

# Ethnobotanical Studies on Some Angiosperms of Tehsil Hiranagar of District Kathua (Jammu and Kashmir), India

Rupali Nanda<sup>1</sup>, Fraz Ahmed<sup>\*2</sup>, Renu Sharma<sup>3</sup>, Nisha Bhagat<sup>1</sup> and Kewal Kumar<sup>4</sup>

<sup>1</sup>Department of Botany, Govt. Degree College (Boys), Kathua, Jammu and Kashmir -18410, India

<sup>2</sup>Department of Botany, Government G.M. Science College, Jammu, Jammu and Kashmir, -180001, India

<sup>3</sup>Department of Botany, Government P.G. College for Women, Gandhinagar, Jammu and Kashmir, 180001-India

<sup>4</sup>Department of Botany, Govt. College for Women, Udampur, Jammu and Kashmir -182101, India

**Corresponding Author :** Fraz Ahmed ([frazrohit@gmail.com](mailto:frazrohit@gmail.com))

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## ABSTRACT

The present study highlights the ethnobotanical use of different angiosperm species growing in the wild in tehsil Hiranagar of district Kathua in the Union Territory of Jammu and Kashmir, India. During the present study, information was collected regarding the various plants used in the area to cure different ailments by local people residing in distant villages of Hiranagar. The information collected for 50 plant species belonging to 29 families of angiosperms depicted that most of the species were used for general health problems such as cough, fever, indigestion, constipation, headache, dysentery, and boils, in addition to the treatment of cancer, kidney stones, eye troubles, female problems, rheumatism, and ulcers. The present investigation also revealed that mostly leaves were used for curing different ailments followed by roots, seeds, bulbs, flowers, and whole plants. Previously, many ethnobotanical studies were available from the district of Kathua. However, to date, no such study is available for Hiranagar.

**Keywords:** Ethnobotanical use, Angiosperms, Hiranagar.

## INTRODUCTION

Traditional knowledge is the main source of all the ethnobotanical investigations. From the past days of civilisation, humans have bowed to plants for healing, a tradition that has survived the arrival of modern medicine and found new strength at the end of the 20<sup>th</sup> century. About seventy percent of the world's population still relies on traditional plant medicine [69]. India is one of the mega-diversity countries with the significantly high number of medicinal plant resources. It has been estimated that more than eighty-five percent of herbal medicines which are used in traditional healthcare systems are obtained from medicinal plants [46]. Many of the drugs that are prescribed have compounds that are directly derived from the plants and several

others which are being sold are natural products. The increase in alternative systems of medicine is primarily because such systems of medicine produce minimal side effects, and the systems are affordable to large sections of poor population [21]. In many of developing countries, namely, Bangladesh (90%), Myanmar (85%), India (80%), Nepal (75%), Sri Lanka (65%) and Indonesia (60%), rural people are mostly dependent on this system of medicine [21]. Who has estimated that the global market for medicinal plants and herbal medicine is worth USD 14 billion per year [57] and USD 1 billion per year in India [23],[24]. As per the estimation of who, the demand for the raw materials of the plants is increasing annually at the rate of fifteen to twenty-five percent which is further estimated to get increased up to more than USD 5 trillion by the year 2050 [25].

According to [50], though there is an increase in global demand for herbal medicines, it is equally important to have a large quantity of quality herbal materials with active principles in the required concentration. The synthesis of complex natural compounds through synthetic chemistry is very challenging as this process is economically prohibitive. Therefore, plants remain to a greater extent, the sole sustainable natural resource of many medicinally important secondary metabolites. Further, the indigenous medicinal knowledge of plants is helpful to ecologists, pharmacologists, taxonomists and wildlife managers in civilising the prosperity of an area [16]. During the last century, ethnobotanical surveys are common and such documentations play an important role in the conservation and utilisation of biological resources [43].

A large number of studies have been carried out in the field of ethnobotany from different parts of India. Some of these include [13],[17],[18],[19],[15],[1],[7],[20],[10],[66],[57],[30] and [68]. Others who explored the ethnobotanical plants from different parts of Jammu and Kashmir include [9],[53],[32],[61],[29],[63],[64],[27],[31],[26],[44],[36],[57],[40],[49],[62],[22],[42],[59],[38],[14],[56] and [21]. Further, ethnobotanical information is also available from other parts of the district Kathua; [54],[37],[58],[41], [4],[48] and [59] but no such reports exist for Hiranagar.

## Objective

Keeping in view the lacuna of ethnobotanical studies and the reliability of local people on the indigenous knowledge, the present study was undertaken to survey and document the plant-based human healthcare practices used by the local people, Vaidas and Hakims of the Hiranagar.

## MATERIAL AND METHODS

### Study Area

Kathua is one of the administrative districts of Jammu and Kashmir and is the gateway of the state. It lies in the southeast of the Union Territory and is situated at 32° 17' to 32° 55' north latitude and 75° 70' to 76° 16' east longitude and encompasses 2651 km<sup>2</sup> area. The district is surrounded by Punjab in the southeast, Himachal Pradesh in the northeast, Doda and Udhampur in the north and northwest, Jammu in the west and Pakistan in the southwest (Figure 1). Kathua includes 11 tehsils, 19 blocks and 512 villages with an area of 2,651 km<sup>2</sup>. Hiranagar is one of the important

tehsils of the district located at 32.45° N, 75.27° E with an average altitude of 308 m.a.s.l. The tehsil is spread over an area of 389 km<sup>2</sup> with 384.92 km<sup>2</sup> being rural while only 4km<sup>2</sup> is urban. The annual rainfall varies from 912 to 1801 mm while the annual temperature varies from 9 to 48°C. The district comprises four tehsils, namely, Kathua, Hiranagar, Basohli and Billawar etc. The inhabitants of the district belong to different cultures and communities such as Gujjars, Bakarwals, Hindus and Muslims, who frequently use the plants for health-related problems. There are 202 villages with a population of 1,37,798 including 1,29,504 rural and 8294 urban [6]. The people of the area are the repository of accumulated experience and knowledge about traditional uses of medicinal plants, but due to modern civilisation, the knowledge about the use of traditional herbal wealth is vanishing rapidly.

### Survey Methods

For the documentation of the utilisation of medicinal plants, a total of 10 field surveys were conducted from 2014-2016 in the study area. The surveys were extended across seasons to get the highest information, and also to cross check the information provided by the local informants during the earlier visits. The surveys were carried out from different areas, and information was collected through interactions and discussions with informants and local herbal healers (Figs.1-5). The data for this article was collected by periodic field trips to different villages of Hiranagar tehsil. The various localities visited for the purpose include Arjan Chak, Bhaiya, Gurah Mundian, Katal, Pathwal, Jandi, Dyalachak and Subachak. During field trips, help was taken from local people to identify the plants for their use and local name (Figs. 6-11). The local names and uses of each plant were collected on the spot. The information of the medicinal plants was collected from Gujjar and Bakarwal tribes, and the Dogra community of district Hiranagar, in Jammu Province, Jammu and Kashmir, Union Territory of India. During the survey, a questionnaire and personal interview methods were adopted. The structured questionnaires, interviews and participatory observation were used to draw information from the resource persons by using standard methods. Links were made with elderly persons to get information regarding the points outlined in the questionnaire along with holding personal interviews with Vaidas and Hakims regarding the medicinal use of various plants. Many tribal doctors were often taken to the forest as guides and informants to identify

the medicinal plants in their natural habitat. The discussion and information collected from local villagers and informants were recorded and documented. Photographs of various plant species were taken when found necessary. The collected plants were identified with the help of various 'Floras', such as Flora of Jammu [53] and Flora of Udhampur [64]. The identifications were then confirmed at the Herbarium, Department of Botany at the University of Jammu.

## RESULTS

The knowledge about medicinal plants and their use in the treatment of different diseases are rather specialised and limited to a few people in the community who are recognized as herbal healers or witch doctor or *Vaids*. In some localities, there are several individuals who do not practice herbal medicine but possess medicinal knowledge and act as reliable informants. These tribal people have remarkable knowledge of the identification, characteristics and use of different plant species. At present, a total of 50 plants belonging to 29 families of angiosperms were collected and studied for the ethnobotanical aspects from different villages of tehsil Hiranagar in district Kathua of Jammu and Kashmir. The ethnobotanical information on these plants is reported for the first time from the study area. These plant species were used by local people in the rural areas of the tehsil in the absence of modern healthcare facilities. Among these plants, the majority were herbaceous with some shrubs, under-shrubs and trees as well. The people in the area utilise these species in multiple home remedies for the treatment of various ailments such as rheumatism, toothache, ulcers, eye troubles, female problems, asthma, cough and cold, fever, typhoid stomach problems, indigestion, vomiting, skin problems, brain tonic, constipation and piles, headache, dysentery, boils, etc. Besides, some species found were useful against cancer (*Amaranthus viridis*, *Chenopodium album*), diabetes (*Aegle marmelos*, *Amaranthus viridis*, *Calotropis procera*), kidney stones (*Bryophyllum pinnatum*, *Citrus psedolimon*), snake bites (*Erianthus ravennae*) and itching and ring worm (*Allium sativum*, *Ranunculus muricatus*). Further, *Centella asiatica* and *Emblica officinalis* were used as tonic for the brain and liver, respectively. It was also observed that a single plant might be used for curing numerous ailments, for example, *Acacia nilotica*, *Achyranthes aspera*, *Aegle marmelos*, *Calotropis procera*, *Ficus palmata*, *Justicia adhatoda*, etc. In addition to the

treatment of human diseases, many species (*Aloe vera*, *Cassia fistula*, *Cyanodon dactylon*, *Grewia optiva*) were used to cure different animal diseases. In the majority of the cases (56.8%), leaves were used for curing different ailments followed by roots (19.6%), seeds (9.8%), bulbs (7.8%), flowers (3.9%) and whole plants (1.96). Majority of the plant species were herbs (44%) followed by trees (36%) and shrubs (18%), whereas only two percent were climbers (Table 1). Further, most of the species belong to the family Euphorbiaceae, Caesalpiniaceae, Liliaceae and Rutaceae with three species each. While families like Acanthaceae, Amaranthaceae, Apiaceae, Lamiaceae, Meliaceae, Mimosaceae, Myrtaceae, Nyctaginaceae, Poaceae and Solanaceae are represented by two species each. Rest of the families (Apocynaceae, Araceae, Asclepiadaceae, Cannabinaceae, Chenopodiaceae, Crassulaceae, Ehretiaceae, Fabaceae, Flacaurtiaceae, Lauraceae, Papaveraceae, Ranunculaceae, Rosaceae, and Tiliaceae) are represented by single species each. The details about the botanical name, local name, family, plant part used and their ethnomedicinal uses are provided in Table 2.

## DISCUSSION

The Indian system of medicines utilises 80% of the materials derived from the plants. There are about 2,500 plant species having great medicinal value, most of which are growing in the wild. The information on their biological activity and chemical constituents are also available [34],[8]. The information of medicinal species increases considerably with oldness and this might be associated to the fact that the expansion of knowledge of medicinal plants is a lifetime practice [45]. [70] has opined that medicinal plant knowledge and uses are directly proportional in case there is loss of ethnomedicinal plant knowledge in the community.

This present study provides a wide range of information on the diversity and indigenous uses of 50 angiospermic plants growing wild in Tehsil Hiranagar. The results are in agreement with the findings of [3 5],[28],[39],[3],[41],[4],[22],[48] and [52]. who reported about plants that are traditionally used for curing many diseases. The domination of medicinal plants of families Euphorbiaceae, Caesalpiniaceae, Liliaceae and Rutaceae is accredited to their wider distribution and richness in the study area. Previously, [2] also reported control of medicinal species from other study areas. Herbaceous plants remained the most utilized medicinal plants and the results are in

**TABLE 1:** Frequency (%) of different preferred plant parts used for the treatment of different ailments in tehsil Hiranagar of district Kathua (Jammu & Kashmir)

NAME OF PLANT PARTS	ROOTS	LEAVES	FLOWERS	SEEDS	WHOLE PLANT	BULBS
FREQUENCY (%)	19.6	56.8	3.9	9.8	1.96	7.8

**TABLE 2:** Ethnobotanical information about some plants of tehsil Hiranagar, district Kathua of Jammu & Kashmir

S. No	Scientific name (Local name)	Family	Plant part used	Traditional use
1	<i>Abrus precatorius</i> Linn. ( <b>Ratti</b> )	Fabaceae	Seeds	Seeds from the pod are boiled in oil and used to cure pain (rheumatism)
2	<i>Acacia catechu</i> Willd. ( <b>Khair</b> )	Mimosaceae	Stem sap	Used to cure mouth ulcers
3	<i>Acacia nilotica</i> Willd. ( <b>Kikar</b> )	Mimosaceae	Stem bark, Pod, Seeds	Pods or legumes are used to cure female problems Bark is used for strengthen of teeth. Seeds are grinded and use to cure eye troubles
4	<i>Achyranthes aspera</i> Linn. ( <b>Puthkanda</b> )	Amaranthaceae	Roots, Inflorescence	Roots are used to cure fever. If fever is too high, the roots are tied to artery of foot Inflorescence is used to cure asthma
5	<i>Acorus calamus</i> Linn. ( <b>Barian</b> )	Araceae	Rhizome	1-2 drops of juice of powdered rhizome is used to cure stomach problems in children (it act as vermifuge)
6	<i>Aegle marmelos</i> (Linn). ( <b>Bill</b> )	Rutaceae	Stem, Fruit, Leaves	Drink made from powdered leaves is used to cure night blindness Leaves of <i>Aegle</i> along with the leaves of guava and Jamun are effective against diabetes Drink prepared from the pulp of fruit, maintain body temperature Stem is hollowed to store water in it. This water is effective against digestive problems
7	<i>Allium cepa</i> Linn. ( <b>Ganda</b> )	Liliaceae	Bulb	Onion juice is used to avoid vomiting in children
8	<i>Allium sativum</i> Linn. ( <b>Thom</b> )	Liliaceae	Bulb	Garlic Juice is used to cure ring worm
9	<i>Aloe vera</i> Linn. ( <b>Kuar-Gandal</b> )	Liliaceae	Leaves	Fleshy parts of leaves if applied on face improves complexion It has also ethano-veterinary use. It is burnt with ash and given to horse to cure intestinal infection.
10	<i>Amaranthus viridis</i> Linn. ( <b>Chilari</b> )	Amaranthaceae	Seeds	It is used to cure cancer Drink obtained from boiling the seeds of <i>Amaranthus</i> is used to cure diabetes
11	<i>Angelica glauca</i> Edgew. ( <b>Choru</b> )	Apiaceae	Roots	Used as stimulant in constipation Helpful in alleviating cough
12	<i>Argemone mexicana</i> Linn. ( <b>Poli, Kandyari</b> )	Papaveraceae	Leaves, Fruit	Leaves are boiled in water and the liquid thus obtained is used as effective body pain reliever. Fruit is useful in tooth troubles
13	<i>Azadirachta indica</i> A. Juss. ( <b>Neem</b> )	Meliaceae	Roots, Leaves, Stem branches	Roots are effective against jaundice Branches are used as Tooth Brush Leaf juice act as blood purifier and vermifuge.
14	<i>Bauhinia variegata</i> Linn. ( <b>Krad, Kachnar</b> )	Caesalpinaceae	Flower Bud	Flower buds are effective against thyroid
15	<i>Bryophyllum pinnatum</i> -Salisb. ( <b>Patharchatta</b> )	Crassulaceae	Leaves	Leaves are eaten to dissolve kidney stone
16	<i>Boerhavia diffusa</i> Linn. ( <b>It-Sitt</b> )	Nyctaginaceae	Roots	Roots are wrapped in white cloth and tied to body to control chronic fever (Nabikagirna, Stomach pain)
17	<i>Calotropis procera</i> Willd. ( <b>Ak</b> )	Asclepiadaceae	Leaves, Flowers	Leaves are dried and powdered to cure knee pain Shoot apical bud is eaten to cure fever Latex is recommended in toothache Leaves are tied to the base of foot to control sugar
18	<i>Cannabis sativa</i> Linn. ( <b>Baang</b> )	Cannabaceae	Leaves	Leaf juice is used to relieve the pain and swelling caused by stinging of wasp or scorpion
19	<i>Casearia tomentosa</i> Roxb. ( <b>Chila</b> )	Flacaurtiaceae	Leaves	Yellow leaves are tied to the stomach of 2-4 months child with "Til-oil" or ghee to control stomach ache



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20	<i>Cassia fistula</i> Linn. <b>(Karangal)</b>	Caesalpinaceae	Leaves, Fruit (Pod)	Pods are used against flatulence in animals (Cows, Buffaloes) Leaves are powdered and mixed with curd. This mixture is used to cure skin infection (Shingles) (Kalwatra)
21	<i>Cassia occidentalis</i> Linn. <b>(Hedma)</b>	Caesalpinaceae	Leaves	Boiled leaves are taken to avoid cold or fever
22	<i>Centella asiatica</i> (Linn.)Urban <b>(BrahmiBooti)</b>	Apiaceae	Leaves	Leaves are used as a brain tonic Also effective against cold
23	<i>Chenopodium album</i> Linn. <b>(Kanna, Bathua)</b>	Chenopodiaceae	Leaves	Use of cure cancer Effective against constipation and piles Used to cure deficiency of iron
24	<i>Citrus pzedolimon</i> Tanaka <b>(Gargal)</b>	Rutaceae	Fruit	Fruit juice, if taken daily for one week, removes kidney stone
25	<i>Cordia oblique</i> Willd. <b>(Lasura)</b>	Ehretiaceae	Stem sap, Leaves	Effective against female problems Leaves have cooling effect
26	<i>Cyanodon dactylon</i> (Linn.) Pers. <b>(Drub, Khabal)</b>	Poaceae	Roots	Roots mixed with water along with mustard oil relieves headache If dog is not well, it eats up this grass and vomits to feel better
27	<i>Datura innoxia</i> Mill. <b>(Akdatura)</b>	Solanaceae	Seeds	Seeds boiled in mustard oil act as pain reliever Fruit is burnt in ash ( <i>kuchla</i> ) and given to horse to cure pain
28	<i>Embllica officinalis</i> Gaertn.,Fruct. <b>(Amla)</b>	Euphorbiaceae	Fruit	Fruits are rich source of vitamin C and act as a liver tonic Maintain blackening of hair
29	<i>Erianthus ravennae</i> (Linn.) P. Beauv <b>(Kanna, Khad)</b>	Poaceae	Whole plant	Effective against piles and snake bite (leg fracture <i>kafaanda</i> )
30	<i>Eucalyptus regnans</i> F. Muell. <b>(Safeda)</b>	Myrtaceae	Leaves	Leaf decoction is used against cold.
31	<i>Euphorbia hirta</i> Linn. <b>(LalDudhli)</b>	Euphorbiaceae	Leaves	Leaves used for treatment of piles.
32	<i>Ficus benghalensis</i> Linn. <b>(Boad)</b>	Moraceae	Leaves	Leaves are effective against knee pain.
33	<i>Ficus palmata</i> Forssk. <b>(Fagada)</b>	Moraceae	Leaves, Roots	If thorn goes inside the skin, milky latex of leaves is poured on the skin so that the thorn automatically comes out. Root decoction is used to cure white spots.
34	<i>Ficus racemosa</i> Linn. <b>(Rumbal)</b>	Moraceae	Stem, Bark	Milky latex from bark is effective against skin problems (Phinsiyan)
35	<i>Ficus religiosa</i> Linn. <b>(Peepal)</b>	Moraceae	Leaves	Mixture of leaves, black pepper and water is effective against piles
36	<i>Grewia optiva</i> Drumm. <b>(Tamman)</b>	Tiliaceae	Stem, Bark	Twigs of <i>Grewia</i> increase milk yield in cow Bark is dipped in water for few hours and given to animals to cure jaundice. If animals have taken the poisonous weed, i.e. <i>Lantana camara</i> , it detoxifies its poison
37	<i>Holarrhaena pubescens</i> Wall. ex. G. Don. <b>(Kutaj)</b>	Apocynaceae	Bark, seeds	Bark and seeds are antidiarrhetic
38	<i>Justicia gendarussa</i> Burm. f. <b>(Kali brankad)</b>	Acanthaceae	Leaves, roots	Ash produced from burning of leaves and roots are mixed with honey and used as a treatment for cough
39	<i>Justicia adhatoda</i> Linn. <b>(Brankad)</b>	Acanthaceae	Leaves, Roots	Leaves are burnt to produce ash and the ash is mixed with honey and used as a treatment for cough. Roots juice is used as a cure for typhoid
40	<i>Litsea chinensis</i> Lour. <b>(Medhasikad)</b>	Lauraceae	Bark, Leaves	Leaves are oiled, heated and tied on the skin for pain relief (leaves are used as demulcent)
41	<i>Melia zedarach</i> Linn. <b>(Drank)</b>	Meliaceae	Leaves	Paste obtained from the leaves is used against toothache
42	<i>Mentha longifolia</i> Huds. <b>(Janglipootna)</b>	Lamiaceae	Leaves	Leaves are dried, powdered, boiled and used against stomach ache and loose motion

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43	<i>Mirabilis jalapa</i> Linn. ( <b>Galbaasi</b> )	Nyctaginaceae	Leaves	Leaves are used to treat abscesses
44	<i>Murraya koenigii</i> (Linn.) Spreng. ( <b>Dronkal, KadiPatta</b> )	Rutaceae	Leaves	Powder made from the leaves is applied to cure wound
45	<i>Nicotiana Plumbaginifolia</i> Viv. ( <b>DesiTambakoo</b> )	Solanaceae	Roots	Roots are boiled and used to treat fever
46	<i>Ocimum basilicum</i> Linn. ( <b>Nazposh</b> )	Lamiaceae	Leaves	Leaves are rubbed and juice is poured into eyes to treat eye flu and allergy
47	<i>Prunus persica</i> (Linn.) ( <b>Peach aaru</b> )	Rosaceae	Leaves	Leaf juice is used to remove worms from the intestine
48	<i>Psidium guajava</i> Linn. ( <b>Marood</b> )	Myrtaceae	Fruit, Leaves, Stem branch	Small young leaves are washed, cleaned and powdered and used against bloody loose motions Stem branches are used against mouth ulcers Fruits are used against cough
49	<i>Ranunculus muricatus</i> - Linn. ( <b>Kodtan</b> )	Ranunculaceae	Stem	White gum from stem of the plant is used against itching and ring worm
50	<i>Ricinus communis</i> Linn. ( <b>Arandi</b> )	Euphorbiaceae	Leaves, Inflores- cence	Oil of leaves is used to cure joint pain

agreements with the overall pattern of dominance of herbaceous species [65], [11], [43], [70], [12] [2], [48]. Such a dominance of herb species is ascribed to the fact that they are more effortlessly accessible in the nearby areas than trees and shrubs. Leaves were the maximum used plant part, followed by roots, seeds, bulbs, flowers and whole plant. Earlier studies by [33], [37], [4] have also reported same results. As per the study by [5], the soft parts of the plants (leaves, buds and flowers) are the highest source of volatile components, delicate fragrances and active principles. The inhabitants of the area use various bio-resources to meet their daily requirements. They use different plant parts in various forms to meet their daily needs. Throughout the world, the traditional practice of using plant resources has a long history and wide acceptability. As per the World Health Organisation, over three-fourths of the world population cannot afford modern medicines and have to rely on the use of traditional medicines of plant origin [47]. The conservation and sustainable utilisation of bio-resources are important subjects of attention throughout the world. Thus, the documentation of information on diversity and indigenous practices must help in the preservation of that knowledge. According to [67], traditional knowledge represents an immensely valuable database that provides baseline information for the commercial exploitation of the biological resources. The ethnobotanical information is also useful for pharmacologists, botanists and those having the potential of developing alternative therapies. Also, the plants which are least known may prove useful in phyto-pharmacological research and

hence may play an essential role in the discovery of new therapeutic substances for the veterinary and other drugs.

## CONCLUSION

Considering the importance of ethnobotanical data, the presently collected information could supplement the direction of the local biodiversity catalogues, which is a key tool for achieving regional and global biodiversity and conservation strategies. It is valuable to impart knowledge to these local practitioners about the variants of such medicinal plants, which could be better result oriented. Further, documentation of traditional knowledge will be useful to understand the pharmacological aspects of the medicinal species of the area. Additionally, at present anthropogenic activities such as industrialisation, deforestation, habitat destruction, urbanisation, etc. pose a serious threat to these species. Thus, it is necessary to document the ethnobotanical flora and conserve it for the future. The present study is a step towards the conservation of the medicinal plants with appropriate measures to be undertaken with the participation of the local people.

## RECOMMENDATIONS

The present findings reveal that tehsil Hiranagar of the district Kathua (Jammu and Kashmir) has remained unexplored for ethnobotanical surveys. It is recommended that additional surveys must be carried out to look for beneficial and harmful



**Fig. 1.** Map showing the study area. **Figs. 2-5.** Collecting ethnobotanical information from Vaid and local people. **Figs. 6-11.** Field photographs of: 6. *Calotropis procera*. 7. *Psidium guajava*. 8. *Aegle marmelos*. 9. *Cassia fistula*. 10. *Melia azedarach*. 11. *Emblica officinalis*.

aspects of traditional healthcare practices as well as introducing modern medical facilities in the area. In addition, the ethnobotanical usages for the treatment of different ailments need to be subjected to detailed scientific screening to identify the actual useful herbal formulations.

#### About Article

The article is a research article where the authors

have documented the ethno-medicinal plants belonging to Angiosperms used by the inhabitants of Tehsil Hiranagar of District Kathua in J&KUT. The present study is first of its kind and no such study has been conducted earlier from the same region.

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