

A Survey on Potential of Medicinal Plants Found in the State of Uttarakhand

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ABSTRACT

A rich heritage of plant-based therapy is available in the Himalayan range. The livelihood of medicinal plants from all over the world is important. Uttarakhand, India's Himalayan state also relies on medicinal and traditional treatment plant species. Since ancient times, Uttarakhand has had a rich knowledge of traditional medications. Most of the typical species in the region have been harvested from wilderness. People of this state are mainly relying on traditional medical practice and medicinal herbs to use plant species for their primary Medicare system. Several of the previous research on traditional medicine, that has traditional efficacy claims, is useful in the management of various ills. In this regard, the locals who were required to document many indigenous medicinal plants mentioned in this article are used considerably. In this case, we try to record certain medicinal plants from this state with their medicinal qualities and it was found that 61 plants have medicinal properties. This study demonstrates the importance of traditional expertise in the treatment of various diseases in association with medicinal and aromatic plants so that this knowledge can be used in the future in various health remedies.

Keywords: Health care, Leaves, Medicinal Plants, Roots, Extracts, Ayurveda, Uttarakhand

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INTRODUCTION

India has great wealth of Medicinal Plants (MPs) and their traditional uses. Plants are used medicinally in different countries and are a source of many potent and powerful drugs. Plant as sources of medicinal compounds has continued to play a major role in the maintenance of human health since ancient times. Uttarakhand state is famous for its rich medicinal plant's resources. The climatic, topographic and soil diversity of this state has resulted in the occurrence of several valuable and economically important medicinal herbs of great therapeutic potential. Uttarakhand supports a large number of medicinal plants curing a wide range of

disorders, which are extensively used by the pharmaceutical industry for preparation of drugs used in Indian System of Medicine [1].

In Hindu Mythology texts from 1000 BC there are documents that represent the treasury of different medicinal plants growing in the Himalayan region. In the Himachal Pradesh (H.P.), roughly 548 of these 1748 medicinal plants have been found contrasted to 707 in Sikkim and Darjeeling, and 701 in Uttaranchal. At 0.247 in Sikkim and Darjeeling and 4th in H.P with 0.0155., as depicted in Figure 1. Sikkim and Darjeeling also earn the largest amount of medicinal flora per Km² of forest coverage [2]. Many essential plant-based medicines were discovered by the western methods dev of medicine. Documentary evidence and additional study on conventional use of therapeutic or ayurvedic medicine, as these tools will play an important role in the developments of novel plant-based medical devices for medical services, has also been deemed with a major

attractive point. Numerous employees have recorded details on the use of primary healthcare plantations in Uttarakhand. Bisht et al. [3] also reported the use in Uttarakhand, India of plant species of the *Lamiaceae* family. This awareness is critically essential for rural populations to thrive and grow in a sustainable way. This information, however, transmits orally from generation to generation and thus has the susceptibility to be removed.

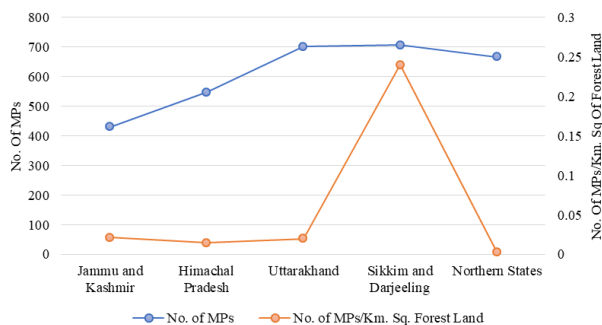


Figure 1. Medicinal Plants (MPs) found in the Himalayan regions and northern states of India.

The traditional medicines farmers of the region are licensed with the HRDI (Herbal Research and Development Institute) in compliance with the policies and on the bases of a personal check on the production (area and crop) of medicinal plant species. Furthermore, in the sense of lawful farming as well as other land maintained by producers or peasants, normally any species of plants with a medical benefit should be continued to grow; it is also recognized as their property. Forecasts are created dependent on increasing in the unit volume and according to delivery time for the likely amount of the product to be processed. The calculation for small forest products (medicinal products) that have to be extracted from off-farm sites is based on loosely growing biomass and renewable harvested content [4]. For various plant species and sections like fruit or seed and leaves, it can vary. The so-called transit passes (formal authorization to sell the crop products grown or processed by medicinal herbs) also is approved by HRDI for the processing of the crop. The transit passes shall be submitted in compliance with the projected output referred to in the application.

HRDI had assigned this license to the Herbal Pharmaceutical Production Unit Efficacy in the growth of the medicinal business has been shown by efforts to develop agricultural technologies, tackle law and legislative concerns and assess the shortcomings of rare and endangered production and other medicinal herbs. to encourage farmers or growers and merchants in remote locations and in the whole province. On the other side, the Division of Forest granted a transit pass for limited forest items of medical need to be obtained from forested areas. There is thus the protocol for issuing dual transit passes in Uttarakhand. In India Uttarakhand is the leader in the field, with the right documentation on prescribed formats of processing, sustained cultivation and selling of medicinal herbs [5].

Medicinal plant is a chief element of indigenous medical systems in all over the world. Natural products have played an important role throughout the world in treating and preventing human diseases. In recent times, there have been increased waves of interest in the field of research in natural products chemistry. This level of interest can be attributed to several factors, including unmet therapeutic needs, the remarkable diversity of both chemical structure and biological activities of naturally occurring secondary metabolites, the utility of novel bioactive natural compounds as biochemical probes, the development of novel and sensitive techniques to detect biologically active natural products, improved techniques to isolate, purify, and structurally characterize these active constituents, and advances in solving the demand for supply of complex natural products [6]. The aim of this study is to review salient reports on pharmacology, phytochemistry and biological activities of some medicinal plant of Uttarakhand. A total of 61 Medicinal plants was selected from a vast list of Medicinal plants found in the Uttarakhand.

- *Abelmoschus moschatus* which belongs to the family of *Medik Malvaceae*. This plant is commonly known as the Jangali Bhindi. In Uttarakhand, root and seeds of *Abelmoschus moschatus* are consumed for various medicinal ailments. A fresh root of this plant is used to treat the leucorrhoea in females and tackles the sexual impotency in males. It has also been found that the seeds of this plant are diuretic and used in various treatments like asthma, burning sensation, ptialism, diarrhes, nausea, various neural disorders and many other fatal diseases [7].
- *Acorus calamus L.* belongs to the family of *Acoraceae* and commonly known as Baj. Root of this plant is associated in overcoming the Headaches. It has also been found that it possesses anti-helminthic and anti-bacterial properties. Various diseases like Fever, bronchitis, asthma, cough, and many other digestive problems can be treated with the extracts of *Acorus calamus*.
- *Adenostemma Lavenia*, belonging to the family of *Kuntze Asteraceae*. In Uttarakhand it is commonly known as Jangli-jira. Its Flower and Leaf extracts are associated with treatment of many diseases like the flowers of this plant are utilized for producing saliva which treats the mouth dryness and the pastes made of leaves of this plant are often used in healing the wounds.
- *Aegle marmelos* which belongs to the family *Rutaceae* and commonly known as Bel. It has been found that Fruits and Roots of this plant have antidiarrheal, Astringent, demulcent, antidysentric and antipyretic properties [8].
- *Aesculus indica* belongs to the family of *Sapindaceae*. It has been reported that Fruit of this plant is associated in the treatment of Rheumatism. Paste is prepared from the fruit and the fresh and hot paste is applied on the parts or the joints that are affected and causing the pain.

- *Ageratum conyzoides L.* belonging to the family of *Asteraceae* and commonly known as the Goat weed in Uttarakhand. It has been reported in various studies that Leaf of this plant possess many medicinal properties like it is utilized in healing the wounds, therapy of leprosy, rheumatism, diarrhea and fever.
- *Allium cepa L.* commonly known as the Pyaj belongs to the family of *Amaryllidaceae*. It has been reported that consumption of its Bulb can overcome the abdominal pains. It has also been reported in many studies that it possesses antioxidant and antimicrobial properties which is the reason for its wound healing capability.
- *Amelanchier canadensis* which belongs to the family of *Medik Rosaceae* and it is commonly known as the Indian wild pear. Juices extracted from the ripe fruits have the capability to treat the diarrhea.
- *Anaphalis triplinervis* also known as the Bakal belongs to the family of *Asteraceae*. Its leaves are utilized in wound healing and various dermal diseases. Various studies have reported that this plant have the properties to overcome the fever, flu, nausea as well as eye infection [9].
- *Anisomeles indica* of family *Kuntze Lamiaceae* which is commonly called as the Catmint. Its Fresh leaves and some greenish slices have an oil which is volatile that is utilized traditionally for the therapy of cough and cold, psoriasis, snake bites, chronic rheumatism.
- *Asparagus curillus* also known as Safed Musli that belongs to the family of *Asparagaceae*, is directed as sexual boost. A root of this plant treats dysuria, dysentery and diabetes.
- *Berberis aristate* belongs to the family of *Berberidaceae* and commonly known as the Kambal Extracts of its roots are utilized for curing the jaundice, eye diseases, skin diseases, syphilis, urinary disorders and chronic rheumatism. Several studies have reported that extracts of this plant can used for the treatment of diabetes.
- *Bergenia ciliata* belongs to the family of *Saxifragaceae* which is commonly known as Sirparha. For the treatment of Kidney stone and ulcer, root's extracts in powdered form are utilized.
- *Boenninghausenia albiflora* belongs to the family of *Rutaceae*, commonly known as Pissumar. Extracts of this plant are externally applied for the treatment of head or eye pains. Various studies also show numerous effects as anti-inflammatory, immunomodulating, hepatoprotective and are also used of its antioxidative properties [10].
- *Boerhavia diffusa* belongs to the family *Nyctaginaceae* also traditionally known as Punarnava. Punarnava's roots extract is utilized for the ailment of eye. It has also been reported that it is useful for many liver problems, asthma, jaundice and contains antimicrobial properties.
- *Bombax ceiba L.* belongs to the family *Malvaceae*. In Uttarakhand, it is commonly called as Saimul. Paste of leaves is used as the painkiller for the treatment of wounds. Various studies have reported that it is also effective for the improvement of sexual impotence.
- *Butea monosperma* belongs to the family of *Kuntze Fabaceae* and it is commonly known as the Dhak or Palash. Extracts extracted from flowers and gum is utilized for gastritis. It also been reported that it is also useful in handling of ulcers, diarrhea and have anti-inflammatory, antioxidation, anti-cancer and hepatoprotective properties.
- *Cajanus scarabaeoides* belongs to the family Thouars of *Fabaceae* and it is also commonly known as Chowkhara. Leaves of this plant are given to the person who faces the problems throat diseases like tonsillitis. Various studies have also reported that it contains Heptoprotective and enormous medicinal properties.
- *Callicarpa macrophylla* belongs to the family *Lamiaceae* which is commonly known as Daya. It has been reported that it is used for the ailment of skin problems, urinary disorder, diarrhea, excretion and care for hairs.
- *Celastrus paniculatus* belongs to the family *Celastraceae* commonly known as Malkangani. Fruits and seeds of this plant are boiled and the solution with oil is used for the therapy of piles, cold, leprosy, gout, anti-spasmodic, diarrhoea etc.
- *Cydonia oblonga* belongs to the family *Rosaceae* commonly known as Bihi in Uttarakhand. It has been reported that the Leaves of this plant contains phenolic compounds that leads to its antioxidant activity, Vitamin-E, carotenoid and several organic acids. Traditionally in Uttarakhand it is being used for the ailment of various skin diseases as well for its antipyretic, sedative and antitussive activity. Seeds of this plant are utilized in cough, bronchitis, diarrhea and constipation.
- *Datura metel* and *Datura stramonium* belongs to the family *Solanaceae*. These plants are commonly known as Dhatura in various parts of India. It has been reported that leaves of these plants are used for various purposes as they contain anti-asthmatic, antibacterial, analgesic, antibiotic and antimicrobial properties.
- *Dicliptera bupleuroides* belongs to the family *Acanthaceae* commonly known as the Soriul. Consumption of its leaves and seeds with water are used in the treatment of bloody diarrhea. Various studies have also reported that they can be used for many skin diseases, urinary tract and respiratory infection, digestive disorder, wound healing, jaundice, sexual problem, round worms, liver ailment, malaria, piles, epilepsy, gummosis, blood vomiting and hepatitis.
- *Drimia indica* belongs to the family *Asparagaceae* which is commonly known as Banpyaja it has been reported that consumption of its bulb is useful for many problems like nematode infection, cough, pyrexia, skin disorders, bone and joint complications, bronchitis, respiratory ailment, dropsy, cancer and epilepsy.

- *Euonymus tingens* belongs to the family *Celastraceae*, commonly known as the Kusum. The powder mix of 10gm with opium seed, almonds, bansh mishri and kali mirch utilized orally in kidney stones and eye disease.
- *Ficus auriculata* belongs to the family *Moraceae* commonly known as Timi. It is suggested that consumption of its fresh juice from leaves for 10days can overcome many Gastrointestinal problems. Anthelmintic properties and hypoglycemic are represented from the extracts of roots and barks. Various studies have also reported anti-tumor activities from its fruits.
- *Ficus benghalensis* and *palmata* belongs to the family *Moraceae* known as Bargad and Bedu respectively. It has been reported that latex from the fruits is used for sexual impotency as well as they have good lung and bladder enhancing properties.
- *Grevillea robusta* belongs to the family *Proteaceae* commonly known as the Silver Oak. Paste of fresh leaves with vegetable ghee and coconut oil very useful in burning and burning sensation.
- *Gymnema sylvestre* belongs to the family *Apocynaceae* commonly known as Aphe in Uttarakhand. Til-oil and leaves are boiled together to aid the pain in the eyes. Milky fluid from the leaves is also believed to have anti-diabetic properties.
- *Gymnosporia spinosa* belongs to the family *Celastraceae* commonly known as Vaikal. Leaves Paste is used in Bala-shosha by applying or rubbing leaves on the back.
- *Hedychium spicatum* belongs to the family *Zingiberaceae* which is commonly known as Kapurkachari. Powder of Roots is very utilized in neuro muscular disorder and various studies have also reported the anticancer properties.
- *Hydrocotyle sibthorpioides* belongs to the family *Araliaceae* which is commonly known as Brahmni. Juice of leaves is given to the people who are facing mental disorders or Manasdaurbalya. It is also utilized to solve problems like piles, menstrual problem, diarrhea, rheumatism etc.
- *Hygrophila auriculata* belongs to the family *Acanthaceae* which is commonly known as Talmakhana. Extract from whole plant is useful in the treatment of gout, inflammations, jaundice, hepatic obstruction, or as a diuretic
- *Jacobaea nudicaulis* belongs to the family *Asteraceae* which is commonly known as Nil kanthi and Ratpatia. Extracts from this plant are useful to tackle fever, some skin diseases eye diseases and it also works as a wound healer.
- *Juniperus communis* belongs to the family *Cupressaceae* which is commonly known as Hapusha. Its green wood is burned and the smoke in inhaled for the treatment of tubercloasis and several other respiratory diseases. Several studies have reported that it also contains anti-microbial and anti-oxidative properties.
- *Lablab purpureus* belongs to the family *Fabaceae* which is commonly known as Chimi. Used for earaches and utilized as analgesic, antidiabetic, antioxidant, antiinflammatory, cytotoxic, hypolipidemic, antilithiatic, insecticidal, hepatoprotective, antimicrobial, antispasmodic.
- *Lannea coromandelica* belongs to the family *Anacardiaceae* which is commonly known as Gunjhinganj. Paste made from bark is useful for tackling the wounds and juices are used for jaundice.
- *Litsea glutinosa* belongs to the family *Lauraceae* which is commonly known as Maida. Bark of this tree is used to arouse sexual power, or to decrease pain. Paste made from bark is also often applied of the fractures.
- *Melia azedarach* belongs to the family *Meliaceae* which is commonly known as Dekrain. People who suffer from imminent headaches applies the paste made from roots of this plant on forehead. It is also used as stomachic, anti-cancer, anti-malarial, astringent as well as contains anti-inflammatory properties.
- *Mimosa rubicaulis* belongs to the family *Fabaceae* which is commonly known as Shikanta. Paste made from leaves is applied to overcome the skin diseases. Various reports have stated its use in smallpox, cough, jaundice, fever, cholera, dyspepsia, bronchitis, tuberculosis and syphilis.
- *Morella esculenta* belongs to the family *Myricaceae* which is commonly known as Kafal or Kaphal. It is used by the people who faces cardiac debility, hemoptysis and edema. It also has an excellent ulcer healing capability as well as it is also used as anti-tumor and anti-inflammatory properties.
- *Origanum vulgare* belongs to the family *Lamiaceae* which is commonly known as Vantulsi. Disorders in the urinary system are cured by the juices of this plant. Various studies have reported other activities like anti-fungal, antihyperglycemic properties.
- *Phyllanthus emblica* belongs to the family *Phyllanthaceae* which is commonly known as Amla. It has been reported that Fruits of this plant contains high amount of polyphenol, mineral and it is also been said that they also have a high amount of Vitamin C. Traditionally it is used for various purposes like as an energy drink, skin fairness, for analgesic, or as an anti-viral and hepatoprotective activities [10].
- *Pleurolobus gangeticus* belongs to the family *Fabaceae* which is commonly known as Salparni. fresh leaves Paste is used as to heal wounds or to treat toothaches and chest pains as well as anti-fungal agent.
- *Plumbago zeylanica* belongs to the family *Plumbaginaceae* which is commonly known as Chitavar. Roots' Paste and fruits are for healing wounds as well as antiatherogenic, cardiogenic, hepato-protective and neuro-protective activities.
- *Polygonatum cirrhifolium* belongs to the family *Asparagaceae* which is commonly known as Mahameda. Roots extract are used for various

properties like anti-diarrheal, anti-microbial, anti-oxidant, anti-malarial and analgesic.

- *Polygonatum verticillatum* belongs to the family *Asparagaceae* which is commonly known as Meda. Extracts from rhizomes are used as emollient, stimulant, carminative and aphrodisiac,
- *Pyracantha crenulata* belongs to the family *Rosaceae* which is commonly known as Ghigharu. Extract from fruits are used as preservatives. It is also utilized in cardiac failure, arteriosclerosis, malarial fever, hypertension, myocardial weakness, cardio-tonic and Burgor's disease.
- *Rosa canina* belongs to the family *Rosaceae* which is commonly known as Dog Rose. Various studies have reported the anti-oxidative activities and enhances the Vitamin C levels.
- *Rosa moschata* belongs to the family *Rosaceae* which is commonly known as Kunja. Extracts from leaves as often utilized as nasal drop and also in abdominal disorders.
- *Roylea cinerea* belongs to the family *Fabaceae* which is commonly known as Kaural. Extracts from leaves are utilized in the people who are suffering from diabetes, throat disorder and also have anti-oxidative and anti-microbial properties.
- *Sida cordifolia* belongs to the family *Malvaceae* which is commonly known as Denusha. Nasal congestion, bronchitis, stomatitis, blenorrea and for people who are suffering asthma.
- *Solanum nigrum* belongs to the family *Solanaceae* which is commonly known as Black Nightshade. It has been reported that it consists of analgesic, anti-constipation and also it helps to cure skin disorders. It is applied to the area which is burnt.
- *Solanum violaceum* belongs to the family *Solanaceae* which is commonly known as Brahati. It has been reported that consumption 4 fruits can help cure cough as well as application of fruit juice also relieves insect bites.
- *Solena heterophylla* belongs to the family *Cucurbitaceae* which is commonly known as Gulakhari. Tubers of this plant is used as vegetable and it is reported that it helps in many respiratory and gastrointestinal disorders.
- *Swertia chirayita* belongs to the family *Gentianaceae* which is commonly known as Chirata. It has been reported in several studies that decoction of full plant can help overcome fever, dermal disorders and anti-fungal, anti-pyretic and hypoglycemic activities.
- *Terminalia arjuna* belongs to the family *Combretaceae* which is commonly known as Arjun. Paste made of bark is used in pneumonia, ulcer, fracture and have anti-bacterial, anti-microbial, anti-tumor, anti-HIV and anti-fertility properties.
- *Vachellia nilotica* belongs to the family *Fabaceae* which is commonly known as Babul. It has been reported that it has antibacterial, anti-tumor, anti-ulcer, anti-inflammatory and astringent properties [11]. Extracts from the roots have anti-tuberculosis and anti-cancer properties. Bark of this

plant have anti-bacterial, anti-oxidant, antimutagenic, diuretic, astringent, leprosy, leucoderma, burning sensation and toothaches.

- *Vitex negundo* belongs to the family *Lamiaceae* which is commonly known as Nirgundi. Traditionally a mix is made with leaves of this plant and rice in water, which is given to the patients that are suffering from gonorrhoea. It has also been reported that this plant contains anti-inflammatory, anti-convulsant, anti-oxidant and hepato-protective activities.
- *Vitis vulpina* belongs to the family *Vitaceae* which is commonly known as Jungle Angoor. Both unripe and ripe fruits are used for various purposes like the unripe grapes are used to treat the sore throat and ripe grapes are used for the therapy of cancers, smallpox, eye disorders and liver disorders.
- *Ziziphus jujuba* belongs to the family *Ramanaceae* which is commonly known as Ber. Fruits of this plant are consumed to enhance weight, strength of liver, muscular power, stamina and have many expectorant activities [12]. Fruits are also dried and used for the treatment of cancer, sedatives, refrigerants and also act as blood purifier. Seeds are used for the treatment of insomnia, excessive perspirations and night sweats. Leaves are also used in the treatment of asthma and many respiratory disorders.

DISCUSSION

The Himalayas have an abundance of herbs and herbal medicine. The central area of the Himalayas comprises Uttarakhand's modern states. The actual state of conventional knowledge of medical plants across the world is profoundly worried because cultural heritage steadily decreases and disappears in the rural areas. This historically accessible medicinal plant are intended to provide an alternative to contemporary treatment services for urban people with low economic conditions. There can be many other causes of deterioration in conventional herbal treatments, but the over-replacement of traditional medications has been accused of allopathic drugs [12]. Nevertheless, regard for cultural rituals and respect have declined nowadays. Therefore, the analysis shows that the region is rich in wealth of historically accessible medicine plants and, if vigilant, can add a lot to the productive need for natural experience and skills in surrounding people.

Swertia hirata is listed as endangered plant species and *Polygonatum verticillatum* is classified as vulnerable species of plant. These plants are also vulnerable to potential extinction from the area due to excessive processing as well as other biotic and abiotic causes. During the period based on the criteria and perceptions, reliance on conventional primary medical procedures in indigenous communities in the study region changed. Elderly or herbalists (Vaidyas) are well known and educated about the conventional use of MAPs opposed to younger ones. In the proposed work, moreover, the procedure using a specific plant to treat specific symptoms could vary from one location to another, showing that local authorities had wealthy ethno-

botanical expertise. The results can be used for future research on the state of common expertise in the field. The indigenous medicine system, especially in recent years, is weakening quite rapidly. This transition may be due to the rapid transition in the socio-economic and cultural values between local residents and rural depopulation. If this is not avoided, a large part of this important profession of medicine will quickly disappear. Thus the, strategy to protect, register and encourage traditional awareness of medicinal plants needs to be urgently established.

CONCLUSION

The natural health treatment of the people is medicinal plants. Their predominant management of diseases is based on a profound understanding of biology and conventional medical experience. Locally citizens in Uttarakhand are very expensive, despite adverse effects, to use these historically readily available medicinal plants for human health. The plants are now endangered for one day owing to their construction practices, rising population, tourism effects, deforestation of forests and so on which the ecology, natural and local aspects need to be protected. Current study represents the potential benefits of the medicinal plants found in the Uttarakhand and it also helps in the preservation of the traditional knowledge.

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