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# Ethnobotanical survey of medicinal plants in block Thalisain in District Pauri Garhwal, Uttarakhand, India

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**Abstract**
The present investigation documents the ethnobotanical knowledge and traditional therapeutic applications of medicinal plants utilized by local communities in Thalisain Block, District Pauri Garhwal, and Uttarakhand. A systematic field survey was conducted employing semi-structured interviews and participatory observations with traditional healers (Vaidhyas) and indigenous inhabitants. A total of 44 medicinal plant species belonging to 32 families were documented, with Lamiaceae, Asteraceae, and Fabaceae representing the dominant families. The documented species are traditionally employed for treating prevalent ailments including respiratory disorders, gastrointestinal conditions, dermatological infections, and musculoskeletal pain. Quantitative ethnobotanical indices revealed high use value for species such as Berberis asiatica, Zanthoxylum armatum, and Ajuga parviflora. This study underscores the necessity for conservation strategies and scientific validation of traditional phytotherapeutic practices to prevent erosion of indigenous knowledge systems and to facilitate sustainable utilization of medicinal plant resources in the Himalayan region.

**Keywords:** Vaidhya, medicinal plants, Thalisain, ethnobotany

## Introduction

The Himalayan region constitutes one of the most significant biodiversity hotspots globally, characterized by exceptional phyto-geographical diversity and heterogeneous climatic regimes that facilitate the proliferation of medicinal flora. Ethnobotanical knowledge systems, transmitted through generations of indigenous communities, represent an invaluable repository of traditional ecological wisdom regarding plant-based therapeutics. In contemporary healthcare frameworks, approximately 80% of the global population relies on traditional medicine for primary healthcare needs, as estimated by the World Health Organization, with medicinal plants serving as the principal resource base.

Uttarakhand, situated in the central Himalayan range, harbors over 1,800 species of medicinal and aromatic plants, many of which remain inadequately documented in terms of their ethnopharmacological properties and conservation status. The Thalisain Block of District Pauri Garhwal represents a microcosm of this botanical wealth, where local communities maintain traditional healing practices through the expertise of Vaidhyas and elder knowledge holders. However, rapid socio-economic transformations, acculturation, and habitat degradation pose substantial threats to both biological diversity and associated traditional knowledge systems.

Despite previous floristic surveys in adjacent regions, comprehensive ethnobotanical documentation specific to Thalisain Block remains limited. The present study was therefore undertaken to systematically inventory medicinal plant diversity, document traditional therapeutic applications, and evaluate the conservation implications of current utilization patterns. This investigation aims to contribute to the scientific validation of indigenous phytotherapeutic practices while establishing baseline data for sustainable resource management and biodiversity conservation in the Garhwal Himalaya.

The Himalayan Alpine region is rich in the diversity of medicinal plants due to its rich phyto-geography and climatic conditions. Plant plays a vital role in the day to day life and plays a crucial role in the development of modern health care system. The revealedations of typical traditional systems of medicine for thousands of years that have been in existence have formed from plants. The plants remain to offer mankind with new medicines. The traditional medicine practice is widespread in China, India, Japan, Pakistan, Sri Lanka and Thailand. About 40% of the total medicinal consumption is attributed to traditional tribal medicines alone by China. As per WHO 80% peoples of developing countries and 70% peoples of developed countries use some form of alternative medicines. The use of herbal medicine as one element of alternative medicine is increasing worldwide (Welz *et al*. 2018) [32]. Most of the important drugs of the past 50 years, which have revolutionized modern medicinal practice, have been isolated from plants. The WHO endorses and promotes the addition of herbal drugs in national health care programs because they are easily accessible at a price within the reach of a common man and are time tested and thus considered to be much safer than the modern synthetic drugs (Singh and Singh, 1981) [30]. The Indian system of medicine has been a part of the culture and tradition of India down the centuries. The Sushruta Samhita attributed to Sushruta in the 6th century BC describes 700 medicinal plants. The Indian Himalayan region (IHR), a mega biodiversity hotspot comprises of about 18,440 species of plants and 1748 taxa were recorded to be of medicinal value (Samant *et al*., 2001) [27]. The knowledge possessed by the traditional healers (Vadhaya) can be employed for the development of modern medicines. Modern searches for bioactive molecules typically make use of plants employed by traditional healers. This has led to the isolation of several new therapeutically important compounds. A good number of potent drugs and a large number of therapeutic leads and many new pharmacologically active constituents have been developed

from herbal drugs due to the dedicated efforts of researchers (Philipson, 1990) [22]. Due to the lack of proper healthcare system peoples of the region are still dependent upon this traditional healing system and also use these methods to treat their domesticated animals.

**Methodology**

The present study based on a field survey in Thalisain Block of District Pauri Garhwal in Uttarakhand to identify the medicinal plants diversity and their ethnomedicinal uses in the region. An extensive survey made during study period to find out the bio-diversity of medicinal flora in selected block in Pauri Garhwal district. The identification of plants was done by using the literature (Dhiman, 2003; Sharma, 2003; Kanjilal, 2004; Bedi 2005; Purohit & Vyas, 2005) [3, 7, 16] and by the help of local herbalist.

**Result and Discussion**

The present study was conducted to find out the medicinal plant diversity and distribution in Thalisain block and their traditional uses amongst the local people. The results of all selectecd parameters during the study period are given in Table 1.

**Ethno-botany:** The information of traditional uses of medicinal plants were gathered by consulting and interviewing of local herbal healers and local people using interview method. During the present study, it was found that the local people of this block have developed their unique healing system using medicinal plants. They collect plant materials from their surrounding forests for preparing traditional medicines. The plant parts like leaves, roots, flower, fruit etc. are used for this purpose. The use of medicinal plants is enumerated in Table-1. Some traditional utility of medicinal plants in dental caries, skin diseases, joint pain, cough & asthma, dysentery & diarrhoea and urinary disorders are most common amongst the locals of Pauri Garhwal district. These traditional uses are given in Table-1.

**Table 1:** Ethno-botanical Status of local plants of Thalisain block for their health care

| S. No. | Botanical Name | Local / Common Name | Parts Used | Used In |
|---|---|---|---|---|
| 1. Family – Acanthaceae | | | | |
| 1. | *Justicia adhatoda* Linn. | Vasing | Flower, bark and leaves | Asthma, cough and dental problems |
| 2. Family – Agavaceae | | | | |
| 2. | *Agave americana* L. | Ram baans | Leaves | Fever, headache and jaundice |
| 3. Family – Anacardiaceae | | | | |
| 3. | *Rhus parviflora* Roxb. | Tunga | Fruit | Fever |
| 4. Family – Apiaceae | | | | |
| 4. | *Centella asiatica* (Linn.) | Mandukparni | Whole plant | Skin diseases and to improve memory |
| 5. Family –Araceae | | | | |
| 5. | *Acorus calamus* Linn. | Vacha | Rhizome | Dental problems, cough and asthma |
| 6. Family – Asclepiadaceae | | | | |
| 6. | *Calotropis procera* Br. | Aka | Roots, leaves and flower | Skin diseases |
| 7. Family – Asteraceae | | | | |
| 7. | *Artemisia nilagirica* (Clarke) Pamp. | Nagdona | Leaves, root | Skin diseases, cuts and wounds |
| 8. | *Eclipta prostrata* Roxb. | Bhringraj | Aerial parts, root | Cough, hair problems |
| 8. Family – Berberidaceae | | | | |
| 9. | *Berberis aristata* DC. | Daru haldi | Bark and root | Dysentery, eye diseases |
| 10. | *Berberis asiatica* Roxb.ex DC. | Kilmora | Root, bark and fruit | Indigestion, skin diseases, diarrhea |
| 11. | *Berberis lycium* Royle | Kingore | Root | Throat and eye infection |
| 12 | *Bombax ceiba* Linn. | Semal / Simal | Flower, bark, leaves | Sexual problems, dysentery and dental problems |
| 13 | *Cassia fistula* Linn. | Amaltas | Flower, roots | Skin diseases |
| 14 | *Cassia occidentalis* Linn. | Kasaundi | Leaves, root | Cold, cough, skin diseases |
| 15 | *Cannabis sativa* Linn. | Bhang | Oil | Backbone pain |
| 16 | *Terminalia bellirica* (Gaertn.) Roxb. | Bahera | Leaves, fruit, bark | Cough |
| 17 | *Shorea robusta* Gaertn. | Sal | Whole plant | Wounds |
| 18 | *Rhododendron arboreum* Sm. | Buransh | Flowers | Diarrhoea and dysentery |
| 19 | *Emblica officianalis* Gaertn. | Amla | Fruit | Diarrhea, jaundice and bleeding gums |
| 20 | *Euphorbia ligularia* Roxb. | Suan | Leaves and root | Asthma, skin diseases, fever |
| 21 | *Ricinus communis* Linn. | Arand | Leaves and oil | Pyorrhea, swelling and joint pain |
| 22 | *Abrus precatorius* Linn. | Ratti | Root, leaves | Skin diseases, joint pain |
| 23 | *Acacia catechu* (L. f.) Willd. | Khair | Bark | Throat infection and cough |
| 24 | *Bauhinia variegata* Linn. | Kodara | bark | Skin diseases |
| 25 | *Quercus leucotrichophora* Cam. | Banj | Leaves | Diarrhoea |
| 26 | *Aesculus indica* Colebr. | Pangar | Seed | Disorders of blood circulatory system, wounds |
| 27 | *Juglens regia* Linn. | Akhoda | Oil | Dental care |
| 28 | *Ocimum basilicum* Linn. | Tulsi | Leaves | Skin diseases and toothache |
| 29 | *Cinnamomum tamala* Nees & Ebesm. | Tejpat / Dalchini | Leaves and bark | Itching, diarrhea and dental problems |
| 30 | *Asparagus recemosus* Willd. | Satawar | Flashy root and cladodes | Disorders of female genital system and urinary trouble |
| 31 | *Toona ciliata* M. Roem. | Toon | Leaves | Cuts and wounds |
| 32 | *Tinospora cordifolia* (L.) Merr. | Giloy / Gurchi | Leaves | Joint pain, itching |

| | | | | |
|---|---|---|---|---|
| 33 | *Albizia lebbek* Benth. | Siris | Seeds and bark | Skin diseases, dysentery |
| 34 | *Ficus Palmata* Forsk. | Baidu | Fruit | To improve health |
| 35 | *Ficus religiosa* Linn. | Peepal | Bark | Skin diseases and burns |
| 36 | *Myrica esculenta* Buch. Ham. | Kaphal | Bark and fruit | Dental caries, wounds and preparation of refreshing drinks |
| 37 | *Cedrus deodara* (Roxb.) Loud. | Dyara | Oil | Joint pain, cough, skin diseases |
| 38 | *Pinus roxburghii* Sarg. | Chir / Sarala | Oil | Swellings, Boils, Skin diseases |
| 39 | *Punica granatum* Linn. | Anar | Fruit, bark, flower | Bleeding gums and nose, cough and asthma |
| 40 | *Datura stramonium* Linn. | Dhatura | Leaves, seed | Asthma, joint pain, swelling |
| 41 | *Solanum indicum* L. | Kantkari | Seeds | Diarrhoea, dysentery and cholera |
| 42 | *Solanum nigrum* Linn | Makoi / Giwai | Fruit, leaves | Dysentery, cough, urinary disorders |
| 43 | *Urtica dioica* Linn. | Kandali | Leaves and root | Tooth cavity and epilepsy |
| 44 | *Valeriana wallichii* DC. | Samoy | Whole plant | Joint pain, epilepsy and hysteria |

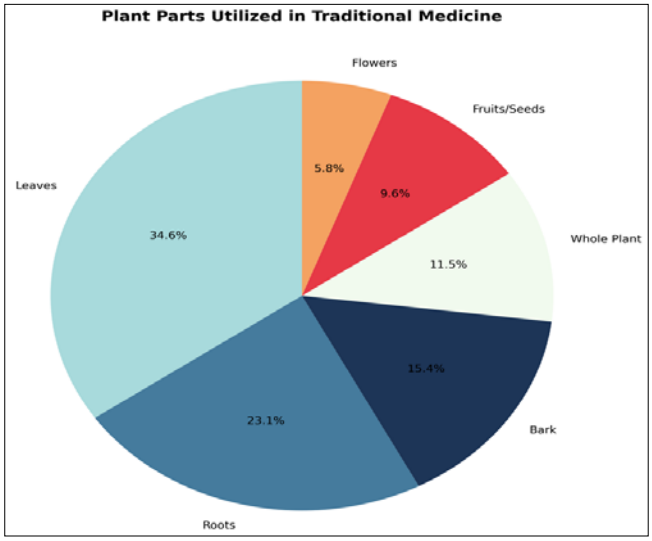


**Fig 1:** Reveals that leaves constitute the primary plant organ utilized (34.6%), supporting the hypothesis of sustainable harvesting practices among traditional practitioners.

The plant species are employed to cure various types of ailments such as cough, cold, fever, dysentery, diarrhea, diabetes, kidney and heart problems, burns, cuts and wounds, joint and muscle pain, asthma, skin diseases, dental care, headache, swelling, snake poisoning. A maximum of 19 species are employed to cure cough, cold and fever such as Cedrus deodara (Kumari and Tiwari, 2011) [20], Prunus persia, Pisidium guajava (Arya *et al*. 2014) [1], Berberis aristata, Morous alba. 11 species of medicinally important plants is employed to cure various skin diseases (Thuja oil, Aesculus indica, Murraya koenigii) such as ulcers Lantana camara (Khalita, 2012) [17], allergy, itches Prunus armeniaca (Raj *et al*. 2012) [24], Ear infection Ricinus communis (Gangwar *et al*. 2010) 09 plants are employed to cure digestive related problems such as indigestion, constipation, stomach ache. Common examples of such plants which are also reported to be employed for digestive related problems are Ficus palmate (Joshi *et al* 2014), Ficus auriculata (Kumari *et al*. 2011) [20], Asparagus racemosus, Illex dipyrena. 09 Plants are employed in the treatment of cuts and wounds Bombax ceiba, Ficus religiosa (Arya et. al. 2014) [1] 08 plants are recorded to cure dysentery and diarrhea by the local peoples of the region which have been reported to be employed in the similar ways by others such as Prunus armenica (Raj *et al* 2012) [24], Rubus elipticus, Rhododendron arboreum, Acacia dealbata, Diopyrous malabarica, 07 plant species are employed to cure joint and muscle pain such as Thuja occidentalis. Some of the major life-style diseases are also recorded to be treated by the recorded medicinal plant species. 06 species are employed to cure heart related problems which includes blood purification, lowering the blood cholesterol level some of the species are Myrica esculentha and Pyracantha crenulata (Rana *et al*. 2018). Singh et. al (2023) [31] studied on therapeutic and cultural evaluation of Brahma Kamal (Saussurea obvallata (Dc.) Edgew: An endangered potential herb and concluded that Various plant parts of S. obvallata have been employed for a variety of ailments, including dysentery, rheumatism, leprosy, bone fractures, nervine debilities, cerebral palsy, paralysis, sexual disorders, lung infections, urinary tract infections, leucoderma, rhinitis, and hyperthermia. Siddaramu et.al. (2022) [29]. Herb diversity and their medicinal uses in Biodiversity Conservation area of Jnanabharathi Campus, Bangalore University, Karnataka and described that The present study was intended to assess the herbs diversity, richness and medicinal use to emphasize its role in tropical dry forest ecosystems, using a quadrate method. A total of 61 species were recorded, comprising of 52 species of herbs, representing 28 families, of which (77%) belongs to native and (23%) exotic (non-native) category. Ridwan et.al. (2022) [26] studied on ethnobotanical study and conservation strategy of medicinal plants in the ecotourism area of Kedah Rainforest Lodges in Aceh, Indonesia and pointed out that medicinal plants have long been employed by indigenous communities, including Gayo people in Aceh, Indonesia. Renu *et al*. (2023) [25].Traditional uses of ethno-medicinal plants for the treatment of skin ailments in district Pithoragarh and illustrated that total of 52 plant species from 36 families were listed for curing skin ailments such as allergies, infections, pigmentation, acne, pimples, burns, wounds, etc. Pandey *et al*. (2024) [12] studied on utilization patterns of Medicinal plants in Jaunpur range of Mussoorie forest division, Uttarakhand and revealed that medicinal plants and important for the development of state but unfortunately habitat destruction certainly decline the populations of these medicinal plants. Jaiswal (2023) [13] studied on Medicinal Plant Diversity in Barnawapara Sanctuary With special Reference to their Uses By Local Tribes and described that the importance of medicinal plants to tribal people and their prospective role in primary health care. Godiyal *et al*. (2024) [12] studied on threatened medicinal plants in Uttarakhand And Their Genetic Diversity Assessment Through Molecular Marker and revealed that The International Union for Conservation of Nature (IUCN) was established to prioritize species conser-vation, assess threat status, and develop suitable strategies due to the vast diver-sity of species. Debi, C. (2024) [6] studied on floristic diversity and medicinally important plant species in the hillside of Landour, Mussoorie and described that Himalayan region is well recognized for a plethora of

medicinal plants. Davis and Choisy (2024) [5] studied on medicinal plants meet modern biodiversity science and revealed that Such interdisciplinary research leverages data and methods spanning space, time, and species associated with medicinal plant species evolution, ecology, genomics, and metabolomic trait diversity, all of which build heavily on traditional Indigenous knowledge.

Conclusion It is important to maintain the ecological balance between man and environment. Today ever growing numbers of peoples suffering from various kinds of diseases and causing a load on the well established medicinal sector so now it is important that the alternative medicinal system are taken into consideration. The medicinal plants which are being employed by the local peoples of the region are not only cost efficient but also shows a prominent potential in curing various types of diseases and ailments with little to no side-effects. Now is the time that these forms of alternative medicines (Aurveda, Unani) together with the modern medicinal systems employed for the better future medicinal facilities and curing patients. There is a decline in the medicinal plant diversity of the region due to overexploitation of the medicinal plants and the growing tourism. So, it is also important that overexploitation these valuable medicinal diversity should be prevented. The medicinal plants having a commercial importance should be highlighted and encouraged for cultivation in this way it will help to generate income as well as conserve the genetic biodiversity. From the recorded data two species Rosmarinus officinale and Asparagus racemosus Uttarakhand State Medicinal plant board (SMPB) is providing assistance for overall coordination of the activities in Medicinal and Aromatic Plants sector in the state (SMPB Uttarakhand) from a total of 28 plant species for commercial production and conservation of genetic biodiversity. Thus there is a need that the ethno-medicinal diversity and knowledge need to recorded and documented as this knowledge system is rapidly disappearing. So, it is important to preserve this valuable resource in which both government and NGOs can play their role. The rapidly misbalance in ecosystem, overexploitation, introduction of invasive species, and the modern culture is rapidly cause loss of such valuable resource.

**Rubus** **ellepticus**

**Rumex hastatus** **Berberis aristata**

**Zanthoxylum armatum** **Berginia ciliata**

**Achyranthes aspera**

**Rhus parviflora**

**Tinospora cardifolia**

**Artemisia vulgaris**

**Rhododendron arborium**

**Quercus leucotrichophora**

**Asparagus racemosus**

**Centella asiatica**

**Acorus calamus**

**Toona ciliata**

**Myrica esculenta**

**Prunus cerasoides**

**Grewia optiva**

**Berberis**

**Rus purviflora**

**Artica**

**Xanthoxylum** **Cannabis**

Some important photographs of Medicinal plants in Block Thailisain, Pauri Garhwal used as ethnomedicinal purposes

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