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Medicinal plants used by local *Vaidyas* in Ukhimath block, Uttarakhand

DP Semwal[1*], P Pardha Saradhi[2], CP Kala[3] & BS Sajwan[3]

[1]Department of Botany; [2]Department of Environmental Biology, University of Delhi, Delhi 110 007; [3]National Medicinal Plants Board, Ministry of Health & Family Welfare, New Delhi 110 001
E-mail: dinusem@rediffmail.com

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Throughout the Indian sub-continent, all earlier medical branches have developed and refined different treatments based on preparations made from available natural resources. Traditional knowledge of local *Vaidyas* (practitioners of *Ayurveda*) about medicinal plants and their importance in local healthcare practices is well known since *Vedic* time. However, mode of applications of the different medicinal plants is lacking from many remote areas of the country. The research work was initiated in the vicinity of Ukhimath (block head) of Uttarakhand state, as it has unique habitat specificity and availability of *Vaidyas*. Of 60 different plant species collected, 45 herbs, 8 trees, 5 shrubs and 2 climbers were used for curing a total of 34 diseases such as headache, fever and intestinal problems. Rhizome/tuber/roots (41.66%), followed by leaves (31.66%), fruits/seeds (15%), twigs/barks (6.66%), flowers (3.33%) and whole plant (1.66%) were used for curing different ailments. A total of 8 medicinal plants such as *Aconitum heterophyllum*, *Angelica glauca, Berberis osmastonii, Dactylorhiza hatagirea, Nardostachys jatamansi, Picrorhiza kurrooa, Podophyllum hexandrum* and *Zanthoxylum armatum* were rare and endangered species, which had high demand in the market and showed greater potential towards curing of ailments. Thus, there is an urgent need to conserve such medicinal plant species for the benefit of humankind.

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Ethnobotany has emerged as an important branch of study which focuses on the utility of different plant species and their properties as food, medicine and other uses[1,2]. Over the past few decades, the traditional knowledge on the use of medicinal plants has been widely acknowledged across the world. According to the World Health Organization, 80% of the world's population in developing countries uses traditional medicine[2]. In India, the knowledge of traditional herbal medicine is synonymous with its rich cultural heritage and has found its mention in *Vedic* literature, particularly the *Rigveda, Charak Samhita* and *Susruta Samhita*[3]. In the North of India, the Himalayas covering 18% of the Indian subcontinent accounts for more than 50% of India's forest and contains 30% of India's endemic species[4]. The area harbours about 8,000 species of higher plants of which 1,748 are used for medicinal purposes[4,5]. There are many remote areas in the Indian Himalaya that contain a rich traditional knowledge on the use of medicinal plants which is still not documented. Ukhimath block in Uttarakhand is one such remote area which possesses a rich medicinal plant diversity and Traditional knowledge. Therefore, study was conducted with the aim to document Traditional knowledge of local *Vaidyas* in this region about uses of medicinal plants, specific herbal formulations and their importance in local healthcare practices. The study area, Ukhimath block lies in the Northwest part of Uttarakhand, a northern state of India. The area falls between 30˚ 30′-30˚ 45′N Latitude and 79˚0′-79˚15′E Longitude and covers an area of about 400 sq km. The altitude ranges between 1,000 to 6,000 m (Fig.1). Owing to wide altitudinal gradient, this area has unique physiognomic, climatic and topographic conditions. The region is also famous for its rich biodiversity, culture, tradition and mythology. The area receives 300 cm of annual precipitation of which the rainy months (June-August) contribute to more than 65%. The relative humidity varies from 35 to 83% annually. There is moderate to heavy snowfall during December-February. The mean maximum temperature varies between 3.5˚C (January) to 32˚C (June). Local people are dependent for their livelihood on their immediate natural resources and production from primary sectors such

*Corresponding author

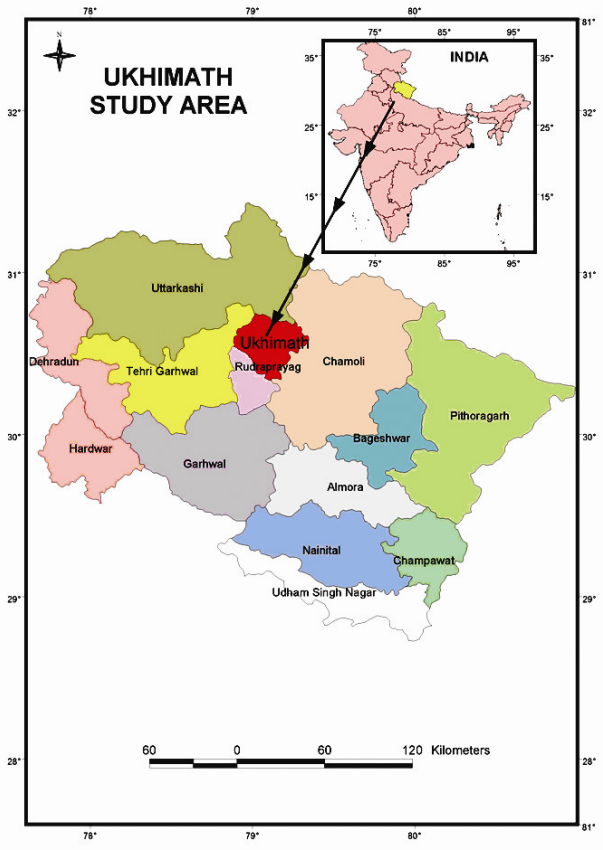

Fig. 1— Location map of study area

as agriculture, horticulture, livestock etc. Rearing sheep and goat is still practiced on a fairly large scale as it is a traditional practice of many villagers. Animal husbandry is common practice for the milk products. Horticulture is becoming more popular in the area while paddy, maize, wheat, pulses and barley are generally cultivated as food crops. Due to the remoteness of the study area, the local people depend on *Vaidyas* for healthcare. There are a very few good primary healthcare centers in the region.

Methodology

Field surveys were undertaken in almost all parts of the Ukhimath block during 2005-2006. During the field surveys, attempts were made to cover all major habitat types available in the study area. The major habitat types identified were home/horticulture garden, sparse pine forest, mixed deciduous forest, moist area, dry rocks, dispersed timberline, under scrub and alpine pasture (grassland). The specimens were identified[6,7]. A semi-structure questionnaire survey was conducted among 45 traditional *Vaidyas* randomly[8]. The main purpose of the survey was to document the knowledge of *Vaidyas* on preparing various herbal formulations. The survey also gathered information about the local names of medicinal plants, plant parts used in treatment, and number of ailments being treated by medicinal plant formulations. Qualitative information so gathered was verified with different *Vaidyas*. A three day workshop was also conducted in the study area and 45 traditional *Vaidyas* were invited to participate for verification of the collected information. These *Vaidyas* resided in 12 sites spread across various villages of the Ukhimath block, such as Ukhimath, Mangoli, Pali, Mansoona, Kyark, Makkumath, Tala, Pothibasa, Baniyakund, Chopta Tungnath, Guptakashi, Kalimath, Kabiltha, Kotma, Narayankoti, Ravigram, Phata, Gaurikund, and Kedarnath. The participants' observation method was used to understand the methods and techniques adopted by *Vaidyas* in preparation of herbal formulations[8-11].

Results and discussion

The study highlights that in absence of modern healthcare facility, people in the study area are dependent on plants for medicinal purposes. The present generation is ignoring the traditional healthcare system and leaning towards market oriented resources for healthcare. Most of the *Vaidyas* identified during the survey were in the age group of 35-80 yrs and all of them were familiar with majority of medicinal plants growing in their surrounding areas. It was observed that 58% of the *Vaidyas* were males and rests were females. During the course of the study, a total of 60 medicinal plant species were documented of which 45 herbs, 8 trees, 5 shrubs and 2 climbers. In majority of cases, extract from the leaves (31.66%) were used for curing different ailments, followed by rhizome/roots (41.66%) and fruits/seeds (15%). The information about the botanical name of the plant, local name, plant parts used uses have been given (Table 1). These plants were used for curing a total of 34 types of diseases ranging from headache to cancer and female disorders to earache (Fig.2). Some of the medicinal plant species and the formulations are frequently used by the local people as well as *Vaidyas* for curing ailments. The young leaves and branches of *Zanthoxylum armatum* (locally known as *Timru*) are used as toothbrush for cleaning of teeth. *Cannabis sativa* leaves when taken with 3 gm of pepper, 15 cumin seeds and 2 cardamoms cures impotency and its seed oil cures asthma. It is also useful in thetreatment of bronchitis and fever. The fruit extract

Table 1— Medicinal plants used by *Vaidyas*/local people in Uttarakhand

Plant name, family, local name	Uses
Aconitum heterophyllum Wall. ex Royle Ranunculaceae *Ateesh*	Paste of dried tuber mixed with water and sugar is taken orally and used to treat diarrhoe bodyache, as an aphrodisiac and tonic.
Adhatoda zeylanica Medik. Acanthaceae *Basinga*	Paste of dried leaves and flowers mixed with honey taken orally is useful in cough, cold and fever. Small twig is used as toothbrush.
Aegle marmelos (L.) Corr. Rutaceae *Bel*	Dried fruit is mixed with sugar is taken orally during fever and cold
Ajuga bracteosa Wall. ex Benth. Lamiaceae *Neelkanth*	Leaf extract consumed before meals is highly beneficial in curing acidity and indigestion.
Allium cepa L. Liliaceae *Pyaz*	Bulb extracts mixed with *Mentha* leaves extract is taken orally for a week; 2-3 drops are useful for ear pain; also useful in headache, high blood pressure and epilepsy.
Allium humile Kunth Liliaceae *Pharan*	Dried leaves paste, root powder of *Saussurea costus* mixed with ghee/butter is taken orally for relieve from asthma and pectoral complaints.
Allium sativum L. Liliaceae *Lahsun*	Bulb extract mixed with mustard oil and boiled is taken orally as well as applied externally in case of arthritis and joints pain.
Angelica glauca Edgew. Apiaceae *Choru*	Root powder mixed with water/juice is useful during cough, cold, choking on food and stomach pain.
Arisaema intermedium Bl. Araceae *Meen*	Root powder mixed with water is consumed while stem extract is applied externally in fever, bodyache, vomiting, dehydration, intestinal pain and skin infection.
Arnebia benthamii (Wall. ex G.Don) Jhon Boraginaceae *Balchadi*	Root extract mixed with mustard oil is taken orally as syrup and also applied externally as hair tonic, antiseptic, throat problem and fever.
Asparagus curilius Buch.-Ham. ex Roxb. Liliaceae *Jhirna*	Root extract is taken orally to relieve from urinary infection.
Berberis osmastonii Dunn. Berberidaceae *Kingore*	Root decoction mixed with rose water is useful during eye infection.
Betula utilis D.Don Betulaceae *Bhojpatra*	Extract/gum from stem/bark is applied externally during fever and body pain.
Brassica campestris L. Brassicaceae *Sarshaon*	Warm *B. campestris* oil is applied externally; used as syrup, and as ear drop to prevent cold, joints pain, jaundice, ear pain and in sciatica.
Cannabis sativa L. Cannabaceae *Bhang*	Leaves/seed extracts taken with pepper, cumin seeds, cardamom is useful in curing fever, bronchitis, indigestion impotency and asthma.
Callicarpa macrophylla Vahl. Verbenaceae *Daiya*	Fruit extract is taken orally to relieve rheumatic pain and mouth ulcer.
Carum carvi L. Apiaceae *Kala zeera*	Seeds boiled with salt and taken orally is useful in fever, headache and as toothpaste
Centella asiatica (L.) Urban Apiaceae *Brahmi*	Leaf extract taken with honey work as memory enhancer, coolant and relieves headache.
Cicerbita macrorhiza (Royle) Beauv. Asteraceae *Karatu*	Leaf juice is taken orally and fresh leaves roll is kept on forehead during fever and headache
Citrus limon (L.) Burm.f. Rutaceae *Nimbu*	Fruit extract mixed with *Mentha* leaf extract and salt is taken to relieve from vomiting, acidity and gastric disorder.
Cobretia duthie Cl. Cyperaceae *Murya*	Root powder mixed with water is taken orally in reducing stomach ache and intestinal pain.
Cynodon dactylon (L.) Pers. Poaceae *Doob*	Whole plant extract is taken orally in dysentery, nose bleeding and anemia.
Dactylorhiza hatagirea (D.Don) Soo, Nom Orchidaceae *Hattazari*	Tuber paste is taken orally to cure diarrhoea, as an aphrodisiac and tonic.
Delphinium denudatum Wall. ex Hook. Ranunculaceae *Nirbisi*	Leaf powder taken orally with milk for one week relieves intestinal pain.
Macrotyloma uniflorum (Lam.) Verdcourt Fabaceae *Gahath*	Dried seed decoction is taken orally during kidney stone and intestinal problem.
Phyllanthus emblica L. Euphorbiaceae *Aonla*	Dried fruit extract mixed with sugar is taken twice a day for 4-5 days in cough, headache, bodyache and fever.
Eupatorium adenophorum Sprengel Asteraceae *Kala binda*	Leaf paste is applied externally on wounds, to stop bleeding on open sores and injured portion, pimples and blisters.
Euphorbia royleana Boiss., Euphorbiaceae *Sullu*	Bark extract/milky juice is applied externally as eardrop and during secretion from ears.
Hedychium spicatum Buch.-Ham. ex Sm. Zinziberaceae *Banhaldi*	Rhizome extract is taken orally in asthma and bronchitis.

Cont.

Table 1— Medicinal plants used by *Vaidyas*/local people in Uttarakhand

Plant name, family, local name	Uses
Juglans regia L. Juglandaceae *Akhor*	Paste of *Juglans regia* oil and bark powder is useful during pregnancy; twig is used for cleaning teeth, curing pyorrhoea.
Jurinea dolomiaea Boiss. Asteraceae *Dhoop*	Leaf paste is taken orally as antiseptic and for curing fever.
Mentha longifolia (L.) Huds. Lamiaceae *Pudina*	Leaf paste with extract of ginger and onion is taken during dehydration, vomiting and liver diseases.
Megacarpaea polyandra Benth. Brassicaceae *Barmola*	Root extract, fried leaves and butter is useful during fever, asthma, stomach pain and dysentery.
Myrica esculenta Buch.-Ham. ex D.Don Myrcaceae *Kaphal*	Fruit juice mixed with salt is taken to relieve headache, bodyache and also used as tonic.
Nicotiana rustica L. Solanaceae *Hamaku*	Fresh leaf extract mixed with butter is applied externally to remove skin sores/blisters.
Nardostachys jatamansi DC. Valerianaceae *Jatamasi*	Root powder paste mixed with refined fat or oil is taken orally during heart disease, high blood pressure and insomnia.
Ocimum sanctum L. Lamiaceae *Tulsi*	Leaf paste is taken with black pepper to get relieve from cough, fever, cold and ear pain.
Orchis chusua D.Don Orchidaceae *Hatha*	Dried tuber extract with sugar is useful in fever and cough.
Oxalis corniculata L. Oxalidaceae *Khatti buti*	Leaf extract is taken orally to remove open sores, in pimples and skin disease.
Paeonia emodi Wall. ex Royle Paeoniaceae *Chandra*	Root decoction consumed twice a day is useful during intestinal pain, dysentery and piles.
Phaseolus vulgaris L. Fabaceae *Sem*	Leaf paste is applied externally to treat skin disease and skin irritation.
Picrorhiza kurrooa Royle Scrophulariaceae *Kutki*	Dried root decoction along with black pepper and honey is useful in fever, stomach ache, jaundice and dysentery.
Pimpinella diversifolia DC. Apiaceae *Bazeer*	Leaf, root and flower paste is taken with water to relieve from gastric disorder.
Podophyllum hexandrum Royle Podophyllaceae *Ban kakri*	Tuber paste is taken or applied externally for skin diseases, wounds and cancers, and as blood purifier
Polygonatum verticillatum (L.) All Liliaceae *Salam mishri*	Tuber paste is taken orally and used as tonic, appetizers and aphrodisiac.
Potentilla fulgens Wall. ex Hk.f. Rosaceae *Bajardantii*	Root and leaf decoction is useful for teeth cleaning, toothache and pyorrhoea.
Raphanus sativus L. Brassicaceae *Muli*	Rhizome extract is taken orally during piles, pimples, indigestion, jaundice and diabetes.
Rhus parviflora Roxb. Anacardiaceae *Tungla*	Bark extract is applied externally; small twigs are also used for cleaning teeth.
Rheum emodi Wall. Polygonaceae *Archu*	Root paste and turmeric powder mixed with refined fat is applied for skin problem; paste is taken orally to relieve muscular pain, abdominal pain and dysentery.
Rheum moorcroftianum Royle Polygonaceae *Archa*	Rhizome/root paste is useful during cough, cold and internal injuries.
Rhododendron arboreum Sm. Ericaeae *Burans*	Flower juice and sugar is useful during fever, headache, stomachache, and as freshener
Rumex hastatus D.Don Polygonaceae *Almoru*	Leaf paste is applied externally to remove sores or blisters; also helps in drying pus from the blisters.
Selinum vaginatum (Edgew.) Cl. Apiaceae *Bhutkeshi*	Root paste/extract is applied on skin to relieve from swelling muscles and skin diseases.
Trigonella foenum-graecum L. Fabaceae *Methi*	Leaf extract is taken orally for curing obesity, indigestion and joints pain.
Urtica dioica L. Urticaceae *Kandali*	Dry leaf extract is taken orally; also useful during joints and muscular pain.
Verbascum thapsus L. Scrophulariaceae *Akela beer*	Root powder is taken with milk early morning to relieve from intestinal pain.
Viola biflora L. Violaceae *Saini*	Fruit paste consumed with water is useful during diaphoretic and intestinal pain.
Zanthoxylum armatum DC. Rutaceae *Timru*	Seed paste and twig/bark is used for teeth cleaning, toothache and pyorrhoea.
Zingiber officinale Rosc Zingiberaceae *Adrak*	Mixture of rhizome extract and honey is used to get relieve from cough, cold and throat pain.

of *Cannabis sativa* is an effective cure of indigestion. *Adhatoda zeylanica* leaf extract is used in the treatment of cough, cold and fever. Its sepals are used as vegetable and are effective cure for many diseases. The young branches are used as toothbrush for cleaning teeth and other related disease.

Ocimum sanctum leaf paste is used to cure cough, cold and ear pain. Tea made of leaves helps in curing cough, cold and other problems. The leaf extract when taken with black pepper cures high fever. *Berberis asciatica/Berberis osmastonii* root decoction is an effective care for eye infection. Whole plant of *Arnebia*

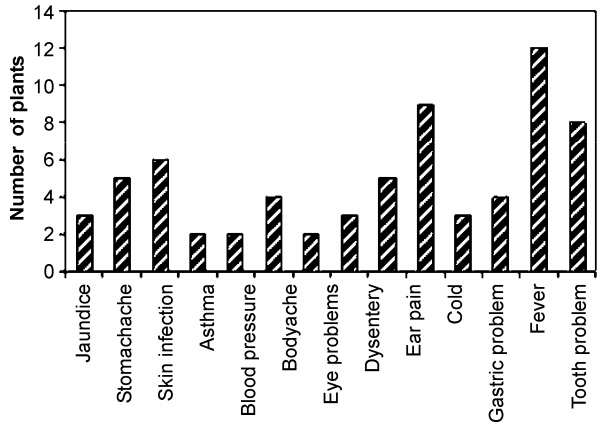

Fig.2 No of plants used in different ailments

benthamii or leaf paste is used as hair tonic, antiseptic and to cure fever. *Hedychium spicatum* rhizome is widely used in *Ayurvedic* medicine. It is also used in the treatment of asthma and bronchitis. *Nardostachys jatamansi* root is useful in the treatment of heart disease, high blood pressure and insomnia. The root powder when mixed with *ghee* (refined fat) or oil is an effective cure for many diseases. *Aconitum* tubers are used as tonic, to constrict diarrhoea and as an aphrodisiac. Decoction of *Potentilla fulgens* leaves and roots are used to cure pyorrhoea. *Picrorhiza kurrooa* oots boiled with water and black pepper cures fever. *Podophyllum hexandrum* rhizome is used for curing skin diseases, cough, cancer and as a blood purifier.

Most of the medicinal plant species used by the local people in this part of Himalaya find their mention in ancient literature of *Ayurveda*. The traditional *Vaidyas* are respected by the local community and have considerable influence on health belief and practice. *Vaidyas* and local people use mainly leaf, flower, bark/stem and roots of different trees, shrubs and herbs many of which perennial herbs with slow growing rhizomes. Conservation assessments for medicinal plants in Uttarakhand have been made[8,12-14]. According to these assessments, there are 8 endangered species, 20 vulnerable and 32 near threatened/least concern species in the Uttarakhand state. The endangered species include *Aconitum heterophyllum*, *Dactylorhiza hatagirea* and *Podophyllum hexandrum*. Many *Ayurvedic* formulations contain about 15 or more secondary plant species that enhance the potency and support the effects of primary plant species[15,16]. Sometimes, secondary plant species are added to the formulations to counteract any possible adverse side effects from the action of the primary plants. However, many *Ayurvedic* herbs are prescribed alone to cure different ailments. Out of the total formulations, few important include *Aconitum heterophyllum* (*Ateesh*), *Dactylorhiza hatagirea* (*Hatajari*), *Nardostachys jatamansi* (*Jatamansi*), *Rhododendron arboreum* (*Burans*), *Picrorhiza kurrooa* (*Kutki*) and *Mentha longifolia* (*Pudina*). It is observed that *Vaidyas* use whole plant or plant parts for the preparation of medicine, whereas the pharmaceutical industry extract the active ingredients to make plant derived drugs[8].

Ukhimath block of district Rudraprayag is the repository of medicinal plant resources which are traded illegally. Collection of medicinal plants is a source of livelihood for the local herbal healers. Every year, shepherds and local herb gatherers from the villages also collect a number of medicinal plants from the wild and use them for domestic purpose or sell these to the local traders. The traders sell these medicinal plants in the local markets as well as to traders outside the State[13]. The continuous exploitation of several medicinal plant species from the wild and substantial loss of their habitats during past 20 yrs have resulted in population decline of many high value medicinal plant species[8,9,16]. It is observed that the *Vaidyas* are usually unwilling to disclose their knowledge about the uses of different plant species, keeping in mind, improper use of the medicine, fear of over exploitation of plant species and fear of loosing their status in the local community[10,17]. This Block is one of the most important regions of Uttarakhand in terms of numbers of *Vaidyas* present in the areas. The region is one of the repositories of medicinal plant diversity in the Himalayan regions, so documentation of indigenous knowledge of local *Vaidyas* is very useful for future generation. In the interior parts of this block, people still depend on the plants for medicinal purposes and are very much concerned about their exploitation in the wild. In hilly areas, already available judicial planning is not sufficient to cope with sustainable utilization of medicinal plant resources. Protection of the biodiversity rights of local people, creating awareness among villagers in terms of organizing group workshops and support to village level voluntary groups would be one of the solutions to protect the existing plant resources of the mountainous region of Himalaya.

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