainable practices and policies must be adopted to protect both the biodiversity of medicinal plants and the cultural knowledge associated with them. This integrated approach can ensure that future generations benefit from the rich heritage of traditional medicine while promoting scientific progress in drug development.

A total of 63 plants, spanning 37 distinct families, have been collected and identified for their potential in preventing various respiratory ailments. These ailments include asthma, bronchitis, tuberculosis, sore throat, and allergies, among others. Notably, the majority of these plants belong to the Fabaceae family, followed by the Solanaceae and Apocynaceae families. Different parts of these plants, such as roots, stems, bark, leaves, and fruits, are utilized to treat these respiratory conditions. Traditional medicine has long relied on the therapeutic properties of these plant parts, and modern research continues to validate their effectiveness. For instance, many of these plants possess anti-inflammatory, antimicrobial, and immunomodulatory properties, which are crucial in managing respiratory diseases. The details of these plant parts and their uses are presented in Table 1. These plants include a variety of higher trees, herbs, and shrubs, with some being classified as weeds.

**Table 1.** List of medicinal plants used for various respiratory ailments in the vicinity of Nawalgarh, Jhunjhunu.

Name of plant	Local name	family	Used part	Medicinal usage
<i>Abutilon indicum</i> (L.)	Sweet Kanghi	Malvaceae	Leaves, roots, seeds	Chest troubles, Bronchitis
<i>Abrus precatorious</i> L.	Ratti/Chirmi	Febaceae	Leaves	Bronchitis, Cough
<i>Acacia leucophloea</i> (Roxb.) Willd.	Urajio/ Ranj	Fabaceae	Bark	Bronchitis
<i>Achyranthus aspera</i> L.	Chirchita	Amaranthaceae	Root	Pneumonia
<i>Adhatodavastica</i> Nees.	Adusa	Acanthaceae	Leaves, roots	Cough, asthma,

			flowers, and bark	liquefy sputum, bronchitis, and tuberculosis
<i>Adhatodazeylanica</i> Medic.	Adusa	Acanthaceae	Leaves	Bronchitis, Asthma
<i>Aegle marmelos</i> (L.) Corr.	Bel	Rutaceae	Pulp of fruit	Asthmatic complaints
<i>Alstoniascholaris</i> (L.) Br.	Saptarni	Apocynaceae	Fresh bark	Tuberculosis
<i>Annona squamosa</i> L.	Sitaphal	Annonaceae	Leaves	Respiratory tract problems
<i>Asparagus racemosus</i> Willd.	Satawari	Liliaceae	Root	Expectorant, Tuberculosis
<i>Azadirachtaindica</i> Juss.	Neem	Meliaceae	Leaves	Neem oil aids in asthma treatment and also helps control phlegm and cough.
<i>Bacopamonnieri</i> (L.) Wettst.	Brahmi	Plantaginaceae	Leaves	Cold, chest congestion, bronchitis and Asthma
<i>Balanitesroxburghii</i> Planch.	Hingota	Simaroubaceae	Bark and fruit	Whooping cough
<i>Barleriacristata</i> L.	Vajra danti	Acanthaceae	Root/root-leaves	Bronchitis & pneumonia, cough
<i>Boerhaviadiffusa</i> L.	Punarnava/Satta	Nyctaginaceae	Root	Asthma Dyspepsia, Expectorant
<i>Boswelliaserrata</i> Roxb. ex Coleb.	Salar	Burseraceae	Whole plant	Bronchitis
<i>Calotropisgigantea</i> (L.) R. Br.	Safed-Aak	Apocynaceae	Decoction of flowers	Asthma
<i>Cassia fistula</i> L.	Amaltas	Caesalpiniaceae	Roots	Chest pain
<i>Centellaasiatica</i> (L.) Urban -buti	Brahmi	Apiaceae	Whole plant	Bronchitis
<i>Cocculuspendulus</i> (JR. & G. Forst) Diels	Jal-jamni	Menispermaceae	Root and leaves	Cold cough
<i>Cissampelospaireira</i> L.	Patha/ Brihatika	Menispermaceae	Roots and leaves	Cough and Asthma
<i>Clerodendronphlomidis</i> L.	Arni	Lamiaceae	Leaves	Bronchitis
<i>Commiphorawightii</i> (Arn.) Bhandari	Guggal	Burseraceae	Plant extract	Asthma
<i>Cordia dichotoma</i> Forst. f.	Lasora	Boraginaceae	Leaves	Dry cough,
<i>Curculigoorchiooides</i> Gaertn.	Kali-musli	Hypoxidaceae	Root	Asthma, Bronchitis
<i>Datura stramonium</i> L.	Dhatura	Solanaceae	Seed and flower	Asthma
<i>Derris indica</i> (Lam.) Bennet	Karanj	Fabaceae	Whole plant	bronchitis
<i>Desmodiumgangeticum</i> (L.) DC	Salpiani/ Kareti	Fabaceae	Roots	

<i>Echinopsechinatus</i> Roxb.	Oont-kateli	Asteraceae	Roots	Cough
<i>Euphorbia caducifolia</i> Haines.	Dandathor	Euphorbiaceae	Roots	Bronchitis
<i>Evolvulusalsinoides</i> L.	Shankpushpi/ Visnukrantha	Convolvulaceae	Leaves	Chronic bronchitis and asthma
<i>Gloriosasuperba</i> L.	Kalihari	Liliaceae	Leaves	Asthma in children
<i>Gmelinaarborea</i> Roxb.	Hawan	Verbenaceae	Leaves	Cough
<i>Gymnemasyvestre</i> (Retz.) R. Br. ex Schult	Gudmar	Apocynaceae	Leaves	Asthma, Bronchitis
<i>Hemidesmusindicus</i> (L.) R. Br.	Anant-Mul	Apocynaceae	Root	Bronchitis
<i>Lantana indica</i> Roxb. Ed.	Beshram	Verbenaceae	Flowers	Cough, Asthma
<i>Leptadeniareticulata</i> (Retz.) Wt. & Arn.	Jeevanthi	Asclepiadaceae	Stem	Cough, tuberculosis
<i>Madhucaindica</i> Gmel.	Mahua	Sapotaceae	Flower	Dry cough
<i>Moringaoleifera</i> Lam.	Sahinjana	Moringaceae	Leaves	Wheezing, cough, dyspnea and contraction of the chest
<i>Oscimum sanctum</i> Linn.	Tulsi	Lamiaceae	Leaves	Cold-cough, expectorant, bronchitis and asthma, sore throat
<i>Peganumharmala</i> L.	Harmal	Zygophyllaceae	Roots	Asthma, Phlegm
<i>Plantago ovata</i> Forsk	Isabgol	Plantaginaceae	Leaves	Cough, sore throat
<i>Plumbagozeylanica</i> L.	Chittrak	Plumbaginaceae	Root, root bark, seeds	Bronchitis, cough
<i>Prosopis cineraria</i> (L.) Druce	Khejri	Fabaceae	Bark	Asthma, Bronchitis
<i>Psoraleacorylifolia</i> L.	Bavchi	Fabaceae	Seeds	Asthma, Bronchitis
<i>Punicagranatum</i> L.	Anar	Punicaceae	Powder of fruit	Sore throats, coughs
<i>Ricinuscommunis</i> L.	Erandi/ Arand	Euphorbiaceae	Seed	Asthma, Bronchitis
<i>Salvadoraoleoides</i> Dence	Mitha-jal	Salvadoraceae	Leaves	Bronchitis
<i>Sesamumindicum</i> L.	Til	Pedaliaceae	Seed oil	Dry cough, Asthma, other lungs diseases,
<i>Sidaacuta</i> Burm. f.	Bal	Malvaceae	Roots	Asthma
<i>Solanum nigrum</i> L.	Makoy	Solanaceae	Roots, Fruits	Asthma, Bronchitis,
<i>Solanum virginianum</i> L.	Nili-kateli	Solanaceae	Whole plant	Expectorant, Cough, asthma, chest pain, sore throat,
<i>Syzygiumcumini</i> (L.) Skeels	Jamun	Myrtaceae	Bark	Bronchitis, Asthma,
<i>Tamarindusindica</i> L.	Imli	Fabaceae	Juice of leaves	Allergic asthma and cough
<i>Terminalia arjuna</i> (Roxb.ex DC.) Wt. & Arn.	Arjuna/Ashoka	Combretaceae	Decoction of stem bark	Cough, asthma and bronchitis
<i>Tinosporacordifolia</i> (L.) Merr.	Giloe/Neem-giloe	Menispermaceae	Stem	Sneezing, nasal itching stuffy nose and Asthma

<i>Tribulusterrestris</i> L.	Gokhru	Zygophyllaceae	Whole plant	Chest pain, Cough
<i>Urgeniaindica</i> (Roxb.) Kunth.	Kolikanda	Asparagaceae	Bulbs	Cough, Bronchial troubles
<i>Urticadioica</i> Linn	Bichu-booti	Urticaceae	Leaves	Bronchitis, Asthma
<i>Withaniasomnifera</i> (L.) Dunal	Ashgandh	Solanaceae	Root	Bronchitis
<i>Zizyphusnummularia</i> Bur m. f,	Jharber	Rhamnaceae	Roots	Cough, sore throat

The findings of this research and the insights gained regarding the traditional uses of plants revealed that rural inhabitants in the studied area utilize these plants to treat a wide range of ailments. People practice traditional medicine based on their existing knowledge, and it is plausible that this wisdom will continue to be applied even in more remote regions globally. However, the expansion of urbanization is threatening numerous plant species due to the destruction of their natural habitats, putting them at risk of extinction. Throughout the study, it became apparent that participants were hesitant to share the information they held. They are reluctant to disclose this knowledge because it grants them a form of social recognition, leading them to safeguard it within their community. Additionally, it was found that much of this valuable information had been lost during the oral transmission of folklore from one generation to the next. The local residents admitted that their ancestors had a much deeper understanding and a greater wealth of knowledge compared to the present generation.

Respiratory ailments are prevalent among humans. In the area surrounding Nawalgarh tehsil, locals have been utilizing various traditional remedies to treat a variety of lung infections caused by the common cold and fever. This folk knowledge has been preserved in their manuscripts. Plant-based preparations for treating colds and coughs are often regarded as miraculous remedies, with some instances requiring only a single dose for effective treatment. These plant parts are typically prepared as medicines using hot and cold water as solvents, although remedies are occasionally made with milk and honey. Medicines are administered in various forms, including decoctions, pastes, powders, and infusions, with decoctions and pastes being the most commonly used. However, with the availability of modern synthetic medicines, the younger generations are less inclined to practice and use these herbal preparations, viewing them as temporary practices.

The conservation of medicinal plants has become a significant focus over the past 15 years, with various conservation methods, such as in situ preservation, botanical gardens, and germplasm banks, being highlighted by researchers. The Nahargarh Wildlife Sanctuary faces considerable biotic pressure due to its location in the northern part of the metropolitan city of Jaipur, placing many ethno-medicinal plants on the brink of extinction. Therefore, the conservation of these plants must be taken seriously. Similar observations have been noted by Borthakur (1991), Negi et al. (1993), Rana et al. (1994), Kapoor et al. (2008), and Khan et al. (2009), Sharma et al. (2022).

#### IV. CONCLUSIONS

The use of these medicinal plants is not only a testament to the value of traditional knowledge but also highlights the importance of biodiversity in discovering new treatments. As respiratory ailments can significantly impact quality of life, the exploration of plant-based remedies offers a promising avenue for developing natural, effective treatments. This comprehensive collection serves as a vital resource for further pharmacological studies and underscores the need to preserve medicinal flora for future generations.

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