

## Ethnomedicinal Plant Diversity in Kumaun Himalaya of Uttarakhand, India

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**Abstract:** Kumaun Himalaya of Uttarakhand State is characterized by a rich diversity of ethnomedicinal plants as well as a rich heritage of traditional medicine system. The present study reveals the status of ethno-medicinal flora and their importance preserved by the local population in Kumaun region. During the study it was observed that 102 species of ethno-medicinal plants belonging to 48 families are being used in the folk-medicine system by the indigenous people of this region. For the present study, an intensive and extensive survey was made for four selected districts of Uttarakhand, viz. Almora, Champawat, Bageshwar and Pithoragarh. The neighboring villages of the study areas were also visited for identification of plant species and to explore the traditional knowledge about the use of indigenous medicinal plants. Therefore, the ethnobiological knowledge of people and listing of plants of particular region are important tools that may help in understanding human environment interactions. [Nature and Science. 2010;8(5):66-78]. (ISSN: 1545-0740).

**Keywords:** ethno-botany; folk medicines; Kumaun region; local communities

### 1. Introduction

Uttarakhand state encompasses an area of 53,485 sq. km., which accounts for nearly 15.5 per cent of the total geographical area of Western Himalayas. Most of the northern parts of the state are covered by the high Himalayan ranges and glaciers, while the lower reaches are densely forested. Due to these great altitudinal variation, wide array of climatic zones are available, which favors the luxuriant growth of diversified and rich vegetation which also has a number of raw drugs described in Ayurvedic texts. The value of biodiversity as a source of pharmaceutically important substances has been the subject of a number of studies, such as Farnsworth and Soejarto (1985), McNeely (1988), Principe (1991) and Pearce and Puroshothaman (1992), while documentation on ethno-botanical knowledge was done by Maikhuri et al. (2000), Nautiyal et al. (2001). While a comprehensive review has described a rich diversity and use of medicinal flora within Uttarakhand (Joshi, 2002), besides a study conducted on the medicinal plant diversity in riparian zone of River Ganga at Haridwar (Gangwar and Joshi, 2006) to understand the use of plant species from Himalayan region to cure various ailments.

Presently, 95% raw materials required by pharmaceuticals and drug manufactures are collected from the wild and remote areas (Kehimker, 2000). The pharmaceutical sector is using 280 medicinal plant species, out of which 175 are from the Indian Himalayan Region (Dhar et al, 2002). This region supports approximately 1748 plant species of known medicinal value (Samant et al, 1998). In India there exists over one

million community based traditional workers and about 600,000 licensed medical practitioners of traditional systems like Ayurveda, Siddha and Unani. They diagnose and cure different diseases through their own traditional knowledge (Hafeel and Shankar, 1999). The health care system of 80% population of the developing world is still dependent on their surrounding vegetation/ forests and pastures. They rely on medicinal plants because of their effectiveness, lack of modern healthcare alternatives and cultural preferences (Caniago and Siebert, 1998). Mostly plant products are used by traditional healers as traditional medicine usually collected from the wild and hilly remote areas to accomplish the increasing demand of herbal medicines. The Indian Himalayan Region (IHR) is also the habitat of major tribal communities like Bhotias, Boaxas, Tharus, Rajis, Jaunsaries, Shaukas, Kharvar and Mahigiri. From ancient period these communities mainly rely heavily and directly on the endemic vegetation for their daily needs such as food, fodder and medicines for their illness and various types of ailments. Lack of alternate income sources; push them to over-exploit natural resources of the region. Non-sustainable collection methods cause threat from harvesting and many valuable medicinal herbs are becoming rare due to their continuous utilization (Swe and Win, 2005). Further, we are witnessing a sharp decrease in the biological species all across the globe, especially in the Kumaun region, perhaps as it forms one of the major hotspots and the conservation of high-altitude medicinal plants is of great concern throughout the Himalayan region, because they are important for traditional health care and in large scale collection for

trade. Hence, there is an immediate need to conserve this natural resource.

### 1.1 Significances of ethno-medicinal plants

Himalayan herbal medicine and their traditional knowledge is a good illustration of poor communities living in the remote areas, fighting even incurable diseases through the traditional methods, and even for their livestock, through these traditional herbal medicines. Medicinal plants are natural resources for new drugs. Plants parts are directly used as medicines by a majority of community in all over world and have no side

effect like allopathic medicines. Most of the modern medicines are produced indirectly from medicinal plants.

### 2. Study Area

For the present study of medicinal plant diversity of Kumaun region of Uttarakhand State, four districts viz. Almora, Bageshwar, Champawat and Pithoragarh, were selected and a total number of 29 spots were identified. The study area varies from 1615 msl to 1646 msl. Geographical description of the study areas is given in Table 1.

Table 1. Districts Wise Description of Studied Sites for Survey of Ethno-medicinal Plant Diversity

S.NO	Districts	Study Sites
1.	<b>Almora</b> Located between 29° 36' North Latitude and 79° 30' East Longitude at an altitude of 1638 meter sea level (msl).	1.Danya, 2.Panwanaula 3.Valachiana 4.Kausani 5.Jageshwar
2.	<b>Bageshwar</b> Located between 29°42'40" to 30°18'56" North Latitude and 79°23' to 80.9°East Longitude. The district is lies at an altitude of 1646 msl.	6.Nadi Gaon, 7.Shishakhani, 8.Chhatina, 9.Chandika
3.	<b>Champawat</b> Located between 29° 5' and 29° 30' in Northern Latitude and 79°59' and 80° 3' at the center of Eastern Longitude with an altitude of 1615 msl.	11.Maneshwar, 12.Loha Ghat, 13.Ghat, 14.Marodapur
4.	<b>Pithoragarh</b> Located between 29.4° to 30.3° North Latitude and 80° to 81° East Longitude at a height of 1645 msl.	15. Dharamgarh, 16.Dhamara, 17.Kanalicheena, 18.Ogla, 19.Jauljeevi, 20.Baluakot, 21.Dharchula, 22.Tapovan, 23.Tawaghat, 24.Chirgala, 25.Sovla. 26. Around Swaminarayan Temple at Chhota Kailash, 27. Aincholi, 28. Dhamora and 29. Dhari villages



Fig.1. Map of the Uttarakhand State in India Showing Study Sites

### 3. Methodology

Present study is based on extensive and intensive field surveys made during 2006-08. The neighboring villages were visited for identification of medicinal plant species collected during the survey and to explore the more information about the traditional knowledge with the help of indigenous peoples of the concern areas who have knowledge about the uses of these medicinal plant species. The collected information was re-examined by consulting important works pertaining to medicinal plants and ethno-botany and identification of medicinal plant species was made with the help of available literature (Nair and Mohanan, 1998; Brahmvarchaska, 2003; Kanjilal, 2004) and local experts.

### 4. Results

The present study investigates the medicinal uses of plant species and the associated indigenous knowledge preserved by the indigenous community in Kumaun region. The data of medicinal plants were collected from twenty nine selected sites of four districts *i.e.* Almora, Bageshwar, Champawat and Pithoragarh (Table 1). The documentation of 102 plant species belonging to 48 families collected from study sites and their medicinal use against various ailments are presented in Table 2. The families and the species

within a family are arranged in alphabetical order. Species names are followed by vernacular names, local names, habit of plant and plant parts used. The reported species are presented with a highest representative of Asteraceae, Limiaceae and Rosaceae (9 species each) followed by Solanaceae and Poaceae (4 species); Araceae, Euphorbiaceae, Polygonaceae, Ranunculaceae, Scrophularaceae and Valerianaceae (3 species each); Apiaceae, Apocynaceae, Liliaceae, Meliaceae, Moraceae, Pinaceae, Plantaginaceae, Rutaceae, Saxiferaaceae, Verbenaceae and Zingiberaceae (2 species each); and besides these 25 families (1 species each) were found to be used by the local communities for medicinal purposes.

On the behalf of the qualitative analysis, the maximum species were herbs (50) followed by shrubs (24), trees (22) and under shrubs and climbers (3 each) as depicted in Fig 2., while on the basis of plant parts used by the local people, it was observed that whole plants of 21 species, various plant parts used (<1 parts of plant such as leaves, twigs and roots; stems, roots and bark etc.) of 43 species, roots of 14 species, leaves of 08 species, fruits of 04 species, bark, rhizome and seeds of 03 species each, stem of 02 species, and flowers of 01 species used to cure various ailments (Fig. 3).

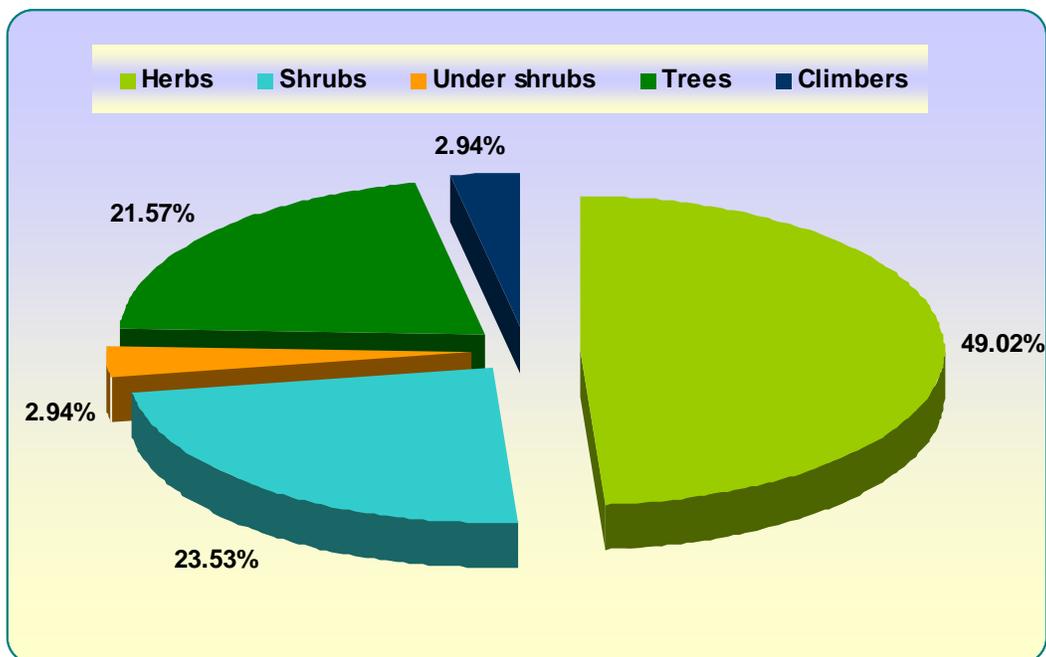


Fig. 2. Distribution of plant species according to habitat type, used to cure various ailments

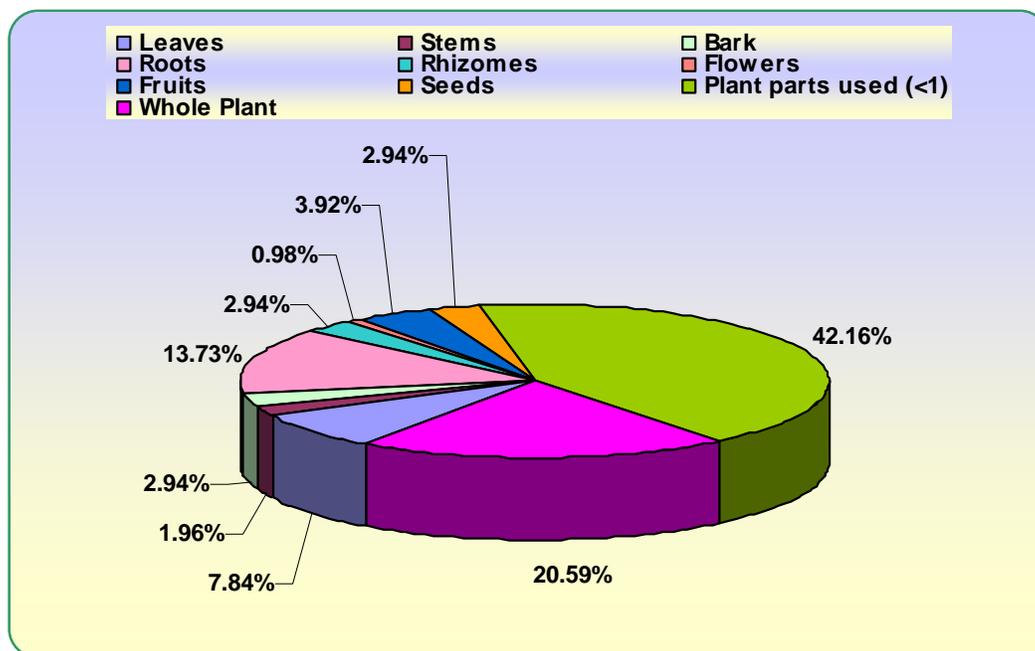


Fig. 3. Plant parts used to cure various ailments

**Table 2. Ethno-medicinal plants species used by the indigenous people of Almora Bageshwar, Champawat and Pithoragarh districts of Kumaun Himalaya**

Species name are followed by vernacular/ local names, habitat of the plant and plant parts used as medicine.

#### 4.1. *Acanthaceae*

4.1.1. *Justicia adhatoda* Linn./ Basa/Shrub/ Leaves  
The plant is used for treatment of various ailments of respiratory tract, cough and bleeding piles. Inflorescence and leaf liquid is used for fever (Ahmad et al., 2008).

#### 4.2. *Agavaceae*

4.2.1. *Agave Americana* Linn./ Rambans /Shrub/ Leaves  
The sap of agaves is antiseptic, diaphoretic, diuretic and laxative and used internally for the treatment of diarrhea and dysentery (Chevallier, 1996). An infusion of the chopped leaf is purgative and the juice of the leaves is applied to bruises (Duke and Ayensu, 1985).

#### 4.3. *Anacardiaceae*

4.3.1. *Mangifera indica* Linn./ Aam /Tree /Fruits  
Seeds are used to cure asthma, fruits are diuretic, and bark used to cure hemorrhages (Sharma et al., 2006).

#### 4.4. *Apiaceae*

4.4.1. *Centella asiatica* Linn./ Mandukparni/Herb / Whole herb

The herb is used to treat inflammatory infections, surgical lesions, damaged skin, slow healing wounds and leg ulcers (Gangwar and Joshi, 2008).

4.4.2. *Pleurospermum angelicoides* DC. / Chhipi /Herb / Roots

Roots used to cure fever, stomach pain, body pain, dysentery and spice. Root grounded into powder with seed of jeera and black piper to cure the typhoid fever, stomach pain (Nautiyal et al., 2004).

#### 4.5. *Apocynaceae*

4.5.1. *Holarrhena antidysenterica* Linn. / Koraya, kura /Tree/Stems, bark roots & seeds

The plant parts are used to remove constipation and to stimulate discharge of urine. This also controls diarrhoea, dysentery, hemorrhoids, rheumatic arthritis, and skin diseases (Singh et al., 2002).

4.5.2. *Carissa spinarum*, A. DC / Jungli karonda/Shrub/ Leaves, fruits, bark and roots

The fruit is used as astringent and antiscorbutic and remedy for biliousness. The leaf decoction is used to cure of intermittent fever, diarrhea, oral inflammation and ear ache. The root is employed as a bitter stomachic and vermifuge (Parmar and Kaushal, 1982).

#### 4.6. *Araceae*

4.6.1. *Acorus calamus* Linn. / Buch /Herb/ Roots

Small dose reduces stomach acidity whilst larger doses increase stomach secretions (Chevallier, 1996), and also recommended in the treatment of anorexia nervosa (Phillips and Foy, 1990). An infusion of the root can bring about an abortion, whilst chewing the root alleviates toothache (Weiner, 1980). It is a folk remedy for arthritis, cancer, convulsions, diarrhoea, dyspepsia, epilepsy (Duke and Ayensu, 1985).

**4.6.2. *Arisaema tortuosum* Wall Schott / Baank/ Herb/ Whole herb**

Herb used to cure various ailments related to digestive tract like constipation, indigestion, abdominal pain and dysentery. It showed anti-nematodal activities and also used treat bone fracture (Choudhary et al., 2008)

**4.6.3. *Arnebia benthamii* Wallich Ex G. Don / Balsamjari/Herb / Roots**

Plant having antibacterial, antifungal, anti-inflammatory and wound-healing properties (Manjkhola and Dhar, 2002). The roots yield a red pigment, Shikonin, which has several medicinal properties and is marketed under the trade name Ratanjot (Kirtikar and Basu, 1984). The plant is considered to be useful in the treatment of diseases of the tongue and throat (Singh and Kachroo, 1976).

**4.7. *Asclepiadaceae***

**4.7.1. *Calotropis procera* (Ait.) R.Br. / Akha, Madar/Shrub/ Leaves & flowers**

Roots and bark are used as tonic, surdorific, antispasmodic and expectorant. Flowers digestive, stomachic. Milky juice is used in leprosy, asthma, fever with enlarged liver, cough and skin diseases. (Qureshi et al., 2001). Plant latex has cytotoxic, procoagulant, anti-inflammatory and abortifacient activity. Root extract have been reported anti-tumor and anti cancerous (Mathur et al., 2009).

**4.8. *Asteraceae***

**4.8.1. *Artemisia annua* L./ Quin-ghaosu, Sweet Worm wood/Herb/ Leaves & plant oil**

Used as anti-malarial medicine, lowers fevers and checks bleeding (Chevallier, 1996). The leaves are antiperiodic, antiseptic, digestive, febrifuge (Yeung, 1985). An infusion of the leaves is used internally to treat fevers, colds and diarrhoea (Foster and Duke, 1990).

**4.8.2. *Artemisia nilagirica* (Clarke) Pamp./ Nagdona/Shrub/ Whole plant**

Plant having antimicrobial and antifungal properties. Used in skin diseases, burns cuts, wounds and inflammations.

**4.8.3. *Aster flaccidus* Bung. / Alpine aster/Herb/ Whole plant**

Used in bronchitis, cramps, common cold and relieves pain (Wangchuk, 2004).

**4.8.4. *Cichorium intybus* Linn / Kasni /Herb/Seeds, root and leaves**

Herb is taken internally to cure liver disorders, spleen problems; decoction of the powdered seeds is used in obstructed or disordered menstruation (Gangwar and Joshi, 2008). The root and the leaves are appetizer, cholagogue, depurative, digestive, diuretic, hypoglycaemic and laxative (Foster and Duke, 1990).

**4.8.5. *Centipedia minima* Linn / Nakh chhikni, Spreading sneezeweed/Herb/Whole herb**

Sandy blight, a kind of eye inflammation, in which the eye feels as if it was full of sand, purulent ophthalmia, as well as other eye infections, have been reportedly treated by Aborigines and white alike by bathing the eyes in infusion of decoctions of the plant (Lassak and McCarthy, 2001).

**4.8.6. *Erigeron asteroides* Roxb. / Bangua/ Herb/ Seeds & roots**

Herb is used as a stimulating diuretic in febrile condition (Pullaiah, 2006; Gangwar and Joshi, 2008).

**4.8.7. *Eupatorium odoratum* Linn. /Tivra gandha/Under shrub/ Leaves and plant extract**

Extract of plant is used to cure cuts and wounds. Decoction of leaves is used to cure soft tissue wounds, burn wounds and skin infections due to anti-inflammatory, anti-microbial and wound healing properties.

**4.8.8. *Sonchus oleraceus* L./ Dudhi /Herb/ Leaves and stem**

Leaves and stems are used to control liver disorders (Gangwar and Joshi, 2008).

**4.8.9. *Xanthium strumarium* Linn / Gokhru, Chhota datura/ Under shrub/ Whole plant**

Whole plant is used for malarial fever, renal complaints. The infusion of the plant is used to treat rheumatism, diseased kidneys and tuberculosis (Moerman, 1998).

**4.9. *Berberidaceae***

**4.9.1. *Berberis asiatica* Roxb.ex D.C /Rasanjana, Daruhaldi, Kilmora /Shrub/Root bark, stem, wood and fruits**

The roots are used for curing diabetes and jaundice. Fresh roots are used to cure diabetes and jaundice (Uniyal et al., 2006).

**4.9.2. *Podophyllum hexandrum* Royle/ Ban Kakri/Herb /Whole plant**

The whole plant, but especially the root, is cholagogue, cytostatic and purgative. It is used for treatment of cancer and especially in case of ovarian cancer. The plant has an antimiotic effect and thus prevents the growth of cells. (Uphof, 1959; Polunin and Stainton, 1984; Phillips and Foy, 1990).

**4.10. *Cupressaceae***

**4.10.1. *Cupressus torulosa* D.Don / Surai /Tree/ Oil of cones**

Oil shows antimicrobial activity (Sellappan et al., 2007).

**4.11. *Dioscoreaceae***

**4.11.1. *Dioscorea deltoidea* Wall / Ban tarur /Climber/ Tuber**

The extract of the root tuber is taken in the treatment of urino-genital disorders (Gangwar and Joshi, 2008), control of roundworm and to alleviate constipation (Manandhar, 2002).

**4.12. *Dipsacaceae***

**4.12.1. *Morina longifolia* Wall. ex DC. / Kandru/Herb / Shoot & roots**

Used to cure worm infected wounds in animals (Pande et al., 2007). Juice of the root is used to treat dysentery and diarrhea (Malla and Chhetri, 2009).

**4.13. *Ephedraceae***

**4.13.1. *Ephedra gerardiana* Wall. ex Stapf / Tut gatha/ Herb/ Stem**

The herb is widely used in preparations for the treatment of asthma and catarrh, reduces swellings of the mucous membranes and has antispasmodic properties (Bown, 1995). The herb also used to treat fever wounds, injuries, bleeding and heals every fever including malaria (Wangchuk, 2004).

**4.14. *Ericaceae***

**4.14.1. *Rhododendron arboretum* Smith / Buransh, brash/ Tree/ Flower extract**

Flower extract is used to cure stomach diseases (Brahmverchas, 2003) and snuffed to stop nasal bleeding (Uniyal et al., 2006).

**4.15. *Euphorbiaceae***

**4.15.1. *Embllica officinalis* Gaerth /Aonla, Aonwala /Tree/ Bark and Fruits**

Bark decoction is used for treating diarrhea, dysentery, cholera and jaundice. Fruits are used in the Ayurvedic medicine 'triphala' as one of the ingredient (Brahmverchas, 2003).

**4.15.2. *Euphorbia royleana* Boiss / Sulu/ Shrub/ Latex**

Latex showed antiseptic and germicidal activity, stop bleeding, ear complaints and hollow cavities of tooth (Gangwar and Joshi, 2008).

**4.15.3. *Ricinus communis* L./ Arand /Shrub/ Leaves, seeds and oil**

The leaves are used to cure pain, wounds, disuria, cough and worm infestations. Fruit used to cure epilepsy, piles, asthma, bronchitis, skin diseases, jaundice, nervous diseases; rheumatism and bacterial infections (Katewa et al., 2004; Luseba et al., 2007). The seed oil is given to the children in case of constipation. The decoction of leaves is applied to the breasts of women, act as glactagogue, i.e. increase milk secretion (Gorsi and Shahzad, 2002).

**4.16. *Fabaceae***

**4.16.1. *Bauhinia variegata* Linn./ Kachnar/ Tree/ Roots & bark**

Roots are carminative, decoction prevent obesity. Bark is anathematic and used in scrofula and coetaneous troubles (Sharma et al., 2006).

**4.17. *Fagaceae***

**4.17.1. *Quercus leucotrichophora* Cam/ Banj, rein/Tree/ Rhizome and wood**

Corm is used as astringent and diuretic. It is also given in diarrhea, indigestion, asthma and gonorrhoea (Gorsi and Shahzad, 2002).

**4.18. *Gentianaceae***

**4.18.1. *Swertia chirata* Roxb.Ex Flem/ Bhucharitta, Kariyata, Chirata/ Shrub/Whole plant**

Roots are used to cure malarial fever (Ahmed et al., 2004), leprosy, leucoderma, scabies, menstrual disorders, urinary and heart disorders. Flowers, stem and roots are used in asthma, jaundice and anemia (Gangwar and Joshi, 2008).

**4.19. *Guttiferae***

**4.19.1. *Hypericum podocarpoides* N. Robson/ Tikua/ Shrub/ Whole plant**

Used as a wound healing agent, prepared ointments from dried extracts of the leaves and stems (Butola, et al., 2007).

**4.20. *Hippocastanaceae***

**4.20.1. *Aesculus indica* (Wall Ex. Camb) Hook. f./ Pangar/ Tree/ Fruits**

Oil extracted from fresh fruits is externally used against wounds and bruises (Ahmed et al., 2004).

**4.21. *Lamiaceae***

4.21.1. *Ajuga bracteosa* Wall ex Bent/ *Ratpatia, kori booti/ Herb/ Leaves & roots*

A bitter astringent given in the treatment of fevers and is also regarded as diuretic (Gorsi and Shahzad, 2002).

4.21.2. *Colebrookea oppositifolia* Smith/ *Binda/ Shrub/ Leaves & roots*

Root juice is given to treat in epilepsy. Leaf juice is used to relieve fever, headaches and wounds. The juice of the young inflorescence is given to treat gastric problems and is also put in the nose for sinusitis. The plant is lopped for fodder to cattle (Malla and Chhetri, 2009).

4.21.3. *Mentha longifolia* Linn. / *Wild pudina /Herb/ Whole herb*

The herb is used for its antiseptic properties and it is beneficial for antifertility, antioviulatory, gastrointestinal disorders, cough, cold and chronic fever. The leaves and flowering stems are antiasthmatic, antispasmodic, carminative and stimulant (Brahmverchas, 2003).

4.21.4. *Mentha piperita* Linn./ *Peppermint, Hortela, Mentha/Herb/ Whole herb*

Used to treat dryness, dysentery and haematuria in animals (Pande et al., 2007).

4.21.5. *Mentha sylvestris* L./ *Pudina /Herb/ Leaves*

The herb is used for digestive disorders, particularly for flatulence, all kind of pain, headache in particular (Pullaiah, 2006).

4.21.6. *Micromeria biflora* Benth./ *Lemon scented thyme/Herb/ Whole herb*

The plant is used as a relief from pain of joints in human (Gorai and Shahzad, 2002) and treat worm infested wounds, shoulder wounds and lock jaws (tetanus) in animals (Pande et al., 2007).

4.21.7. *Ocimum kilimand-scharicum* Guerke./ *kilimanjaro basil, Kapoor tulsi /Herb/ Leaves & oil*  
Oil showed significant protection efficiency against *Anopheles gambiae* ss (Kweka et al., 2009).

4.21.8. *Ocimum sanctum* Linn. / *Ram tulsi /Herb/ Leaves, twigs & oil*

Plant has antibacterial, anti-inflammatory and wound healing properties and also used in diarrhea, astringent and rheumatism (Brahmverchas, 2003). Leaf paste applied on skin to treat infections cuts and wounds (Gangwar and Joshi, 2008). Oil used to treat pains and sprains.

4.21.9. *Thymus serpyllum* Linn./ *Ajwain/Herb/ Leaves & floral shoots*

The plant has sharp pleasant taste; the leaves are used as laxative, stomachic, and useful in purifying the blood (Gorsi and Shahzad, 2002). The oil is a remedy in toothache. The herb is given in weak vision, complaints of liver and stomach, suppression of urine and menstruation (Qureshi et al., 2007).

4.22. **Liliaceae**

4.22.1. *Asparagus filicinus* Buch.-Ham. Ex D. Don /*Sharanoi/Climber/ Roots*

The roots of herb are used to cure diarrhoea, dysentery and diabetes (Dhiman, 2005).

4.22.2 *Asparagus recemosus* Willd./ *Satawar, Sahasmuli / Climber/ Flashy roots & cladodes*

Roots and cladodes are useful in leucorrhoea, seminal debility, general debility, headache, hysteria, reduced blood pressure also useful in acidity and ulcer, extract of cladode is anticancerous. Dried root powder is used to cure liver disorders and to enhance lactation of cattle and women (Singh et al., 2002; Brahmverchas, 2003).

4.23. **Lythraceae**

4.23.1. *Woodfordia fruticosa* (L.) Kurtz/ *Dhauila, Pholdhawai/Shrub/ Flowers & fruits*

Flower paste is used in skin diseases and leucorrhoea. Flower and fruit paste/decoction are used to cure bowel complaints, menorrhagia, haemorrhage, seminal weakness and for cooling (Singh et al., 2002; Sharma et al., 2006).

4.24. **Malvaceae**

4.24.1. *Malvastrum coromandelianum* Garcke. / *Bala/Herb/ Leaves and stem*

Ulceroprotective and antipyretic plant (Dahanukar et al., 2002). Emollient and decoction are given in dysentery (Sharma et al., 2006).

4.25. **Meliaceae**

4.25.1. *Toona ciliata* M.Roem. /*Toon /Tree/ Stem bark*  
The extract of stem bark have antibacterial and antifungal activity (Chowdhury, et al., 2003), and is used to cure infantile dysentery, cough, bronchitis, intermittent fever, verminosis, leprosy and ulcer (Sharma et al., 2006)

4.25.2. *Albizia lebbek* Benth./*Siris/ Tree/Seeds & leaves*

The seed are reported to be used as tonic to the brain. The leaves are used in relieving tooth ache and strengthen the gum and teeth (Gorsi and Shahzad, 2002).

4.26. **Moraceae**

4.26.1. *Ficus carica* L./ *Anjir/ Tree/ Fruits and bark*

Fruits and bark powder are used to control diabetes by reducing blood sugar (Chakraborty, 2004). The root is useful in leucoderma and ring worm. The fruit is useful in inflammation, weakness, paralysis, thirst diseases of liver and spleen, cure piles and stimulate growth of hair (Gorsi and Miraj, 2002).

4.26.2. *Ficus religiosa* L./ *Peepal* /Tree/ Leaves, fruits, seeds & bark

Fruit powder is laxative and is used to cure asthma and bark powder is used to cure gonorrhoea and scabies (Singh et al., 2002). Plant showed anti-protozoal properties and plants part used to control diabetes by reducing blood sugar (Chakraborty, 2004).

#### 4.27. *Myricaceae*

4.27.1. *Myrica esculanta* Buch Ham./ *Kaphal*/Tree/ Bark

Used in chronic cough, asthma, painful dental gin and ear ache, external application in healing of chronic and malignant ulcers (Gangwar and Joshi, 2008).

#### 4.28. *Orchidaceae*

4.28.1. *Dactylorhiza hatagirea* (D. Don) Soo/ *Hathajari* Herb/ Roots

Root paste is used to treat burns and cuts. Provides supplements to the body and builds tissues (Wangchuk, 2004).

#### 4.29. *Paeoniaceae*

4.29.1. *Paeonia emodi* Wall ex Hooker.f. / *Hilto*, Himalayan Peony /Herb/ Rhizome

The powdered rhizome is used to cure backache, general weakness, headache, dizziness, vomiting and to aid pregnancy (Khan et al., 2007).

#### 4.30. *Parnassiaceae*

4.30.1. *Parnassia nubicola* Wallich ex Royle/ *Mamira*, *Nirbansi* /Herb/ Roots

Root paste is taken to get relief from cuts & wounds. Leaf juice is applied to treat eye problems and inflammation (Kunwar and Adhikari, 2005).

#### 4.31. *Pinaceae*

4.31.1. *Cedrus deodara* Roxb.Loud./ *Deodar*, *Dyar*/Tree/ Bark wood- oil

Bark wood- oil is used as aphrodisiac (Ahmed et al., 2004).

4.31.2. *Pinus roxburghii* Roxb/ *Chir*, *Sarala*/Tree/ Wood & resin

Wood is used to cool burning sensation of the body. Wood and Resin wood used in snake bite and scorpion sting. Water with a small amount of resin in it is used as antiseptic (Ahmed et al., 2004). The green needles are ground and sap is extracted. It is taken to increase the flow of urine (Uniyal et al., 2006).

#### 4.32. *Plantaginaceae*

4.32.1. *Plantago ovata* Forsk/ *Isabgoal*/ Herb/ Husk of seeds

The seeds are cooling, demulcent, useful in inflammatory and applied as poultice to rheumatic and gouty swelling, good in dysentery and decoction useful in cough and chronic diarrhea and constipation (Gorsi and Miraj, 2002).

4.32.2. *Plantago lanceolata* Linn/ *Jangli isabgoal*/Herb/ whole herb

Seeds are chewed as carminative and used against dyspepsia (Ahmed et al., 2004) and the herb is used to cure sore wounds, dysentery, purgative mouth disease and chills (Matin et al., 2001).

#### 4.33. *Poaceae*

4.33.1. *Cenchrus biflorus* Roxb./ *Chirchitta*, *Kutta ghash*, *Bur grass*/Shrub/ Stem & seeds

Fresh crushed stem and seed powder are used for easy child birth and abortion (Bozzini, 1991).

4.33.2. *Cynodon dactylon* (Linn.)Pers./ *Doov*/ Herb/ Whole plant

Entire aboveground parts are crushed with water. Two to three drops of this extract are poured in the nostril to cure nasal bleeding (Uniyal et al., 2006).

4.33.3. *Dendrocalamus hamiltonii* Nees et Arn. ex Munro /*Phulrua*/Herb/ Leaves and roots

Leaves and roots used to reduce blood sugar level (Kar et al., 2003).

4.33.4. *Eulaliopsis binata* (Retz.) Hubb./ *Bhabhar ghas*/Herb/ Roots

The herb is used to treat papillae and internal injuries (Pande et al., 2007).

#### 4.34. *Polygonaceae*

4.34.1. *Rheum australe* D. Don/ *Chhirchey*/Tree/ Aerial parts

Whole plant is crushed and poultice is made in a cotton cloth. This is then heated and applied to cure swelling, which has developed as a result of fractured bone (Uniyal et al., 2006). Plants parts are also used to cure alimentary disorders, cuts, wounds, bone fracture, indigestion, cough, dysentery, haematuria, eye disease, skin disease, sprain, constipation, mastitis, hoof diseases, broken horn and internal injuries in animals (Pande et al., 2007).

4.34.2. *Rumex histatus* D. Don/ *Chalmori*, *almoru*/ Herb/ Leaves

Leaves are believed to have cooling properties and help in stopping nasal bleeding (Uniyal et al., 2006).

4.34.3. *Rumex nepalensis* D. Don./ *Khatura, jungali palak/ Herb/ Leaves*

Leaf extract is antiseptic and used to stop bleeding. It is also used against allergy caused by leaves of *Acacia nilotica* (Ahmed et al., 2004).

4.35. **Punicaceae**

4.35.1. *Punica granatam* Linn./ *Anar/ Shrub/ Juice, fruit bark & flower*

Pulp is used as cardiac and stomachache (Ahmed et al., 2004). Fruit juice used in piles, flower juice used in nose bleeding, bark and flowers in diarrhea and dysentery, decoction of flower buds used in bronchitis and vaginal discharges (Gangwar and Joshi, 2008).

4.36. **Ranunculaceae**

4.36.1. *Aconitum heterophyllum* Wall ex Royle/ *Ativisha, atees / Herb/ Bark & roots*

Dried roots are powdered and taken orally to cure stomach ache and fever (Uniyal et al., 2006), good in periodic and intermittent fevers, useful in diarrhea and vomiting (Gorsi and Miraj, 2002).

4.36.2. *Ranunculus sceleratus* L. / *Celery-leaved buttercup, Jaldhania/Herb/ Whole herb*

Herb is used to treat dysuria, asthma and pneumonia (Gangwar and Joshi, 2008).

4.36.3. *Thalictrum foliolosum* DC./ *Mamira/ Herb/ Roots*

Herb used to control external parasites (Pande et al., 2007). Dried root powder mixed with *Thymus linearis* in equal proportion is taken regularly to cure stomach pain and gastric trouble (Uniyal et al., 2006).

4.37. **Rosaceae**

4.37.1. *Cotoneaster microphyllus* Wall. Ex. Lindn/ *Little leaf cotoneaster/ Under shrub/ Fruits, wood & stolons*

The stolons are used as an astringent (Qureshi et al., 2007).

4.37.2. *Fragaria nubicola* Lindley /*Bhi kaphal, bud mava/ Herb/ Fruits and leaves*

Powdered leaves with leaves of *Berberis lyceum* are used against gastric ulcer, as antiseptic and against wounds (Ahmed et al., 2004). Decoction of plant is consumed to cure fever. (Uniyal et al., 2006).

4.37.3. *Geum urbanum* Linn/ *Bohay, clove wort / Herb / Roots*

Roots are used to control fever (Matin et al., 2001).

4.37.4. *Potentilla fulgens* Wall Ex Hook/ *Bazra danti / Herb/ Roots*

Leaves are chewed for strengthening the tooth (Singh, 2008).

4.36.5. *Prinsepia utilis* Royle./*Jhatalu /Shrub/Roots*

Root extract is taken orally as an antidote to neutralize the effect of poison intake. Root paste after heating at low temperature in an earthen pot is applied on wounds (Uniyal et al., 2006).

4.37.6. *Prunus persica* Stokes./ *Aru / Tree/ Leaves*

The fruit is antipyretic, tonic to the brain, enriches the blood, flowers are said to be used as laxative (Gorsi and Shahzad, 2002).

4.37.7. *Pyracantha crenulata* D.Don/ *Ghigharu/ Shrub/ Fruits*

Used to cure burns (Pande et al., 2007)

4.37.8. *Pyrus malus* L. /*Seb / Tree/ Fruits and barks*

The poultice made of rotten apple is used for weak eye and brain tonic (Gorsi and Shahzad, 2002). An infusion of apple tree bark is given in intermittent, remittent and bilious fevers (Gorsi and Miraj, 2002).

4.37.9. *Rubus ellipticus* Smith./ *Hisal, hisalu / Shrub/ Fruits & roots*

Roots used to control blood pressure and diarrhea in human (Dhiman, 2005) and haematuria in animals (Pande et al., 2007) and fruits purifies blood and very effective for heart patients (Matin et al., 2001).

4.38. **Rutaceae**

4.38.1. *Murraya koenigii* (L.) Spreng./ *Kadli nimb, Karwil, Curry leaves /Tree/ Leaves & fruits*

Leaves used to cure diarrhea, dysentery and vomiting (Sharma et al., 2006) and are also known to be good for hair, for keeping them healthy and long (Palanisamy and Pillai, 2007).

4.38.2. *Zanthoxylum armatum* DC./ *Timur/Shrub/ Stem & fruits*

Used to control gastric disorders, constipation and external parasites (Pande et al., 2007).

4.39. **Sapindaceae**

4.39.1. *Sapindus mukorossi* Gaertn./ *Reetha/ Tree/ Seeds*

Used to control external parasites, hair and skin diseases and to expel leach (Pande et al., 2007)

4.40. **Saxifragaceae**

4.40.1. *Berginia ligulata* (Wall.)Engl./ *Pashanbheda/ Herb/ Leaves & rhizome*

The plant has been recognized for its role in dissolving kidney and bladder stone. Rhizome is useful in cough and cold, cardiac problems, fever, ulcer, swelling, old

wounds, cuts and burns, septic, laizi, gastrointestinal problems, colitis and eye ailments (Chowdhary et al., 2009).

**4.40.2. *Berginia strachyi* Hook f. & Thoms. Engl. /Pashanbheda/ Herb/ Rhizome and bark**

The herb is used in curing several ailments like old wounds, kidney stones, ophthalmia, cough and colds, tonsils etc (Chowdhary et al., 2009).

**4.41. *Scrophulariaceae***

**4.41.1. *Bocopa monieri* Linn./ Brahammi, Jal neem/Herb/ Whole herb**

Used to control dyspepsia, cough, fever, insomnia, epilepsy, debility after heart attack, hoarseness of voice, less memory tension and blood purifier (Brahmverchas, 2003; Dhiman, 2005).

**4.41.2. *Picrorhiza kurroa* Royle/ Kutki/ Shrub/ Roots**

Roots used to cure dyspepsia, asthma, biliousness, fever, piles, blood troubles, burning sensation, inflammation, ring worm, jaundice, anemia, heart disease, malarial fever, worms infestation in children, indigestion (Brahmverchas, 2003; Dhiman, 2005).

**4.41.3. *Verbascum thapsus* Linn./ Ekalveer/Herb/ Whole herb**

Leaves are useful in fever. Leaves and flowers are useful in pulmonary diseases, cough, bleeding of lungs and bowels. Dried corolla of the flower is used in gout and rheumatism (Gorsi and Miraj, 2002).

**4.42. *Solanaceae***

**4.42.1. *Datura stramonium* Linn./ Datura/ Herb/ Whole plant**

The seeds have an acid and bitter taste, used as tonic, febrifuge. The leaves after roasting are applied locally to relieve pain (Gorsi and Shahzad, 2002).

**4.42.2. *Solanum indicum* Linn Syn.*S.ferox* Linn./ Bhata katari/Shrub/ Fruits**

Fruits and roots used to cure asthma, dry cough, colic, disuria, chronic fever, alopecia, dropsy and toothache (Dhiman, 2005).

**4.42.3. *Solanum nigrum* Linn/ Makoi/Herb/Whole herb**

Decoction of leaves is used for liver and skin diseases. Fruits are used to treat eye diseases, dysentery and fever. Seeds and roots are used to treat liver related problems, (Chakraborty, 2004; Dhiman, 2005).

**4.42.4. *Withania somnifera* Dunal./ Ashwaganda, aksun/ Herb/Roots**

To improve memory and weakness in humans (Brahmverchas, 2003).The leaves are applied to

tumors. The roots are regarded as useful in rheumatism and dyspepsia. The fruits are diuretic (Gorsi and Shahzad, 2002).The tuberous roots are also effective in treating leucoderma, constipation, insomnia, tissue-building and nervous breakdown. Leaves are recommended for fever, painful swellings and ophthalmitis (Sharma et al., 2006).

**4.43. *Taxaceae***

**4.43.1. *Taxus baccata* Linn/Thuner/Tree/ Bark**

Decoction of the stem is used early morning to cure tuberculosis (Ahmed et al., 2004).

**4.44. *Theaceae***

**4.44.1. *Camella sinensis* (L.) Kunize / Chahua, Chai/Shrub/Leaves and seeds**

Leaves and seeds used to treat asthma, angina pectoris peripheral vascular disease and coronary artery diseases. Tea extract have antibacterial activities (Gangwar and Joshi, 2008).

**4.45. *Urticaceae***

**4.45.1. *Urtica dioica* Linn/ Bichchhua, Bichhu ghas /Herb/ Leaves**

The leaves are used to cure uterine hemorrhages, bleeding from nose and blood vomiting (Dhiman, 2005; Gangwar and Joshi, 2008), regulate menstrual period (Matin et al., 2001).

**4.46. *Valerianaceae***

**4.46.1. *Nardostachys grandiflora* DC./Masi, / Herb/ Leaves**

The herb is used in chronic fevers and heart disorders (Wangchuk, 2004), stem used as a contraceptive and combat stress condition (Chakraborty, 2004).

**4.46.2. *Valeriana wallichii* DC / Samoy/Herb/ Whole herb**

The plant used in treatment of inflammatory disease habitual constipation, insomnia, epilepsy, neurosis, anxiety and as a diuretic, hepatoprotective, analgesic and cytotoxic ( Subhan et al., 2007).

**4.46.3. *Valeriana jatamansi* DC / Sugandhbala, jatamasi / Herb/Rhizome & roots**

This wild herb is being exploited for its roots and rhizomes which contain valepotriates, which are highly effective against leprosy (Kaur et al., 1999).used in hysteria, epilepsy, cholera, dysentery (Matin et al., 2001).

**4.47. *Verbenaceae***

**4.47.1. *Vitex negundo* Linn./ Nirgundi/ Shrub/Leaves and bark**

Used in asthma and urinary diseases. Leaves yield a tonic and febrifuge, smoked for relief in catarrh and

headache. Flowers astringent, used in diarrhea, fever and liver complaints (Sharma et al., 2006)

4.47.2. *Lantana camera L.var. aculeate/ Baramasi, Phoolwari/Shrub/Whole plant*

Whole plant is used for the treatment of bronchitis; leaf decoction is used in treating constipation (Singh et al., 2002).

#### 4.48. *Zingiberaceae*

4.48.1. *Roscoea alpina Royle / Safed musli,kakoli /Herb/ Roots*

Roots of herb are used to cure rheumatism (Gangwar and Joshi, 2008).

4.48.2. *Hedychium spicatum Buch. Ham Ex. Smith./ Kapoor kachri, Van Haldi/Shrub/ rhizome*

The powder as well as decoction of root is carminative and digestive. Decoction is expectorant; stimulant and stomachic. The powder of root is useful in the treatment of liver complaints, and is also used in treating fevers, vomiting, diarrhea, inflammation, pains and snake bite. The root is given for heating potency to the female. It is used in the treatment of indigestion and poor circulation due to thickening of the blood (Bhatt et al., 2007).

### 5. Discussion

Traditional knowledge of Himalayan medicine is a good illustration of poor communities, fighting even incurable diseases through the traditional methods and even for their livestock, through these traditional herbal medicines. The indigenous traditional knowledge of medicinal plants and therapies of various local communities has been transmitted orally for centuries is becoming extinct, due to changes in traditional culture and introduction of modern technologies. Hence, these traditional practices need proper documentation and the present study is an attempt to collect/ explore, preserve and proper documentation of medicinal plants which are being used traditionally. The investigation revealed that the local people, herbalist and vaidyas have explored a number of plant species to cure various ailments. Qualitative analysis of present study reveals that a total of 102 plant species were identified, of which 49.02 % were herbs; 23.53 % shrubs; 21.57% trees and 2.94 % climbers and under shrubs each (Fig. 2). While on the basis of the plant parts used, it was observed that the maximum plant species (42.16%) were found to be used as various parts such as leaves, roots, stems and bark etc. followed by whole plants (20.59%), roots (13.73%), leaves (7.84%), fruits (3.92%), bark, rhizome and seeds (2.94% each) and flowers (0.98%) to cure various diseases (Fig. 3).

### 6. Conclusion

Despite the development of rural health services, villagers still use medicinal herbs to a large extent for treatment of common ailment like cough, cold and fever, headache and body ache, constipation, dysentery, cuts and burns, boils, ulcer, skin and respiratory diseases etc. Further herbal medicines have no side effects, easily available and economically viable Hence; there is an urgent need of detailed investigation and documentation of indigenous knowledge about medicinal plants and therapies which were being passed orally from generation to generation.

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