



RESEARCH PAPER

OPEN ACCESS

Medicinal plants used for the treatment of skin diseases in sarkaghat tehsil of Mandi District, Himachal Pradesh, India

Sunil Kumar Verma¹, Shalu Kanwar^{*2}

¹*Assistant Professor, Department of Botany, DAV College, Hoshiarpur, Punjab, India*

²*Research Scholar, Department of Botany, Career Point University, Kota, Rajasthan, India*

Article published on October 30, 2019

Key words: Ethnobotany, Traditional medicines, Medicinal potential, Floral diversity, Explorations

Abstract

The present study was carried out to assess and document the medicinal knowledge of plants of Sarkaghat area used for the treatment of skin diseases as the area has diverse flora with high medicinal potential. In the present study 51 different medicinal plant species belonging to 48 genera and 33 families were documented for the treatment of skin diseases. These plant species are used for the treatment of 21 types of skin diseases. Plant leaf is the most used part for the treatment of skin diseases.

***Corresponding Author:** Shalu Kanwar ✉ shalukanwar22@gmail.com

Introduction

The relationship of man with plants began from the time of human origin. From the time of their origin humans have depended on plants for their primary needs such as food, fodder, fuel, timber etc. There are about 3,00,000 species of vascular plants in the world. About 80% of the world population rely upon traditional medicines for their primary health care (Owolabi, Omogbai and Obasuyi, 2007). Plant parts are directly used as medicine by a majority of communities all over the world and have no side effect like allopathic medicine (Gangwar, Deepali and Gangwar, 2010). Medicinal plants are the plants with potential capacity for the treatment of various diseases and are in use by people from ancient times (Rawat and Choudhury, 1998). They are inexpensive and have fewer side effects so demand for herbal remedies is increasing day by day.

The Indian civilization took to medicinal plants about 5000 yrs ago. Medicinal plants are used in all the indigenous systems of medicine in India namely Ayurveda, Siddha, Unani and Tibetan Medicine. India has rich biological biodiversity. Out of the 12 mega biodiversity centers of the world it ranks at the 6th position. India possesses 2.4% of the world land area with 12% of the global plant wealth. According to Jain (1968) in India out of 15,000 species of flowering plants, about 1% are considered to be of medicinal value. So around 7500 species have medicinal value in India.

The entire Himalayan region is known for its extensive high mountain ranges and is a treasure house of many important medicinal plants (Chauhan, 1999). About 75% of the medicinally important plant species in India grow in wild (Laloo, Kharlukhi, Jeeva, and Mishra, 2006; Kannan and Jeeva, 2008).

Medicinal plants are increasingly gaining acceptance among the literates in urban settlements due to the increasing inefficacy of many modern drugs used in infections such as typhoid, fever, gonorrhoea, tuberculosis; increasing antibiotic resistance in several bacteria; increasing cost of prescription drugs

for the maintenance of personal health (Lederberg, Hamburg, and Smolinski, 2003). Medicinal plants are basic ingredients in the traditional medicines and are depleting at a faster rate due to increased consumption and indiscriminate withdrawal of resources from the wild (KUMARI, Chandra JOSHI, and Mohan TEWARI, 2012). It has become essential to protect and patent the traditional knowledge (Raghupathy, 2001). Medicinal plants possess many potentially valuable therapeutic agents that provide raw material for the preparation of medicines. These bioactive compounds are known as phytochemicals and they are exploited on a large scale because they are less toxic, more systemic and easily biodegradable.

The skin is the outermost covering of the body and is the largest body organ. It protects the internal body organs. Skin diseases are among the most prevalent diseases in the world (Shibeshi, 2000). Skin diseases are common form of infections which affect people of all ages throughout the world. Skin diseases account to about 34% of all occupational diseases (Abbasi *et al.*, 2010).

The study area Sarkaghat Tehsil is a part of Mandi District of Himachal Pradesh. Himachal Pradesh is positioned in the Northwestern region of India. It is located in the western Himalayas. It is bounded by states of Jammu and Kashmir in the north, Punjab in the west, Haryana in the southwest, Uttarakhand in the southeast, Tibet in the east, Uttar Pradesh in the south. Most of the parts of the state lies in the Dhauladhar range. Himachal is fed by 5 perennial rivers Chenab, Ravi, Beas, Sutlej and Yamuna. Mandi district is one of the 12 districts of Himachal Pradesh. Mandi district was formed by the merger of Mandi state and Suket state on 15th April, 1948. It lies in the foothills of Shivalik range. It is the 7th largest district area wise. The study area Sarkaghat Tehsil is situated between 31°41'55" North latitude and 76°44'10" East longitudes in the Western Himalayas (Fig. 1, 2). It is bounded by Balh Tehsil in the East, Bilaspur District in the South East, Dharampur Tehsil in the North West, Hamirpur District in the South West and Joginder Nagar Tehsil in North East. The track is hilly covered by Shivalik range and the elevation varies

from 450-1,300 metres (Balokhra, 2002). This region is rich in floral diversity and is suitable for ethnobotanical explorations. Various plants are used for the treatment of skin diseases.

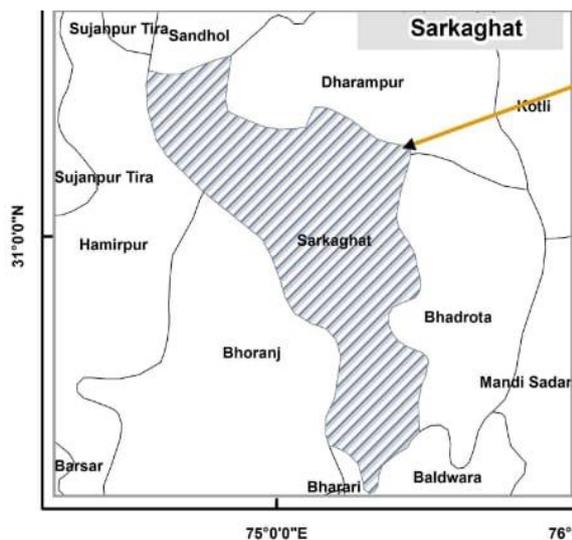
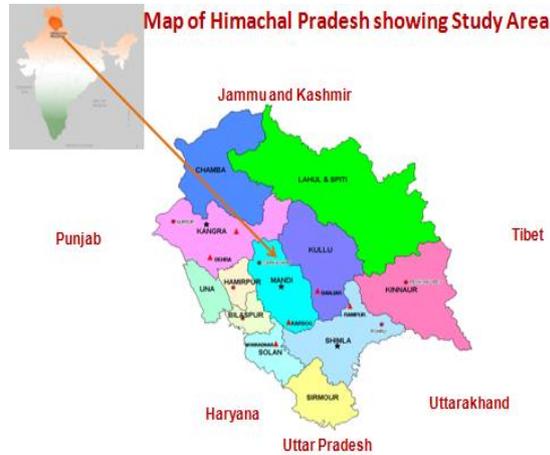


Fig. 1. Map of Himachal Pradesh showing study area.

A lot of work on medicinal plants from different parts of the country and state of Himachal Pradesh are reported (Ahluwalia, 1952; Ambasta, 1986; Jain, 1991; Gaur and Singh, 1993; Begum and Nath, 2000; Harsha *et al.*, 2003; Kaur *et al.*, 2007; Samant *et al.*, 2007; Kumar *et al.*, 2009; Singh & Singh, 2014). The study area is rich in floral diversity and the people of the area depend greatly on forest products for their daily needs.

Despite the exhaustive work carried out in ethnobotany, there was no systematic study carried

out for the documentation of indigenous knowledge related to medicinal plants in Sarkaghat Tehsil of Mandi District, Himachal Pradesh, India. So an ethnobotanical study of medicinal plants of Sarkaghat Tehsil was carried out to document the rich ethnobotanical knowledge of this area. The present study is an attempt to identify and document the various medicinal plants which are used for the treatment of various skin diseases in the Sarkaghat tehsil of Mandi district of Himachal Pradesh. It is hoped that these plants will be further studied in the near future to investigate their phytochemistry and pharmacology.

Material and methods

Selection of Study Site and Data collection

A preliminary survey was conducted in the study area and survey sites and villages were selected for the study. Ethnobotanical data related to medicinal plants was collected with the help of data collection sheet. Ethnobotanical information about medicinal plants, their local names were obtained from local chiefs, priests, vaidyas, ayurvedic medicinal practitioners, headman, well informed elderly people through informal interviews, group discussion and through semi structured questionnaire based upon proforma designed by (Jain and Goel, 1995).

Plants collection and identification

Extensive field visits were conducted in the study area from low elevations to high elevations and in different seasons during 2018. During the fields visits complete specimens were collected; photographs of plants were clicked; characters such as structure of leaves and flowers, colour of the flower, inflorescence type, pubescence, secretions on the vegetative and reproductive parts, habit and habitat were documented in the field notebook. The voucher specimen were identified according to the field characters noted in the field note book at the time of collection; by comparison with the specimen lying in the herbarium; literature on the medicinal plants of Himachal Pradesh like “Medicinal and Aromatic Plants of Himachal Pradesh” (Chauhan, 1999), “Himachal Pradesh Ki Vanoshdhiya Sampada”

(Dhiman, 1976); various local floras like “Flora Simlensis” (Hooker, 1897) and “Flowers of the Himalaya” (Polunin and Stainton, 1984).

Herbarium Formation

Healthy plant portions showing distinct morphological characters like stem, leaf, flower, fruit were cut with secateurs. Specimen were dried and pressed. Dried and pressed specimens were poisoned by dipping in 2% alcoholic solution of mercuric chloride to provide protection against insects and fungal attack. Poisoned specimens were mounted onto herbarium sheets. Labells containing information like botanical name, family name, local name, vernacular name and habit were attached at

the bottom right hand corner of the herbarium sheets. The voucher specimens were deposited as a permanent record to the Herbarium of the Department of Botany of Career Point University, Hamirpur, Himachal Pradesh as a permanent record.

Results and discussions

A systematic account of plants used in skin diseases

The present study revealed the use of 51 medicinal plant species from 48 genera and 33 families for the treatment of skin diseases. These medicinal plants have been arranged in alphabetical order along with their family, vernacular name, local name, habit, plant part / parts used and medicinal uses (Table 1).

Table 1. List of medicinal plant species used for the treatment of various skin diseases in Sarkaghat area.

S.No.	Botanical Name	Family	Vernacular Name	Local Name	Habit	Part/ Parts Used	Medicinal Uses
1.	<i>Abrus precatorious</i> linn.	Fabaceae	‘john crow’ bead, abrus seed	Ratti	Shrub	Leaf	Leaves are used in leucoderma, itching.
2.	<i>Acacia catechu</i> (linn.) Wild.	Fabaceae.	Black catechu, cutch tree	Khair, katha	Tree	Heartwood	Heartwood extract cutch is used on boils and eruptions of the skin.
3.	<i>Acmella oleracea.</i>	Asteraceae.	Electric daisy, toothache plant, eye ball	Akarkara	Herb	Leaf, flower head	Leaf and flower head are used on burns, itchy skin
4.	<i>Aegle marmelos</i>	Rutaceae	Elephant apple, bengal quince	Bill, bail	Tree	Fruit	Fruit pulp is used in leucoderma
5.	<i>Agave americana</i>	Agavaceae	Centuryplant, american agave	Chhub	Herb	Leaf	Leaves are used on burns
6.	<i>Ageratum conyzoides</i>	Asteraceae	Blue flowered groundsel, blue top, goat weed	Ujadu, fulnu booti, neela phulnu	Herb	Leaves, stems, whole plant	The whole plant is used on cuts, wounds. Leaves and stems are used in skin diseases
7.	<i>Ajuga bracteosa</i>	Lamiaceae	Bugle, bugleweed lungememen	Neelkanthi	Shrub	Leaf	Leaves are used in acne, pimples
8.	<i>Aloe vera</i>	Liliaceae	Aloe vera, indian aloe, ghritkumari	Kuarya	Herb	Leaf	Leaves are used on wound, burn, rashes, sores; in skin diseases
9.	<i>Amaranthus viridis</i>	Amaranthaceae	Green amaranth, pigweed	Chaulai	Herb	Whole plant	Whole plant is used on wounds, boils
10.	<i>Argemone mexicana</i> linn	Papaveraceae	Mexican prickly poppy, prickly poppy	Satyanashi	Herb	Roots, leaves, latex	Roots and leaves are used in chronic skin diseases. Latex is used on warts.
11.	<i>Avena sativa</i> linn	Poaceae	Oatmeal, oatgrass	Jai, joi	herb	Seed and stalk	Used in skin diseases.
12.	<i>Barleria cristata</i>	Acanthaceae	Bluebell barleria, crested	Dantkanti	Herb	Leaf, root	Leaves and root used on boils and sores.

S.No.	Botanical Name	Family	Vernacular Name	Local Name	Habit	Part/ Parts Used	Medicinal Uses
13.	<i>Bauhinia vahlii</i> wright and arn	Fabaceae	purple nail dye Malu creeper, adda leaf	Torr	Climber	Bark	Bark is used in cuts, wounds, skin diseases
14.	<i>Berberis aristata</i>	Berberidaceae	Indian barberry, tree turmeric, daruhaldi	Kasmale	Shrub	Bark, root	Used in skin diseases
15.	<i>Boehmeria macrophylla</i>	Urticaceae	False nettle, harmless nettle	Chaprayala, chamrala	Under shrub	Whole plant	Whole plant is used in skin diseases.
16.	<i>Calotropis procera</i>	Asclepiadaceae	Apple of sodom, auricula tree	Aak	Shrub	Latex	Latex is used in eczema
17.	<i>Carissa carandas</i>	Apocynaceae	Christ's thorn, black currant, karanda	Karonda	Shrub	Bark	Bark is used in skin diseases, on wounds
18.	<i>Cassia fistula</i>	Fabaceae	Indian laburnum, golden shower tree	Amaltas	Tree	Leaf, bark, root	Leaves and root are used in skin diseases. bark is used in boils, leprosy
19.	<i>Catunaregam spinosa</i>	Rubiaceae	Mountain pomegranate, false guava	Rade ka kanda	Tree	Bark	Bark in used in skin diseases
20.	<i>Catharanthus roseus</i>	Apocynaceae	Madagascar periwinkle, rose periwinkle	Sadabahar	Shrub	Leaf, flower	Leaves and flowers are used in skin disease
21.	<i>Centella asiatica</i>	Apiaceae	Coinwort, indian pennywort	Brahmi booti	Herb	Whole plant	Used in skin care.
22.	<i>Centepeda minima</i>	Asteraceae	Spreading sneeze weed, sneeze wort	Nakchikdu	Herb	Whole plant	Whole plant is used in skin diseases.
23.	<i>Cissampelos pareira</i>	Menispermaceae	Velvet leaf, midwife's herb, ice wine	Patindu	Under shrub	Rhizome	Rhizome is used in wounds, skin diseases
24.	<i>Cordia dichotoma</i>	Boraginaceae	Clammy cherry, fragrant manjack	Lasude	Tree	Fruit, bark	Fruit is used in skin eruptions. Bark is used on boils.
25.	<i>Curcuma longa</i>	Zingiberaceae	Curcumin, indian saffron	Haldi, haldre, buswar	Herb	Rhizome	Rhizome is used in skin diseases
26.	<i>Dioscorea bulbifera</i>	Dioscoreaceae	Air potato, airyam	Tardi	Vine	Tuber, bulbil	Tuber and bulbils used in skin diseases
27.	<i>Dodonaea viscosa</i>	Sapindaceae	Hop bush, vilayti mehndi	Jangli anar, mehndu	Shrub	Leaves	Used in wounds, skin rashes
28.	<i>Duchesnea indica</i>	Rosaceae	Indian strawberry, wild strawberry	Jangli strawberry	Herb	Leaf, fruit	Leaf, fruit is used in skin diseases
29.	<i>Euphorbia helioscopia</i>	Euphorbiaceae	Sun spurge, madwoman's milk	Dudhi	Herb	Latex	Latex used on warts, corns
30.	<i>Falconeria insignis</i>	Euphorbiaceae	Tiger spruce, acute milk spruce	Balodhar	Tree	Leaf, bark, latex	Bark is used on wounds. Leaves are used in skin diseases, burns,. Latex is used in skin diseases, warts.
31.	<i>Ficus auriculata</i> lour	Moraceae	Anjir, cluster fig, elephant ear fig	Tremblu, trimla	Tree	Latex, fruit	The latex is applied to cuts and wounds.
32.	<i>Ficus benghalenses</i>	Moraceae	Banyan, indian banyan	Bargad	Tree	Fruit, latex	Fruit and latex used in skin diseases

S.No.	Botanical Name	Family	Vernacular Name	Local Name	Habit	Part/ Parts Used	Medicinal Uses
33.	<i>Ficus carica</i>	Moraceae	Fegda fig, daghla anjir, common fig	Fedge, fegda, bharuni, khasra	Tree	Latex	The latex is used to treat corns, warts
34.	<i>Holarrhena pubescens</i>	Apocynaceae	English easter tree, ivory tree	Inderjau	Shrub	Bark, latex	Bark is used as in skin diseases. Latex is used in eczema, skin diseases. Leaf used on warts, wounds.
35.	<i>Impatiens balsamina</i>	Balsaminaceae	Rose balsam	Tayur	Shrub	Leaf	
36.	<i>Jasminum officinale</i>	Oleaceae	Common jasmine, true jasmine	Malti	Vine	Leaf, flower	Leaf, flowers are used in skin diseases
37.	<i>Jatropha curcas</i>	Euphorbiaceae	Physic nut, poison nut	Chaplota, chablota	Shrub	seed	Seed in skin diseases
38.	<i>Lantana camara</i>	Verbenaceae	Lantana weed, wild sage		Shrub	Leaf	Leaves used in skin diseases
39.	<i>Mallotus philippensis</i>	Euphorbiaceae	Kamala tree, monkey face tree	Kambal. Kamala	Tree	Fruit	Fruit is used in skin diseases, for wound healing. Galls are used in skin diseases, wounds
40.	<i>Quercus leucotrichophora</i>	Fagaceae	Himalayan oak, white oak	Ban	Tree	Galls	Leaf used in burns.
41.	<i>Solanum melanogena</i>	Solanaceae	Brinjal, aubergine	Bhattha	Herb	Leaf	
42.	<i>Solanum nigrum</i> linn	Solanaceae	Black nightshade, wonder berry	Makoy, makoh	Shrub	Leaf, fruit	Leaves and fruits are used in skin diseases.
43.	<i>Thymus linearis</i>	Lamiaceae	Himalyan thyme, wild thyme	Jangli ajwain	Herb	Whole plant	Whole plant is used in skin diseases
44.	<i>Trianthema decandra</i>	Aizoaceae	Black pig weed, horse purslane	Bishkharpar	Herb	Leaves	Leaves are used in skin diseases
45.	<i>Trichosanthes cucumerina</i>	Cucurbitaceae	Snake gourd	Parod	Vine	Leaf, root, flower	Leaf, root, flower used in skin diseases
46.	<i>Urtica dioica</i>	Urticaceae	Common nettle, stinging nettle	Bichhu booti	Herb	Leaf	Leaf used in skin allergies.
47.	<i>Vernonia anthelmintica</i> (L.) Wild.	Asteraceae	Iron weed, bakchi, baksi	Brahmjiri	Herb	Seeds	Seeds used in leucoderma, skin diseases.
48.	<i>Vitex negundo</i> linn.	Verbenaceae	Chaste tree, huang ping	Bana, sura	Shrub	Leaves, stem	Leaves are used skin diseases. Stem is used in burns.
49.	<i>Woodfordia fruticosa</i>	Lythraceae	Fire flame tree, van mehndi, dhaura	Dhai, dharti, dhavi, dhava	Shrub	Flowers	Flower used in skin burning, wounds.
50.	<i>Wendlandia heynei</i>	Rubiaceae	Tilaka, tiliyaa, tilki	Pansira	Tree	Bark	Bark is used in skin diseases
51.	<i>Zizyphus nummularia</i>	Rhamnaceae	Wild jujube, jhar beri	Jungli ber	Shrub	Root	Root is used in boils, ulcers, wounds.

Taxonomic analysis of plants used in skin diseases
 Out of the 33 families of medicinal plants identified from the study area the predominant families are Asteraceae, Euphorbiaceae, Fabaceae with 4 plant spp. each; Apocynaceae and Moraceae with 3 plants

spp. each; Lamiaceae, Rubiaceae, Solanaceae, Urticaceae, Verbenaceae with 2 plant spp. each (Table 2, Fig. 2). The remaining families are represented by 1 plant spp. each. This confirms that the Sarkaghat area is rich in medicinal plant diversity.

Table 2. Table showing taxonomic analysis of medicinal plants used in treatment of skin diseases.

S.No.	Families	No. of genera per family	No. of species per family
1.	Acanthaceae	1	1
2.	Agavaceae	1	1
3.	Aizoaceae	1	1
4.	Amaranthaceae	1	1
5.	Apiaceae	1	1
6.	Apocynaceae	3	3
7.	Asclepiadaceae	1	1
8.	Asteraceae	4	4
9.	Balsaminaceae	1	1
10.	Berberidaceae	1	1
11.	Boraginaceae	1	1
12.	Cucurbitaceae	1	1
13.	Dioscoreaceae	1	1
14.	Euphorbiaceae	4	4
15.	Fabaceae	4	4
16.	Fagaceae	1	1
17.	Lamiaceae	2	2
18.	Liliaceae	1	1
19.	Lythraceae	1	1
20.	Menispermaceae	1	1
21.	Moraceae	1	3
22.	Oleaceae	1	1
23.	Papaveraceae	1	1
24.	Poaceae	1	1
25.	Rhamnaceae	1	1
26.	Rosaceae	1	1
27.	Rubiaceae	2	2
28.	Rutaceae	1	1
29.	Sapindaceae	1	1
30.	Solanaceae	1	2
31.	Urticaceae	2	2
32.	Verbenaceae	2	2
33.	Zingiberaceae	1	1

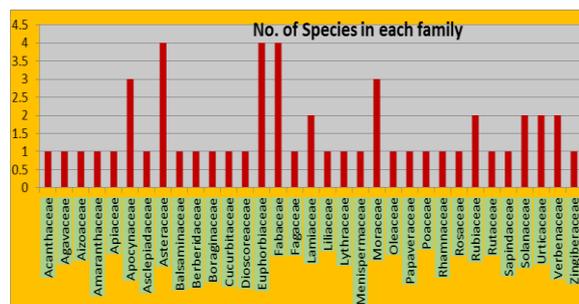


Fig. 2. Fig. showing taxonomic analysis of medicinal plants used in treatment of skin diseases.

Importance of the above mentioned families in the study area

The medicinal plant species were reported for the treatment of 21 skin diseases (Table 3, Fig.3). 33 plant species are used for general skin diseases, 14 for wounds, 6 for burns and boils each, 5 for warts, 4 for skin cuts, 3 for leucoderma; 2 each for corns, eczema, sores, rashes, skin itching; 1 each for ulcers, skin

burning, skin allergies, leprosy, pimples, acne, chronic skin diseases, skin eruptions. This proves that the informants of the area have rich ethnobotanical knowledge related to medicinal plants related to the treatment of different skin diseases. The inhabitants of the study area rely upon these medicines to a large extent for the treatment of a large number of skin diseases.

Table 3. Table showing various disease categories treated by medicinal plants.

S. No.	Disease Category	No. of Plants Used
1.	Leucoderma	3
2.	Skin Itching	2
3.	Boils	6
4.	Skin Eruptions	1
5.	Burns	6
6.	Wounds	14
7.	Cut	4
8.	General Skin Diseases	33
9.	Chronic Skin Disease	1
10.	Acne	1
11.	Pimples	1
12.	Rashes	2
13.	Sores	2
14.	Warts	5
15.	Eczema	2
16.	Leprosy	1
17.	Skin Care	1
18.	Corn	2
19.	Skin Allergies	1
20.	Skin Burning	1
21.	Ulcers	1

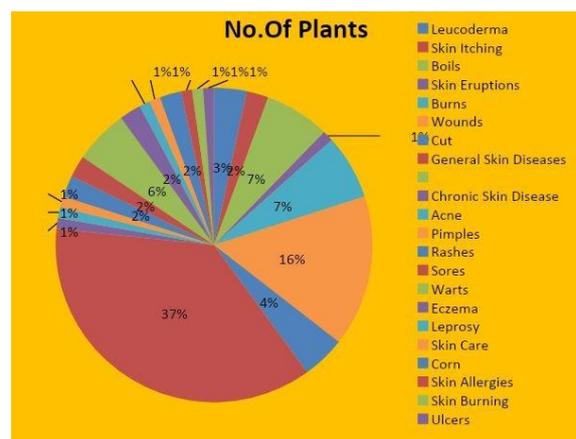


Fig. 3. Fig. showing various disease categories treated by medicinal plants.

Plant Parts in Use

Out of 51 plant spp. leaves of 13 plant spp., bark of 9 spp., latex of 8, fruit of 7, root of 6, whole plant of 6,

flower of 5, seed of 3, rhizome of 2, stem of 2; gall, bulbil, heartwood, tuber of 1 plant species each are used for the purpose (Table 4, Fig. 4) . This proves that plants with different habits are used. In most cases leaves of plants are used as medicine.

Table 4. Table showing Plant parts used for treatment of skin diseases.

S. No.	Plant Part Used	No. of Plants
1.	Bark	9
2.	Bulbil	1
3.	Flower	5
4.	Fruit	7
5.	Gall	1
6.	Heartwood	1
7.	Latex	8
8.	Leaf	13
9.	Rhizome	2
10.	Root	6
11.	Seed	3
12.	Stem	2
13.	Tuber	1
14.	Whole Plant	6

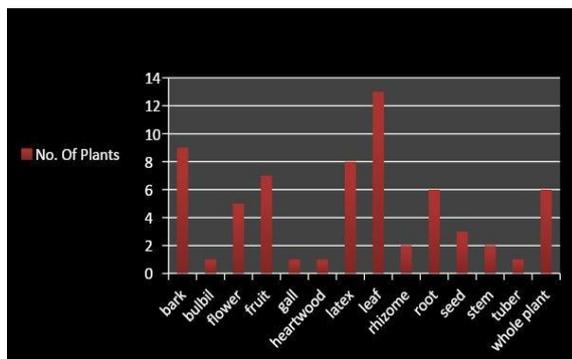


Fig. 4. Fig. showing plant parts used for treatment of skin diseases.

Habit Analysis

In the study it was found that 18 medicinal plants are herb, 15 are shrubs, 12 are trees, 3 are vine, 2 are undershrub and 1 plant species used is a climber.

From the above studies it was observed that there is diverse ethnomedicinal knowledge related to medicinal plants in Sarkaghat area. Plants from families Asteraceae, Euphorbiaceae, Fabaceae are the most used plants for skin diseases. So efforts should be taken for the conservation of plants of these families. The plants are used for the treatment of a number of skin diseases. Herbs are the most used

form of vegetation in the treatment of skin diseases. Plant leaves are the most used plant part in the treatment of skin diseases. Further phytochemical and studies should be carried out in future to validate the use of plant species in skin diseases and to discover new drugs.

Table 5. Table showing analysis of Habits of Medicinal Plant Species.

S. No.	Plant Habit	No. of plants	Habit%
1.	Tree	12	24
2.	Shrub	15	29
3.	Herb	18	35
4.	Vine	3	6
5.	Undershrub	2	4
6.	Climber	1	1

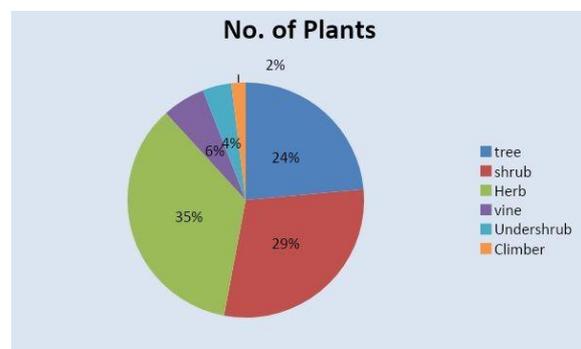


Fig. 5. Fig. showing analysis of Habits of Medicinal Plant Species.

Conclusion

The present study provides information about the ethnobotanical diversity of medicinal plants of Sarkaghat Tehsil used for the treatment of skin diseases. This study is an initiative in documenting the vast ethnobotanical knowledge of the local inhabitants which is otherwise passed orally from one generation to another. During the course of study 51 plant species belonging to 33 families and 48 genera were recorded. It was observed that people of rural as well as urban areas largely depend on medicinal plants as source of medicine for various ailments. They have vast knowledge about medicinal plants. The study revealed that the study area Sarkaghat shows great ethnobotanical diversity of medicinal plants in respect to the treatment of skin diseases. The present study provides information about the use of various medicinal plant species for the treatment of various types of skin diseases.

There is urgent need for the documentation and conservation of this plant based knowledge of Sarkaghat area

Acknowledgement

The authors are thankful to all the inhabitants of Sarkaghat area who contributed to the successful completion of this study by sharing their valuable ethnobotanical knowledge related to medicinal plants.

References

Abbasi AM, Khan MA, Ahmad M, Zafar M, Jahan S, Sultana S. 2010. Ethnopharmacological application of medicinal plants to cure skin diseases and in folk cosmetics among the tribal communities of North-West Frontier Province, Pakistan. *Journal of Ethnopharmacology* 2010, **128**, 322-335. DOI: 10.1016/j.jep.2010.01.052. Epub 2010 Feb 4.

Ahluwalia KS. 1952. Medicinal plants of Kangra valley. *Indian Forester* **78(4)**, 181-194.

Ambasta SP (ed.). 1986. *The Useful Plants of India*. C.S.I.R., New Delhi.

Balokhra JM. 2002. *The Wonderland Himachal Pradesh*. H.G. Publication, New Delhi.

Begum D, Nath SC. 2000. Ethnobotanical review of medicinal plants used for skin diseases and related problems in Northeastern India. *Journal of herbs, spices & medicinal plants* **7(3)**, 55-93. DOI.org/10.1300/j044v07n03_07

Chauhan NS. 1999. *Medicinal and Aromatic Plants of Himachal Pradesh*. Indus Publ.Co., New Delhi.

Dhiman DR. 1976. *Himachal Pradesh Ki Vanoshdhiya Sampada*. Imperial Printing Press. Dharamsala, H.P.

Gangwar KK, Deepali and Gangwar RS. 2010. Ethnomedicinal Plant Diversity in Kmaun Himalaya of uttarakhand, India. *Nature and Science* **8(5)**, 66-78.

Gaur R, Singh P. 1993. Ethnomedicinal plants of Mandi district, Himachal Pradesh. *Bulletin of Medico-Ethnobotanical Research* **14(1-2)**, 1-11.

Harsha V, Hebbar S, Shripathi V, Hegde G. 2003. Ethnomedicobotany of Uttara Kannada District in Karnataka, India-plants in treatment of skin diseases. *Journal of Ethnopharmacology* **84(1)**, 37-40. DOI: 10.1016/s0378-8741(02)00261-1

Hooker JD. 1897. *The Flora of British India* (Vol. 7): L. Reeve.

Jain SK, Goel AK. 1995. Workshop Exercise-1. Proforma for Field Work 142-147. In: Jain, S.K. (ed.). *A Manual of Ethnobotany*. Scientific Publ., Jodhpur.

Jain SK. 1991. *Dictionary of Indian Folk Medicine and Ethnobotany*. Deep Publications, New Delhi.

Jain SK. 1968, *Medicinal plant India, Land and Land People*, National Book Trust of. India, 1968, 1-3.

Kaur I, Sharma S, Lal S. 2011. Ethnobotanical survey of medicinal plants used for different diseases in Mandi district, Himachal Pradesh. *Int J Res Pharmacy and Chem* **1**, 1167-1171.

Kumar M, Paul Y, Anand V. 2009. An ethnobotanical study of medicinal plants used by the locals in Kishtwar, Jammu and Kashmir, India. *Ethnobotanical Leaflets*, 2009(**10**), 5.

Kumari P, Joshi GC, Tewari LM. 2012. Indigenous uses of threatened Ethno-medicinal plants used to cure different diseases by Ethnic people of Almora District of Western Himalaya. *International Journal of Ayurvedic & Herbal Medicine* **2**, 4.

Laloo R, Kharlukhi L, Jeeva S, Mishra B. 2006. Status of medicinal plants in the disturbed and the undisturbed sacred forests of Meghalaya, northeast India: population structure and regeneration efficacy of some important species. *Current science* 225-232.

Owolabi OJ, Omogbai EK, Obasuyi O. 2007. Antifungal and antibacterial activities of the ethanolic and aqueous extract of *Kigelia africana* (Bignoniaceae) stem bark. *African Journal of Biotechnology* **6(14)**.

Polunin O, Stainton A. 1984. Flowers of the Himalaya: Oxford University Press.

Raghupathy L. 2001. Conservation and sustainable use of Medicinal plant: Current Issue, Himalaya Medicinal Plants: Potential and prospects (Edited by S. S. Samant)

Rawat MS, Chowdhury S. 1998. Ethno medico botany of Arunachal Pradesh (Nishi & Apatani tribes): Bishen Singh Mahendra Pal Singh.

Samant Pant S, Singh M, Lal M, Singh A, Sharma A, Bhandari S. 2007. Medicinal plants in Himachal Pradesh, north western Himalaya, India. The International Journal of Biodiversity Science and Management **3(4)**, 234-251.

Shibeshi D. 2000. Pattern of skin diseases at the University teaching hospital, Addis Ababa, Ethiopia. International Journal of Dermatology **39**, 822-825. DOI.org/10.1046/j.1365-4362.2000.00085.x

Singh B, Singh J. 2014. Ethnobotanical uses of some plants from central Haryana, India. Phytodiversity **1**, 7-24.

Smolinski MS, Hamburg MA, Lederberg J. (eds). 2003. Microbial threats to health: Emergence, detection, and response. Washington, DC: Institute of Medicine, National Academies Press pp 203-210.