Ethno-Botanical Study of Medicinal Plants from Unexplored Area of District Ramban (J&K) India

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ABSTRACT

Background: Medicinal plants are used for different purposes and in diverse uses of human beings. Medicinal plants have played key roles in the lives of local peoples living in these biodiversity rich regions by providing products for both food and medicine. A study was conducted in hill station of District Ramban (J&K) in order to check the present status of medicinal plants diversity their abundance and for suggested utilization measures for residential peoples of the area. The current ethnobotanical study aimed to survey and collect the medicinal plants in order to document the traditional knowledge from the local peoples.

Methods: In this field-laboratory investigation during 2019-2020. Three large sampling zones of Ramban District were surveyed and selected based on varied local data, altitude and latitude. In the laboratory, the collected medicinal plants were identified morphologically based on the valid Taxonomic keys and Herbaria.

Result: During the field survey, medicinal plants used by the local community were ranged from 68 to 79 plant species, which were 46 to 55 herbs, 13 to 15 trees, and 08 to 09 shrubs from selected sampling zones for treating various diseases and disorders. These medicinal plants are distributed in 38 families with diversity of Asteraceae family was dominant in all sampling zones.

Key words: Asteraceae, Ethno-botany, Medicinal plant, Ramban.

INTRODUCTION

Ethno-medicine plays very significant role in human health care since time immemorial. According to WHO, about 80% of the people in developing countries still depend on local medicinal plants to fulfil their primary health needs. Ethnobotanical surveys have been found to be one of the reliable approaches to drug discovery (Fabricant and Fornsworth, 2001; Kalaichelvi and Swaminathan, 2009; Verma, 2006). India is fortunate to have tremendous and varied medicinal plants resources distributed broadly in the vivid forest ecosystem. According to WHO approximately 80% of world population in developing countries depends on traditional medicines for primary health care (Uniyal, 2005; Verma, 2010). The Indian Himalayan region spreads across Jammu & Kashmir, Himachal Pradesh, Uttarakhand, West Bengal, and Arunachal Pradesh. Jammu and Kashmir are a treasure of floral and faunal diversity. At least 500 million people in India directly or indirectly depend on medicinal plants derived drugs for their health care needs (Noorjahan and Saranya, 2018). Many studies have been carried out from time to time to document the ethnomedicinal information from different districts of Jammu and Kashmir, India (Sharma et al., 2012; Sharma et al., 2019; Khan et al., 2004) except unexplored area of District Ramban.

Therefore, in the present study, an effort has been made to document some locally available medicinal plants used by the local community of district Ramban, for curing various diseases. The present data has its importance because it is recorded for the first time.

MATERIALS AND METHODS

Description about study area

The study area was divided into three sampling zones and every zone has further three stations for the collection of medicinal plants.

Zone 1
- Pogal Valley (Sarvadhar to Omnagar)
- Sarvadhar (33021'16.99 N longitude, 75020'04.08 E latitude)
- Omnagar (33020'01.96 N longitude, 75025'51.41 E latitude)
- Omnagar Valley (Omnagar to Neel)

Zone 2
- Neel (33025'20.03 N longitude, 75025'30.08 E latitude)
- Sanasar Valley (Sanasar to Nathatop)

Zone 3
- Sanasar (34008'36.56 N longitude, 74079'73.71 E latitude)
- Nathatop (33007'77.78 N longitude, 75019'36.88 E latitude)
Sampling strategy
The study was conducted on monthly basis on all the three-sampling station of district Ramban for the period of one year during 2019-2020. The sampling process was completed in three days every month and two sites were covered in one day.

Collection of Medicinal plants
The collection and identification of specimen has been done by flowering/fruited to facilitate the process of identification covering all the sampling month. In case of trees and shrubs, branches of suitable size in flowering or fruiting stages were taken. Field number for each collected sample was assigned. Larger specimens were folded in shape of V, N, or M. The specimens were pressed in blotting sheets with the help of wooden and iron presses in the field. Flowers of the Himalaya, Flora Britannica and other local floras for confirmation of identity. The technique for collection of plants was the same as suggested by (Jain and Rao, 1978).

Identification of Medicinal plants
The plants were identified with the help of flora (Raizada and Saxena, 1978). The identified medicinal plants were confirmed by consulting the herbaria of different standards keys in Department of Plant Sciences, Central University of Himachal Pradesh and Department of Botany and Microbiology, Gurukula Kangri Vishwavidyalaya, Haridwar.

Documentation of local traditional knowledge
Local uses of medicinal plants of the sampling area, their local names, parts used, purpose for which it is used, method of administration were recorded through talks and conversation with elderly persons, and rural women in villages.

Results and Discussion
The results pertaining to the present research work based on ethno-botanical study of medicinal plants from unexplored area of District Ramban (J&K) India, emphasis on survey of medicinal plants in which a total number of 79 medicinal plant species belonging to 38 families had been collected and identified from the selected sampling zones. The results related to this data have been described in Table 1 to Table 3. Total 35 families of medicinal plants were recorded from sampling zone 1 in which Asteraceae family was most

Table 1: Medicinal plant recorded from selected sampling zone along with family and habit.

| Botanical Name          | Zone 1 | Zone 2 | Zone 3 | Family       | Habit  |
|------------------------|--------|--------|--------|--------------|--------|
| Achilliea millefolium  | P      | P      | A      | Asteraceae   | Herb   |
| Adiantum venustum      | P      | P      | P      | Pteridaceae  | Herb   |
| Asparagus filicinus    | P      | P      | P      | Asparagaceae | Herb   |
| Aesculus indica        | A      | P      | P      | Sapindaceae  | Tree   |
| Agrimonia pilosa       | P      | P      | P      | Rosaceae     | Herb   |
| Ainsliaea aptera DC.   | A      | P      | P      | Asteraceae   | Herb   |
| Amaranthus spinosus    | P      | P      | P      | Amaranthaceae| Herb   |
| Anaphalis contorta     | A      | P      | P      | Asteraceae   | Herb   |
| Anemone vitifolia      | P      | P      | P      | Ranunculaceae| Herb   |
| Angelica glauca        | P      | P      | P      | Apiaceae     | Herb   |
| Arctium lappa Linn.    | P      | P      | P      | Asteraceae   | Herb   |
| Artemisia vestita      | P      | P      | P      | Asteraceae   | Herb   |
| Berberis aristata      | P      | P      | P      | Berberidaceae| Herb   |
| Berberis lyctum        | P      | P      | P      | Berberidaceae| Herb   |
| Bergenia ciliata       | P      | P      | P      | Saxifragaceae| Herb   |
| Bergenia stracheyi     | P      | P      | A      | Saxifragaceae| Herb   |
| Betula utilis          | P      | P      | P      | Betulaceae   | Tree   |
| Bidens pilosa Linn.    | P      | P      | P      | Asteraceae   | Herb   |
| Bistorta amplexicaulis | P      | P      | P      | Polygonaceae | Herb   |
| Bupleurum falcatum     | P      | P      | A      | Apiaceae     | Herb   |
| Cannabis sativa        | P      | P      | P      | Cannabaceae  | Herb   |
| Capsella bursapastoris | P      | P      | P      | Brassicaceae | Herb   |
| Cedrus deodara         | P      | P      | P      | Pinaceae     | Tree   |
| Celtis australis       | P      | P      | P      | Cannabaceae  | Tree   |
| Corylus colurna        | P      | P      | P      | Betulaceae   | Tree   |
| Cotoneaster microphylla| P      | P      | P      | Rosaceae     | Shrub  |
| Cuscuta reflexa        | P      | P      | P      | Convolvulaceae| Herb   |
| Common Name                | Genus               | Family          | Type    |
|----------------------------|---------------------|-----------------|---------|
| Cynoglossum glochidiatum   | P                   | Boraginaceae    | Herb    |
| Datura stramonium          | P                   | Solanaceae      | Herb    |
| Delphinium denudatum       | P                   | Ranunculaceae   | Herb    |
| Dioscorea deltoidea        | P                   | Dioscoreaceae   | Herb    |
| Elaeagnus umbellata        | P                   | Elaeagnaceae    | Shrub   |
| Elsholtzia fruticosa       | P                   | Lamialescace    | Shrub   |
| Fagopyrum cymosum          | P                   | Polygonaceae    | Herb    |
| Geranium wallichianum      | P                   | Geraniaceae     | Herb    |
| Hypericum perforatum       | P                   | Hypericaceae    | Herb    |
| Jasminum humile            | P                   | Oleaceae        | Shrub   |
| Juglans regia              | P                   | Juglandaceae    | Tree    |
| Juniperus recurv            | P                   | Cupressaceae    | Tree    |
| Lamium album               | P                   | Lamiaceae       | Herb    |
| Leonurus cardiaca          | P                   | Lamiaceae       | Herb    |
| Mentha longifolia          | P                   | Lamiaceae       | Herb    |
| Nasturtium officinale      | A                   | Brassicaceae    | Herb    |
| Ocimum basilicum           | P                   | Lamiaceae       | Herb    |
| Origanum vulgare           | P                   | Lamiaceae       | Herb    |
| Phytolacca acinosa         | P                   | Phytolaccaceae  | Herb    |
| Pinus wallichiana          | P                   | Pinaceae        | Tree    |
| Plantago lanceolata        | P                   | Plantaginaceae  | Herb    |
| Plantago major             | P                   | Plantaginaceae  | Herb    |
| Podophyllum hexandrum Royle| P                   | Berberidaceae   | Herb    |
| Polygonum hydropiper       | P                   | Polygonaceae    | Herb    |
| Populus ciliata            | P                   | Salicaceae      | Tree    |
| Prunus armeniaca           | P                   | Rosaceae        | Tree    |
| Prunus persica             | P                   | Rosaceae        | Tree    |
| Punica granatum            | P                   | Lythraceae      | Shrub   |
| Ranunculus laetus          | P                   | Ranunculaceae   | Herb    |
| Rhododendron arboreum      | P                   | Ericaceae       | Tree    |
| Robinia pseudoacacia       | A                   | Fabaceae        | Tree    |
| Rosa brunonii              | P                   | Rosaceae        | Shrub   |
| Rumex nepalensis           | P                   | Polygonaceae    | Herb    |
| Salix babylonica           | P                   | Salicaceae      | Tree    |
| Selinum vaginatum          | P                   | Apiaceae        | Herb    |
| Siegesbeckia orientalis    | A                   | Asteraceae      | Herb    |
| Skimmia laureola           | P                   | Rutaceae        | Shrub   |
| Solanum nigrum             | P                   | Solanaceae      | Herb    |
| Solidago virgaurea         | P                   | Asteraceae      | Herb    |
| Sonchus asper              | P                   | Asteraceae      | Herb    |
| Tagetes minuta             | P                   | Asteraceae      | Herb    |
| Taraxacum officinale       | P                   | Asteraceae      | Herb    |
| Taxus baccata              | P                   | Taxaceae        | Tree    |
| Thalictrum foliolosum      | A                   | Ranunculaceae   | Herb    |
| Thymus serpyllum           | P                   | Lamiaceae       | Shrub   |
| Trifolium repens           | P                   | Fabaceae        | Herb    |
| Urtica dioica              | P                   | Urticae         | Herb    |
| Valeriana jatamansi        | P                   | Valerianaceae   | Herb    |
| Verbascum thapsus          | P                   | Scrophulriaceae | Herb    |
| Xanthium strumarium        | P                   | Asteraceae      | Herb    |
| Zizyphus mauritiana        | P                   | Rhamnaceae      | Shrub   |

**Table 1:**

| Total | 72    | 79    | 68    |
dominant family (10 species) followed by Lamiaceae (6 species), Rosaceae (5 species), Ranunculaceae (3 species), Polygonaceae (4 species), Apiaceae (3 species), Berberidaceae (3 species) etc. *Pinus wallichiana* was recorded as dominant species (7%) followed by *Juglans regia* (6%), *Cedrus deodara* (5%), *Plantago lanceolate* (5%), *Valeriana jatamansi* (4%), *Ocimum basilicum* (3%) as in Fig 1, due to the uniform sunlight exposure and low human interferences. Total 3 types of medicinal plant were collected in which Herb (50 number) followed by Tree (13 number) and Shrub (9 number) as in Table 1 and Fig 2. Ethnomedicinal uses of 10 species belonging to 7 families from Pulwama District was reported by (Chak et al., 2009). Total 38 families were recorded from sampling zone 2 in which Asteraceae family was most dominant family (13 species) followed by Lamiaceae (6 species), Rosaceae (5 species), Ranunculaceae (4 species), Polygonaceae (4 species), Apiaceae (3 species), Berberidaceae (3 species) etc. Higher number of plant species may be due to the lower elevation which imply the climate adaption by plant species. *Pinus wallichiana* was recorded as dominant species (6%) followed by *Juglans regia* (5%), *Cedrus deodara* (4%), *Plantago lanceolate* (4%), *Capsella bursapastoris* (3%), *Valeriana jatamansi* (3%), *Taxus baccata* (2%), *Ocimum basilicum* (2%) Fig 1. Total 3 type of medicinal plant was collected in which Herb (55 number) followed by Tree (15 number) and Shrub (9 number) Table 1 and Fig 2. (Singh, 1997) conveyed 58 ethno-medicinal plants from Dehradun. (Uniyal, 2003) documented 24 medicinal plant from Wildlife Sanctuary. (Singh, 2004) counted 90 medicinal plant of Western Himalayas. (Singh and Chauhan, 2005) recorded the medicinal plant habit of 43 plant belonging to 25 families. 35 families were recorded from sampling zone 3 in which Asteraceae (11 species) followed by Lamiaceae (6 species), Rosaceae (5 species), Ranunculaceae (3 species), Polygonaceae (3 species), Apiaceae (2 species), Berberidaceae (3 species) etc. *Juglans regia* was recorded as dominant species (7%) followed by *Capsella bursapastoris* (5%), *Cedrus deodara* (5%), *Pinus wallichiana* (5%), *Tagetes minuta* (4%), *Anaphalis contorta* (3%), *Ocimum basilicum* (3%), *Plantago lanceolata* (3%), *Ranunculus laetus* (3%) Fig 2. *Juglans regia* was recorded as dominant species because of prolonged winter season, which is more significant climate factor for sustainable establishment of various types of medicinal plants. There is evidence that primarily climatic factors are responsible for spread of *J. regia*. Climatic change in the environment causes huge impacts on plant species their communities and also on forest ecosystems. (Bisht and Pundir, 2008) reported 67 medicinal plants from Western Himalayas, Uttarakhand. 65 medicinal plants were identified by (Srivastav et al., 2009) in different areas of Manipur. Total 3 type of medicinal plant was collected in the form of Tree, Herb and Shrub in which Herb (46 number) was recorded as dominant followed by Tree (14 number) and Shrub (8 number) as in Table 1 and Fig 1.

**Table 2:** Habit type of medicinal plant and their number recorded from selected sampling zones.

| Plant type | Zone 1 | Zone 2 | Zone 3 |
|------------|--------|--------|--------|
| Herb       | 50     | 55     | 46     |
| Shrub      | 09     | 09     | 08     |
| Tree       | 13     | 15     | 14     |

![Fig 1: Line diagram showing the abundance (%age) of medicinal plants collected from selected sampling zones.](image)
### Table 3: List of medicinal plants with common name, part used and various uses.

| Botanical Name | Common name | Parts used | Uses |
|----------------|-------------|------------|------|
| Achilliea millefolium | Pehel gassh | Leaves, flower | Diuretic, Simulative, Haemostatic tonic |
| Adiantum venustum | Nullij | Fronds | Expectorant, Diuretic, in scorpion-sting |
| Asparagus filicinus | Shatavari | Root | Tonic, astringent |
| Aesculus indica | Handoon | Roots, bark | Leucorrhoea; Dislocated joints |
| Agrimonia pilosa | Levenhak | Roots, leaves | Diuretic |
| Ajinaea apteraDC. | Deeinch | Roots | Stomach-ache, Diuretic |
| Amaranthus spinosus | Walve Ther | Whole plan | Sudorific fevers, Snake-bite; Eczema, Boils, burns, Gonorrhoea |
| Anaphalis contorta | Hund jund | Whole plan | Healing wounds, prevents bleeding |
| Anemone vitifolia | Gare Fagur | Whole plant | Pathogenic fungi |
| Angelica glauca | Chora | Whole plant | Dyspepsia, Constipation, confinement, |
| Arctium lappa Linn. | Kund | Roots, seeds | Diuretic, Diaphoretic, Depurative, |
| Artemisia vestita | Lasheklu | Leaves | Haemostatic |
| Berberis aristata | Chukchin | Root bark, | Menorrhagia, Diarrhoea, Jaundice, |
| Berberis lycium | Bel Chukchin | Roots | Febrifuge, Menorrhagia, Diarrhoea, Ophthalmia, Jaundice, Piles, |
| Bergenia ciliata | Humbud | Rhizomes | Diarrhoea, Fever, Spleen enlargement |
| Bergenia stracheyi | PatharChut | Rhizomes | Menorrhagia, Urinary troubles |
| Betula utilis | Bhoj patra | Bark | Anaemia, Cough, Obesity |
| Bidens pilosa Linn. | Poshikul | Whole plant | Leprosy, Tumour, skin problem |
| Bidens tripartita | Zerjund | Whole plant | Chronic dysentery, Eczema |
| Bistorta amplexicaulis | Maachrin | Root-stock | Unani medicine |
| Bupleurum falcatum | Kaliwar | Whole plant | Liver problems |
| Cannabis sativa | Bang | Leaves, flower, | Sedative, analgesic, narcotic |
| Capsella bursapastoris | Palenmuj | Herb | Diuretic, Febrifuge, Haemostatic |
| Cedrus deodara | Deodar | Bark | Fevers, diarrhoea, dysentery |
| Celtis australis | Brimj | Fruit | Amenorrhoea |
| Corylus colurna | Peri Guer | Nuts, leaves | Treatment of injuries |
| Cotoneaster microphylla | Brim | Stolons | Astringent |
| Cuscuta reflexa | | Whole plant | Liver complaints, itch, fevers |
| C. glochidiatum | Pambche | Roots | Vomiting |
| Datura stramonium | Datura | seeds, flowers | Ear ache, Scalp, falling hair |
| Delphinium denudatum | Varch Kul | Roots | Adulterant for aconite |
| Dioscorea deltoidea | Singli | Tubers | Washing silk, wool, hair |
| Elaeagnus umbellata | Jeyien | Flowers, seeds | Stimulant, Cardiac, astringent |
| Elsholtzia fruticosa | Bhimchi | Fruits, leaves | Fruiting, leaves yield essential oil |
| Fagopyrum cymosum | Katamuj | Seeds | Choleriac diarrhoea, fluxes |
| Geranium wallichianum | Hakigasse | Whole plant | Cure for tooth ache, eye- troubles |
| Hypericum perforatum | Bader Posh, | Whole plant | Wounds, ulcers, swellings |
| Jasminum humile | Pitmali | Flowers, roots, | Oil perfumery, ringworm |
| Juglanse regia | Doon | Leaves, bark, | Anthelmintic, Detergent, Rheumatism |
| Juniperus recurva | Dhoop | Wood, leaves, | Incense, alcohol extract |
| Lamium album | Gurchalan | Whole plant | Haemorrhages of uterus, nose |
| Leonurus cardiaca | Genurye | Leaves | Diuretic, Emmenagogue |
| Mentha longifolia | Pudina | Whole plant | Carminative, Antiseptic |
| Nasturtium officinale | Aalam | Whole plant | Vermifuge, Diuretic |
| Ocimum basilicum | Tului | Whole plant | Stomachic, Alexipharmac, Ringworm, |
| Origanum vulgare | Rukheer | Whole plant | Stomachic, Diuretic, Diaphoretic |
| Phytolacca acinosa | Tethkul | Whole plant | Pain in joints |
| Pinus wallichiana | Kail | Resin, needles | Liniment for healing of the cuts, wounds |

Table 3: Continue......
Table 3: Continue......

| Plant | Common Name | Part Utilised | Uses |
|-------|-------------|---------------|------|
| Plantago lanceolata | Isabgol | Whole plant | Cough, asthma, pulmonary diseases |
| Plantago major | Isabgol | Seeds | Gastric complaints, stomach disorders |
| Podophyllum hexandrum Royle | Wangun | Whole plant | Skin affections |
| Polygonum hydropiper | Marchi | Kernels, leaves, | Cough, anthelmintic |
| Populus ciliata | Phras | Bark | Blood purifier |
| Prunus armeniaca | Cheir | Kernels | Pharmaceutical, cosmetic industry |
| Prunus persica | Deain | Bark, fruits, | Diarrhoea, dysentery, bronchitis |
| Ranunculus laetus | Phugur | Herb | Toxic properties |
| Rhododendron arboreum | Yung | Bark, petals | Digestive disorders |
| Robinia pseudoacacia | Kikar | Leaves, flowers | Eye troubles |
| Rosa brononi | Gulab | Flowers, roots | Syphilitic ulcers |
| Rumex nepalensis | Ghasse | Leaves | Rheumatism |
| Salix babylonica | Vier | | |
| Selinum vaginatum | Bhogli | Roots | Sedative, analgesic properties |
| Siegesbeckia orientalis | Lichkura | The whole plant | Ulcers, Sores, skin diseases |
| Skimmia laureola | Kasturi | Leaves | Small-pox |
| Solanum nigrum | Kambil KUI | Whole plant | Fevers, diarrhoea, eye troubles |
| Solidago virgaurea | Raterkul | Aerial part | Kidney, bladder stone |
| Sonchus asper | Nujir | Herb | Wounds, boils treatment |
| Tagetes minuta | Gainda | Herb | Stomachic, aperient |
| Taraxacum officinale | Nunar | Rhizomes, | Stomachic, hepatic stimulant |
| Taxus baccata | Yew | Leaves, fruits | Coldness of extremities, diarrhoea |
| Thalictrum foliolosum | Jare | Roots | Extremities, diarrhoea |
| Thymus serpyllum | Ban ajwain | Leaves, Roots, | Expectorant, carminative |
| Trifolium repens | Ghasse | Leaves, flowers | Detergent, depurative |
| Urtica dioica | Soi | Whole plant | Chronic hepatitis, habitual constipation |
| Valeriana jatamansi | Mushki | Roots | Hysteria, nervous unrest, urinary troubles |
| Verbascum thapsus | Thumbik | Whole plant | Heart stimulant |
| Xanthium strumarium | | Whole plant | Chronic malaria, urino-genital diseases |
| Zizyphus mauritiana | Bel | Fruits | Sedative, soporific, to stop vomiting |

Fig 2: Number of medicinal plant recorded along habit type.
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REFERENCES
Bisht, D. S. and Pundir, Y. P. S. (2008). Wild medicinal plants of Jaunsar-Bawar (Western Himalayas), Uttarakhand. Indian Forester. 134(5): 674-686.

Chak, I., Agarwal, R. K. and Khan, A. M. (2009). Ethnomedicinal study of important plants the treatment of hair & boils in District Pulwama of Kashmir. Ann For. 17:101-107.

Fabricant, D. S. and Fornsworth, N. R. (2001). Plants traditional medicine for drug discovery. Environmental health perspectives (Supplementary). 109:69-75.

Jain, S.K. and Rao, R.R. (1978). A Handbook of Field and Herbarium Methods. Today and Tomorrow Publ. New Delhi.

Kalaichelvi, K. and Swaminathan, A. A. (2009). Alternate L, use Through Cultivation of Medicinal and Aromatic Plants - A Review. Indian Journal of Agricultural Research. 30(3): 176-183.

Khan, Z. S., Khuroo, A. A. and Dar, G. H. (2004). Ethno botanical survey of Uri, Kashmir Himalaya. Indian j Tradit knowle. 3: 351-357.

Noorjaham, C.M. and Saranya, T. (2018). Antioxidant, anticancer and molecular docking activity of tulsi plant. Indian Journal of Agricultural Research. 38(3): 209-212.

Raizada, M.B. and Saxena, H. (1978). Flora of Mussoorie. Bishen Singh Mahendra Pal Singh, Dehradun.

Sharma, A. K., Malik, D.S., Kumar D. and Bargali, H. (2019). Ichtyotoxic Plants used for Collection of Fishes in India: A Review. Latest Trends in Zoology and Entomology Sciences. 5: 27-52.

Sharma, M.M., Verma, R.N., Jamal, S.M., Batra, A. and Rao, D.V. (2012). An anti-asthmatic plant: Tylophora indica burm. F. Merill-A Review. Indian Journal of Agricultural Research. 33(3): 192-201.

Singh, G. S. (2004). Ethno-biological and bio-medicinal wealth of Western Himalayas, India. Journal of Medicinal and Aromatic Plant Science. 26(3): 517-526.

Singh, K. K. (1997). Studies on native medicine of Jaunsari tribe of Dehra Dun District, UP, India. Pharmaceutical Biology. 35(2): 105-110.

Singh, V. and Chauhan, N. S. (2005). Traditional practices of herbal medicines in the Lahual valley, Himachal Himalayas. Indian Journal of Traditional Knowledge. 4(2): 208-220.

Srivastav, P.K., Singh, N. I. and Singh, S. T. (2009). Medicinal food plants of Manipur, Annals of Forestry. 17(2): 269-292.

Uniyal, B. (2003). Utilization of medicinal plants by the rural women of Akola, Maharashtra. Indian Journal of Traditional Knowledge. 2(4): 336-370.

Uniyal, B. and Shiva, V. (2005). Traditional knowledge on medicinal plants among rural women of the Garhwal Himalayas, Uttarakhansd. Indian J. Trad. Knowledge. 4: 259-266.

Verma, J. S. (2006). Insect pest problem in medicinal plants - A Review. Indian Journal of Agricultural Research. 27 (2): 130-136.

Verma, K.C. (2010). Ashwag,ha (Withania somnifera dunal): Wonder medicinal plant. Indian Journal of Agricultural Research. 31(4): 292-297.