

 <p>ISSN NO. 2320-5407</p>	<p>Journal Homepage: - www.journalijar.com</p> <p>INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)</p> <p>Article DOI: 10.21474/IJAR01/4775 DOI URL: http://dx.doi.org/10.21474/IJAR01/4775</p>	 <p>INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR) ISSN 2320-5407</p> <p>Journal homepage: http://www.journalijar.com Journal DOI: 10.21474/IJAR01</p>
---	---	---

RESEARCH ARTICLE

ETHNOBOTANICAL SURVEY OF MEDICINAL AND AROMATIC PLANTS OF SANGLA VALLEY, DISTRICT KINNAUR, HIMACHAL PRADESH.

Kirti Negi^{1*}, Harminder Pal Singh¹, Daizy R. Batish², Anu sharma² and Savita Kumari².

1. Department of Environment Studies, Panjab University, Chandigarh.
2. Department of Botany, Panjab University, Chandigarh, India.

Manuscript Info

Manuscript History

Received: 7 May 2017
Final Accepted: 9 June 2017
Published: July 2017

Key words:-

Amchi, Ethnobotanical, Traditional knowledge, Aromatic plants, Kinnaur

Abstract

Sangla Valley in district Kinnaur of Himachal Pradesh is known for its rich diversity of plants owing to its unique geographical position and edapho-climatic factors. However, due to heavy snowfall, the area remains cut off from the surroundings making movement of the people from one place to other difficult. People of the area especially the tribal have to rely on the traditional health care system involving use of medicinal and aromatic plants. Thus, the traditional healers (Amchi) have in-depth knowledge about the medicinal plants required for the treatment of various ailments. Unfortunately, this knowledge of the people is vanishing fast and also there is a lack of proper documentation of medicinal and aromatic plants of the area. In order to preserve their vast treasure of traditional knowledge, a study was undertaken where in various medicinal and aromatic plants of the Sangla Valley were inventoried and the Ethno-botanical knowledge with respect to their use was collected.

Copy Right, IJAR, 2017.. All rights reserved.

Introduction:-

People value many plants because of their ancient believes and experiences. Plants provide people with food, as well as materials for construction and the manufacture of crafts and tools and many other products like fuel, paints and dyes and above all these uses, man has used plants as a source of medicine. Since the beginning of civilization, man has used plants for various ailments, before the allopathic system of medicine.

It has formed the basis of traditional medicine systems that have been in existence for thousands of years and continue to provide mankind with new remedies for the treatment of various diseases without any side effects. Medicinal plants have traditionally occupied important position in the socio-cultural, spiritual and health arena of rural and tribal areas. India has one of the oldest, richest and most diverse systems of traditional medicine since time immemorial. If we look back in the history there are many evidences and records which prove that man rely on healing effects of plants e.g. records written on clay tablets in cuneiform are from Mesopotamia and date back from about 2600 BC. Among the substances that were used were oils of *Cedrus* species (Cedar), *Cupressus sempervirens* (Cypress) and *Papaver somniferum* (poppy juice), used for the treatment of various ailments ranging from cold and cough to many harmful diseases. According to World Health Organization (WHO), 80% of the world population presently uses herbal medicine for primary health care (Mukherjee and Wahile, 2006). They are also getting considerable economic benefits in the development of indigenous medicines and in the use of medicinal plants for the treatment of various diseases. WHO notes that from 119 derived pharmaceutical medicines, about 74% are used

Corresponding Author:- Kirti Negi.

Address:- Department of Environment Studies, Panjab University, Chandigarh.

in modern medicine in ways that are correlated directly with their traditional uses as plant medicines by native culture.

Himachal Pradesh, situated in the centre of the Western Himalayas, having diverse agro climatic conditions ranging from semi-tropical to alpine and culminating to the cold desert region, is bestowed with a veritable emporium of medicinal and aromatic plants (Chauhan, 1999). Unfortunately, these traditional knowledge based system started to disappear with the passage of time, due to lack of documentation, because of ignorance and illiteracy of the tribal communities thus, results in the erosion of knowledge associated with medicinal plants. Low income in these traditions compels the persons to give up these practices and look for other lucrative occupation. Nevertheless, the importance of this fast eroding traditional knowledge is being realized and studies are being conducted to gather this useful information with a scientific approach.

Method:-

Study Site:-

This valley has a spectacular terrain of lush green vegetation, orchards, vineyards, snow covering peaks and cold desert mountains (Balokhra, 2002). It is rich in flora and fauna but relatively unexplored and little work has been done to inventorize, evaluate and explore the medicinal and aromatic plants that are used by the locals of this region. It is a part of the Greater Himalayas situated at 31° 6' to 31° 30' N Latitude and 78° 10' to 79° E Longitude (Map shown in Figure 1). An altitude varies from 1500 to 4500 m. The length of the valley is about 65 km which covers an area of nearly 300 km² and accommodating nearly 9,500 inhabitants. The valley comprises a number of small watersheds which find their way into the Baspa River. Moreover, hamlets are scattered all along the valley. North facing slope is relatively gentle and has adequate vegetation cover, farm fields, soil cover and sporadic settlements. Uppermost part of the mountain peaks are usually covered with snow for 2– 4 months with the melting of snow extraordinary variety of beautifully coloured flowers inhabits these mountain forming a rich storehouse of medicinal and aromatic plants (Chauhan, 2003). Further, its unique geographical position and edapho-climatic factors make it a biodiversity rich zone comprising of medicinal and aromatic plants.

Data Collection:-

The study was done during the year 2010 to 2013. For this, extensive field trips of the entire area were undertaken between June to September to different localities and areas of the Sangla Valley. A participatory rural appraisal using transect-walk method was adopted (Cunningham, 2001). It involved semi-structured questionnaire surveys, participatory observations, interviews and discussions with local traditional healers (*Amchis*), village elders and field visits to elicit information on the uses of various plants. (Chauhan, 2003; Chauhan, 1989; Chawala *et al.*, 2008 ; Chawala *et al.*, 2012; Singh *et al.*, 2011; Singh *et al.*, 2008 ; Negi *et al.*, 1993; Joshi *et al.*, 2006 ; Verma *et al.*, 2010 ; Verma *et al.*, 2011).

Ethno-medicinal data were collected through general conversations with the local tribal (informants) of both sex and age groups ranging from 45 to 85 years. In total, 50 people were interviewed to gather information. Of these, 30 informants were male and twenty were female. The information regarding local names, part used, mode of preparation and administration of medicinal plants was gathered from local people. Only those medicinal plants were collected, which are most frequently used by the tribes for the treatment of various ailments. Collection of the specimens has been done during field trips to facilitate the process of identification, dried specimens were identified consulting DD Herbarium of FRI, Dehradun and identified plants were deposited to herbarium of Panjab University, Chandigarh to get voucher number. Information collected during field surveys were consulted from the relevant literature given (Rawat *et al.*, 2011; Sharma *et al.*, 2005; Sharma *et al.*, 2006 ; Prasanna *et al.*, 2010 ; Sood *et al.*, 2001).

Results:-

Survey results are listed in (Table1) with information given for each plant viz. botanical name, family, local name, English name, habit, habitat, part used, ethno medicinal uses, and mode of application. Investigation has brought in to light the uses of 53 plants belonging to 29 families are continuously being exploited by people residing in tribal belt Kinnaur against various body disorders and ailments. Among the 29 families Asteraceae, is the most dominating family with (8 species) followed by Polygonaceae and Rosaceae (4 species each), Ranunculaceae, Apiaceae, Cupressaceae, Ericaceae and Lamiaceae with (3 species each), two species from Saxifragaceae, and Scrophulariaceae. However, other families were found to contribute one species each.

Due to tribal belt, inhabitants of this area still rely on traditional medicinal system for treatment of their ailments like fever, cold, cough, gastro intestinal trouble and rheumatism using different plant parts. Study revealed that leaves and roots were the most common plant part used accounting to (17 species each), followed by rhizomes and flowers (7 species each), seeds (5), seed oil (4), stolon, fruit and bark (3 species each), whole plant and tuber (2 species each) and other parts of (4) plant species which doesn't fall in any of the above mention categories.

As shown in (Table 1) plants found in different habit, which revealed that herbs (34) is the most common growth form which was followed by shrubs (10), trees (6) and others (3). Due to unique geographical location and edapho-climatic conditions, plants found here in varied range of habitat, ranging from dry areas to areas covered with snow fall.

Different mode of preparations was used by people, as per the different information provided by local practitioners and Amchi regarding medicinal plants. Most frequently used method for consumption of medicinal plant part was in the form of powder (22) which was followed by paste (15), decoction (12), oil (6), seeds (2), and (1) each of flowers, bark, leaves, tuber, juice and tea made of leaves.

Discussion:-

Ethobotanical survey was conducted in Sangla Valley, Kinnaur, to gather information about medicinal plants used against various ailments, revealed that native people of area have faith and respect for Amchi system of medicine, despite of emergence in modern system of medicine. The history of herbal medicine in India is very old, reference of oldest used plants are there in Hindus scriptures like Rigveda (4500–1600 BC), Charaka Samhita (1000–800 BC) and others. Maximum use of leaves for medicinal purpose indicates their easy availability and higher medicinal potential in them (Gurib-Fakim, 2006). Study revealed that number of medicinal plants are used against stomach disorder and related ailments, and these finding have been scientifically validated by study on ethno-medicines used against four common ailments found in Lahaul-Spiti area (Singh and Lal, 2008). In present study valuable information about medicinal plants are reported against number of ailments like Cold, cough, stomachache, cuts, wounds, burns, fever, arthritis, constipation and dysentery. There are number of reports which supported the use of *Aconitum heterophyllum* against stomach disorder and other related issues (Sood *et al.*, 2001; Sharma *et al.*, 2004). Among 53 plant species, *Aconitum heterophyllum*, *Angelica glauca*, *Arnebia benthamii*, *Bergenia ciliata*, *Bunium persicum*, *Dioscorea deltoidea* and *Podophyllum hexandrum* were most widely used medicinal plant. Asteraceae which is the most dominating family in kinnaur holds position second, fourth, and seventh in western Himalaya, eastern Himalaya, and the Flora of British India, respectively (Hooker 1904; Hara and Hohashi 1966- 1974; Rau 1975). There are number of medicinal plants in study site which need to be conserve as soon as possible as there number is decreasing in very fast pace thus we conclude that:

Conclusion:-

Himalayas has an extraordinary diversity of plant species due to its unique location, and has been regarded as a treasure which is confine to persons living here, but this treasure is diminishing very fast because people residing in this belt hesitate to share their information with others. They are not ready to go ahead with this traditional system of medicine, due to low income generation and moving towards lucrative occupation, which results in gap of information between old and young generation. There are number of endangered medicinal plants, status of these plants is not known to ethnic people due to illiteracy and ignorance. They are using these resources in very unsustainable way causing huge damage and loss to biodiversity. So it's a high time that, state should made strict laws for sustainable development of environment.

Table 1:- A list of medicinal plants of Sangla Valley with their botanical name, family, local and English name, habit and habitat, part used, ethno-medicinal uses and mode of application.

S. No.	Botanical Name and Family	Voucher Number	Local name / English name	Habit / Habitat	Part used	Ethnomedicinal Uses	Mode of application
1.	<i>Aconitum heterophyllum</i> Wall. ex Royle Ranunculaceae	19953	Atish, Patish, Indian Atees, Atis root	Herb, Moist places	Roots	Cough, dysentery, stomach ache and vomiting	Powder
2.	<i>Aconitum violaceum</i>	19954	Mithapatis,	Herb,	Tuberous	Renal pain,	Decoction

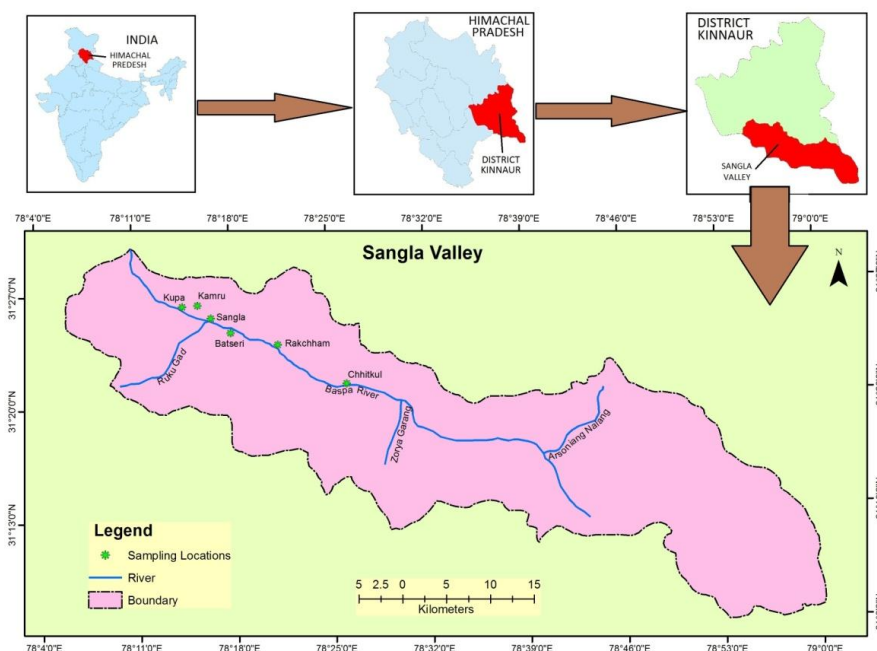
	Jacquem. ex Stapf Ranunculaceae		Indian Atees	Moist places	roots	rheumatism, high fever and piles	
3.	<i>Angelica glauca</i> Edgew. Apiaceae	19955	Sapal, Angelica	Herb, Rocky areas	Roots	Stomach ache, tonic and diuretic	Powder
4.	<i>Arisaema flavum</i> (Forssk.) Schott Araceae	19956	Jamusha, Yellow cobra lily	Herb, Open slopes	Tubers	Stomach ache	Tubers are eaten raw
5.	<i>Arnebia benthamii</i> (Wall. ex G. Don) Johns. Boraginaceae	19957	Khomae, Ratanjot	Herb, Rocky areas	Roots	Tooth ache, ear ache and eye diseases	Powder
6.	<i>Artemisia brevifolia</i> Wall. ex DC. Asteraceae	20407	Nurcha, Mugwort	Shrub, Rocky areas	Flowering branches	Asthma and brain diseases	Powder
7.	<i>Arctium lappa</i> L. Asteraceae	20408	Jungli kuth, Greater Burdock	Herb, Open slopes	Roots and seeds	Blood purifier, common cold and fever	Decoction
8.	<i>Bergenia ciliata</i> (Haw.) Sternb. Saxifragaceae	19958	Pashanbheda , Silphori, Rock foil	Herb, Moist rock	Rhizomes	Fever and swollen joints	Powder
9.	<i>Bergenia stracheyi</i> Hook. f. & Thorns. Saxifragaceae	19959	Pashanbheda, Elephant ears	Herb, Moist rock	Rhizomes	Fever	Decoction
10.	<i>Betula utilis</i> D.Don Betulaceae	19960	Bhojpatra, Himalayan silver birch	Deciduous tree, Rocky areas	Barks	Tonic and bronchitis	Paste
11.	<i>Bunium persicum</i> (Boiss.) B.Fedtsch. Apiaceae	19961	Kala jeera, Black cumin	Herb, Mountain slopes	Seeds	Stomach ache, fever, flatulence and diarrhea	Seeds are eaten raw
12.	<i>Cannabis sativa</i> L. Cannabaceae	19962	Bhang, Hemp, Marijuana	Herb, Wasteland	Flowers and fruits	Astringent, spasmodic and appetizer	Powder
13.	<i>Cassiope fastigiata</i> (Wall.) D. Don Ericaceae	20411	Motaeshing, Himalayan heather	Herb, Rocky areas	Leaves	Fire burns and wounds	Paste
14.	<i>Capsella bursa- pastoris</i> (L.) Medik. Brassicaceae	20412	Daegha, Shepherd's purse	Herb, Waste land	Whole plant	Cardiovascular, cuts and wounds	Tea made of dry leaves
15.	<i>Carduus nutans</i> L. Asteraceae	20413	Musk Thistle, Nodding plumeless thistle	Herb, Grassy meadows	Flowers and Seed oil	Blood purifier and atherosclerosis	Oil and powder
16.	<i>Cedrus deodara</i> (Roxb.) G.Don Pinaceae	19963	Devdar, Deodar, Himalayan Cedar	Coniferous tree, Rocky areas	Wood oil	Treatment of stomach worms, paralysis and urinary diseases	Oil
17.	<i>Cotoneaster microphyllus</i> Wall. ex Lindl. Rosaceae	20415	Rock spray or small leaf cotoneaster	Shrub, Mountain slopes	Stolon, roots	Astringent, for cuts and wounds	Powder and paste
18.	<i>Crocus sativus</i> L. Iridaceae	19964	Kesar, Saffron	Herb, Cultivated in fields	Stigma and Style	Fever, tonic and stomach ache	Paste and powder

19.	<i>Dactylorhiza hatagirea</i> (D. Don) Soo Orchidaceae	19966	Salam panja, Marsh orchid	Terrestrial orchid, Moist places	Roots and tubers	Cold, cough, sexual dysfunction and diarrhea	Powder and paste
20.	<i>Daphne papyracea</i> Wall. ex Steud. Thymelaeaceae	20416	Shooruh, Indian / Nepal paper plant, Lokta	Shrub, Mountain slopes	Roots	Skin diseases and gonorrhoea	Paste
21.	<i>Delphinium brunonianum</i> Royle Ranunculaceae	20417	Roskarch, Musk larkspur	Herb, Mountain slopes	Flowers and leaves	Worm, fever and skin diseases	Paste
22.	<i>Dioscorea deltoidea</i> Wall. ex Griseb. Dioscoreaceae	19967	Singli-mingli, Wild yam	Climber, Forest areas	Dried Rhizomes	Ophthalmic and rheumatic pain	Powder
23.	<i>Fagopyrum esculentum</i> Moench Polygonaceae	19969	olgo, Buckwheat	Herb, Waste land	Seeds and leaves	Abdominal complaints	Powder
24.	<i>Fagopyrum tataricum</i> (L.) Gaertn. Polygonaceae	19970	Bras, Wild buckwheat buckwheat	Herb, Waste land	Seeds and leaves	Astringent	Powder
25.	<i>Gnaphalium affine</i> D.Don Asteraceae	20419	Bachha, Cudweed	Herb, Waste land	Whole plant	Leucorrhoea, seminal emissions and rheumatoid	Decoction
26.	<i>Heracleum candicans</i> Wall. ex DC. Apiaceae	19971	Poral, Heracleum	Herb, Mountain slopes	Leaves and flowers	Liver complaints arthritis, cuts and wounds	Paste
27.	<i>Hippophae rhamnoides</i> L. Elaeagnaceae	19972	Chharma, Surch, Seabuckthorn	Shrub, River sides	Berry's	Liver ailment, male impotency, high cholesterol and excessive menstrual bleeding	Juice
28.	<i>Juglans regia</i> L. Juglandaceae	19974	Kaa, Walnut	Tree, Cultivated land	Roots, bark, fruits and leaves	Rickets, diarrhea and tooth cleaning	Bark and Leaves
29.	<i>Juniperus communis</i> L. Cupressaceae	20421	Thekeru, Juniper	Shrub, Mountain slopes	Fruits	Diaphoretic, carminative and stimulant	Decoction
30.	<i>Jurinea dolomiaea</i> Boiss. Asteraceae	19975	googlyung, Juniper	Herb, Slopes of mountain	Roots	Colic	Powder
31.	<i>Juniperus polycarpus</i> K. Koch Cupressaceae	20422	Shur, Turkestan Juniper, Persian Juniper	Tree, Mountain slopes	Leaves	Cardiac and nervous problems	Powder
32.	<i>Juniperus squamata</i> Buch.-Ham. ex. D.Don Cupressaceae	20423	Dhupang, Flaky or Himalayan Juniper	Shrub, Mountain slopes	Leaves	Fever and reduce inflammation	Paste
33.	<i>Koeleria macrantha</i> (Ledeb.) Schult Pers.	20424	Jolt, Prairie Junegrass	Herb, Mountain	Leaves	Treatment of cuts	Paste

	(=K. cristata Pers.) Poaceae			slopes			
34.	<i>Mentha longifolia</i> (L.) Huds. Lamiaceae	19976	Pudina, Horse mint	Herb, Moist places	Leaves	Head ache and Stomach complaints	Oil
35.	<i>Morchella esculenta</i> Fr. Morchellaceae	19977	Rangmooch, Conic morel, Morel	Mushroom, Forest areas	Stolon and rhizomes	Fever and constipation	Decoction
36.	<i>Picrorhiza kurroa</i> Royle ex Benth. Scrophulariaceae	19978	Kadu, Picrorhiza	Herb, Rocky slopes	Rhizomes and Stolon	Cold, cough, Stomach ache and constipation	Powder
37.	<i>Plantago tibetica</i> Hook.f. & Thoms. Plantaginaceae	19979	Isabgol	Herb, Moist places	Roots and leaves	Muscular abscess, skin eruption, boils and rashes	Paste
38.	<i>Sinopodophyllum</i> <i>hexandrum</i> (Royle) T.S. Ying (= <i>Podophyllum</i> <i>hexandrum</i> Royle) Berberidaceae)	19980	Karui, Himalayan Mayapple	Herb, Forest areas	Rhizomes and roots	Cancer	Powder
39.	<i>Prunus armeniaca</i> L. Rosaceae	19981	Chul, Wild apricot	Tree, Cultivated land	Seed oil	Arthritis	Oil
40.	<i>Prunus mira</i> Koehne ex Sargent Rosaceae	19982	Rag, Behmi, Wild peach	Tree, Cultivated land	Seed oil	Arthritis and rheumatic pain	Oil
41.	<i>Rabdosia rugosa</i> (Wall. ex Benth.) H. Hara Lamiaceae	20434	Thator Wrinkled leaf Isodon	Shrub, Rocky areas	Leaves	Stomach ache and gastric	Decoction
42.	<i>Rheum australe</i> D.Don Polygonaceae	19983	Arch, Himalaya rhubarb	Herb, Moist areas	Roots and rhizomes	Tonic and rheumatic pain	Paste and powder
43.	<i>Rhododendron</i> <i>anthopogon</i> D. Don Ericaceae	19984	Sermanung, Dwarf Rhododendro n	Shrub, Rocky slopes	Leaves	Headache	Paste
44.	<i>Rhododendron</i> <i>lepidotum</i> Wall. ex G. Don Ericaceae	20435	Tholaeshing, Pink Scaly Rhododendro n	Shrub, Rocky slopes	Bark	Purgative	Decoction
45.	<i>Rosa webbiana</i> Wall. ex Royle Rosaceae	19985	Jungli gulab, Rose	Shrub, Rocky areas	Flowers	Indigestion	Flowers are eaten raw
46.	<i>Rumex nepalensis</i> Spreng. Polygonaceae	19986	Jungli palak, Webbs rose	Herb, Waste land	Roots and leaves	Colic, dislocated bones and swollen gums	Paste and powder
47.	<i>Saussurea</i> <i>gossypiphora</i> D. Don Asteraceae	19987	Khasbal, Snow lotus, Kasturi kamal	Herb, Rocky areas	Roots and flowers	Gynecological problem, cuts and wounds	Powder
48.	<i>Saussurea costus</i> (Falc.) Lipsch. Asteraceae	19988	Kuth, Costus	Herb, Rocky areas	Roots	Stomach cramp, increase sperm count, tonic and dysentery	Decoction

49.	<i>Saussurea obvallata</i> (DC.) Edgew. Asteraceae	19952	Dongur, Brahm kamal, Saw wort	Herb, Rocky areas	Seeds, flowers and roots	Headache, wounds and Cuts	Oil, decoction, powder
50.	<i>Thymus linearis</i> Benth. ex Benth Lamiaceae	19989	Van ajwain, Mother of thyme	Herb, Rocky areas	Seed oil	Stomach Complaints	Seeds are eaten raw
51.	<i>Verbascum thapsus</i> L. Scrophulariaceae	20441	Tamakhu, Great mullein	Herb, Grassy meadows	Leaves	Wounds, cold and dysentery	Paste and decoction
52.	<i>Viola biflora</i> L. Violaceae	19991	Banafsha, Sweet violet	Herb, Open slopes	Leaves	Fever and cough	Powder
53.	<i>Urtica dioica</i> L. Urticaceae	20589	Purchoya, Stinging nettle	Herb, Waste ground	Leaves	Antirheumatic and tonic	Decoction

Fig 1:- Map Of Study Site.
LOCATION OF SANGLA VALLEY IN INDIA



References:-

- Balokhra, J.M. (2002). The Wonderland Himachal Pradesh. H.G Publication New Delhi.
- Chauhan, N.S. (1999). Medicinal and Aromatic Plants of Himachal Pradesh. New Indus Publishing Company, Delhi. 555 p.
- Chauhan, N.S. (2003). Important medicinal and aromatic plants of Himachal Pradesh. J. of Ind. For., 129: 979-998.
- Chauhan, N.S. (1989). Potential of aromatic plants flora in Himachal Pradesh. J. Ind. Perf., 33: 118-122.
- Chawla, A., Rajkumar, S., Singh, K.N., Lal, B. and Singh, R.D. (2008). Plant Species Diversity along an Altitudinal Gradient of Bhabha Valley in Western Himalaya. J. of Mount.Sci., 5: 157-177.
- Chawla, A., Parkash, o., Sharma, V., Rajkumar, S., Lal, B., Gopichand, Singh, R.D. and Thukral, A.K. (2012). Vascular plants, Kinnaur, Himachal Pradesh, India. J. of Sp. lists and dist. Ch. List., 8: 321-348.
- Cunningham, A.B. (2001). Applied ethnobotany. People, wild plant use and conservation. London: Earthscan.
- Gurib-Fakim, A. (2006). Medicinal plants Traditions of yesterday and drugs of tomorrow. J. of Mol.Aspect. of Med., 27: 1-93.

9. Hara, H. and Hohashi, H. (1966-1974). The Flora of Eastern Himalaya. 3 Vols. Tokyo, Japan: The University of Tokyo Press.
10. Hooker, J.D. (1904). A Sketch of the Flora of British India. London: Kessinger Publishing.
11. Joshi, P.K., Rawat, G.S., Padilya, H. and Roy, P.S. (2006). Biodiversity characterization in Nubra Valley, Ladakh with special reference to plant resource conservation and bioprospecting. *J. of Biodivers. and Conserv.*, 15: 4253–4270.
12. Mukherjee, P.K. and Wahile, A. (2006). Integrated approach towards drug development from Ayurveda and other Indian system of Medicine. *J. of Ethnopharmacol.*, 103: 25-35.
13. Negi, K.S., Gaur, R.D. and Tiwari, J.K. (1993). Ethnobotanical notes on the flora of Har-ki-Doon (District Uttarkashi), Garhwal Himalaya, Uttar Pradesh, India. *J. of Ethnobot.*, 11: 9-17.
14. Samal, P.K., Dhyani, P.P. and Dalio, M. (2010). Indigenous medicinal practices of bhotia tribal community in Indian central Himalaya. *Ind. J of Trad.knowl.*, 9:140-144.
15. Rau, M.A. (1975). High Altitude Flowering Plants of Western Himalaya. Calcutta: Botanical Survey of India.
16. Rawat, D.S. and Kharwal, A.D. (2011). Traditional Health Practices By 'Kinners'-A Tribe in Alpine and Sub-Alpine Himalayas of kinnaur (Himachal Pradesh), India. *J.of Life Sci. Leafl.*, 22:1048-1055.
17. Singh, K.N. and Lal, B. (2008). Ethnomedicines used against four common ailments by the tribal communities of Lahaul-Spiti in western Himalaya. *J. of Ethnopharmacol.*, 115: 147–159.
18. Singh, G. and Rawat, G.S. (2011). Ethno-medicinal Survey Of Kedarnath Wildlife Sanctuary in Western Himalaya, India. *J.of Fundam. and Appl. Life Sci.*, 1:35-46.
19. Sharma, P.K., Chauhan, N.S. and Lal, B. (2004). Observations on the traditional phytotherapy among the inhabitants of Parvati valley in western Himalaya, India. *J. of Ethnopharmacol.*, 92: 167-176.
20. Sharma, P. K. and Lal, B. (2005). Ethnobotanical notes on some medicinal and aromatic plants of Himachal Pradesh. *Ind.J.of Trad. Knowl.*, 4 : 424-428.
21. Sharma, P. K., Sethi, G.S., Sharma, S.K. and Sharma, T.K. (2006). Ethnomedicinal observations among the inhabitants of cold desert area of Himachal Pradesh. *Ind.J. of Trad. Knowl.*, 5:358-361.
22. Sood, S.K., Nath, R. and Kalia, D.C. (2001). Ethnobotany of Cold Desert Tribes of Lahaul-Spiti (N.W. Himalaya). Deep Public., New Delhi.
23. Verma, R.K. and Kapoor, K.S. (2010). Assessment of floristic diversity in Pooh Valley: of cold deserts of District Kinnaur, Himachal Pradesh. *Biol. Forum- an Int. J.*, 2: 35-44.
24. Verma, R.K. and Kapoor, K.S. (2011). Plant Species Diversity in Ropa - Giavung Valley in Cold Deserts of District Kinnaur, Himachal Pradesh. *Biol. Forum-an Int. J.*, 3: 34-43.