e-ISSN:2322-0066

Research & Reviews: Journal of Biology

Traditional Use of Medicinal Plants in Kashmir: A Review

Muzafar Ahmad Rather[1], Shoib Ahmad Baba[2,3]*

[1]Department of Biochemistry, University of Kashmir, Jammu & Kashmir, India

[2]Academy of Science and Innovative Reasearch, Canal Road Jammu, 180001, Jammu & kashmir, India

[3]Indain Institute of Integrative Medicine, Jammu & Kashmir, India, 180001

Review Article

Received date: 13/11/2015

Accepted date: 18/12/2015

Published date: 25/12/2015

***For Correspondence**

Shoib A. Baba, Academy of Science and Innovative Reasearch, 180001, Jammu & kashmir, Tel: 9797757900, India.

E-mail: shoaibnazir25@gmail.com

Keywords: Ethanomedicine, Medicinal plant, Kashmir Himalaya, Overexpolitation.

ABSTRACT

The beautiful valley of Kashmir harbors a diversity of medicinal plants that have been used in traditional health care systems for thousands of years. This knowledge, transmitted by oral tradition from generation to generation, has been eroding in recent decades due to rapid cultural change. Besides this, medicinal plants are being overexploited at an alarming rate. Untill now, the traditional uses of medicinal plants in Kashmir have not been reviewed and if reviewed, focus has been either on particular groups or on restricted regions. Here, we present a review of traditional uses of medicinal plants by the People of Kashmir valley in order to provide comprehensive documentation, diseases treated in traditional medicine and suggest perspectives for conservation and management of medicinal plants of Kashmir.

INTRODUCTION

Medicinal plants have been used for centuries in traditional health care systems and numerous cultures around the world still rely on plants for their primary health care. With the recent advancements in plant sciences, there has been a tremendous increase in the use of plant based health products in developing as well as developed countries. About 70-80% people around the globe rely on medicinal plants for primary health care [1,2]. Medicinal plants also form a source of income for millions of people. According to World Health Organisation (WHO), ethnomedicine has retained its reputation in all regions of the developing world and its use is rapidly growing in the industrialised countries. Traditional herbal remedies account for 30-50% of the total medicinal consumption in China. In Ghana, Nigeria and Zambia, the first line treatment for 60% of the children with malaria is the use of herbal medicine [3]. With minimum side effects and low cost, people in developing countries like Bangladesh (90%), Myanmar (85 %), India (80%), Nepal (75%), Sri Lanka (65%) and Indonesia (60%) have strong belief in this system of medicine [4]. As estimated by the World Health Organization (WHO), the present demand for ethanomedicinal plants is approximately US $ 14 billion per year [5]. The demand for medicinal plant based raw materials is growing at the rate of 15 to 25% annually and is likely to increase more than US $ 5 trillion in 2050. In India the medicinal plant related trade is estimated to be approximately US $ 1billion per year [6, 7]. World Health Organization has made an attempt to identify all medicinal plants used globally and listed more than 20,000 species [8]. Owing to the topographical variations, Kashmir Himalaya harbors a rich diversity of medicinal plants. Since times immemorial, people in the region have learned and practiced medicinal usage of plants. Through ages, this ancient prized wisdom has been transmitted from generation to generation as part of oral traditions [6]. With Concerns regarding the loss of native knowledge and the possible extinction of medicinal plant resources of Kashmir, there is urgent need to document and review the studies carried on the medicinal plants of Kashmir. Only a few studies have been carried out to review traditional use of medicinal plants of Kashmir. Here we present a review on, medicinal plant diversity, plant parts used and diseases treated in traditional medicine of Kashmir. Finally, we suggest suitable Conservation and management strategies for medicinal plants of Kashmir.

MATERIALS AND METHODS

The present study is the review of existing information on the medicinal plants of Kashmir. Studies published in journals, books, theses and reports were reviewed. We reviewed a total of 30 publications that provided information about the use of medicinal plant species to treat various ailments. Pertinent literature was searched in different electronic databases (ISI Web of Science, MEDLINE, Science Direct, Scopus, and Google Scholar). We do not claim to have included every existing information source about traditional uses of medicinal plants of Kashmir, but we focus on information easily accessible to researchers.

Medicinal plant diversity

The Kashmir valley often referred to as a 'Terrestrial Paradise' is well-known around the globe. One of the main features contributing to the worldwide reputation of Kashmir is the rich biodiversity that adorns its captivating landscape. Being phyto geographically located at the intersection of Holarctic and Paleotropical Floristic Realms and falling within the North-Western Himalaya, the region is endowed with teeming diversity of medicinal plants [9]. The study enlisted 81 medicinal plants used by the people of Kashmir. These plants belonging to 15 families of spermatophytes. The results are presented in **(Table 1)** [4-43] with family names, taxon name, local name, arts used, and medicinal use. The representative angiosperm families with highest number of plants were Asteraceae (10) Ranunculaceae (5) and Lamiaceae (4) **(Table 2).** Among gymnosperms most plants belonged to family Pinaceae (4) **(Table 2).**

Table 1. List of plants used as ethanomedicine in Kashmir Valley.

S. No	Taxon name	Local name	Family	Part used	Ethanomedicinal uses
1	*Aconitum heterophyllum* [4,27]	Paewakh	Ranunculaceae	Root	Antidote for snake bites,
2	*Achillea millefolium* [4,20,27]	Berguer, Pahal gassesh	Asteraceae	Rhizome, Leaves	Headache, Cough, Tooth ache
3	*Arnebia benthamii* [27, 28,10]	Kah Zaban	Boraginaceae	Rhizome	Common Cold, Cough, Fever, blood purifier
4	*Acorus calamus* [4,10]	Via-gander	Acoraceae	Rhizome	Stomachic, Diarrhea, cough, Swellings, Joint pain
5	*Coriandrum sativum* [4,10]	Danival	Apiaceae	Seeds	Hair fall
6	*Artemesia absenthium* [4,27]	Tethwan	Asteraceae	Leaves	Obesity, Diabetes, liver infection
7	*Cotula anthemoids* [3,4,27,10]	Bobul	Asteraceae	Roots	Constipation
8	*Taraxacum officinale* [4,10,27]	Hand	Asteraceae	Roots	Back pain, common cold, Chest infection
9	*Trigonella foenum-graecum* [4,21, 10,27]	Meth	Fabaceae	Seeds	Back Pain
10	*Arisaema jacquemontiana* [4,10,27]	Hapat makei		Rhizome	Muscular strength and Skin infections
11	*Cannabis sativa* [4]	Bhang	Cannabinnaceae	Leaves, seeds and stem	ear-ache, blood purifier, scabies and piles
12	*Cascuta reflexa* [4,10]	Kukliporte	Cuscutaceae	Whole Plant	Joint pains, wound healing and falling of Hairs.
13	*Berberis lyceum* [4]	Kawdach	Beriberidaceae	Roots, Fresh fruit	Indigestion, Constipation.
14	*Euphorbia helioscopa*[40,22,23]	Gurisochol, Gandi booti	Euphorbiaceae	Seeds, roots and latex	abdominal cramps, cholera and eruptions
15	*Euphorbia wallichia* [4,27]	Guri-dud/ Harbi	Euphorbiaceae	Stem, leaves, latex	Skin diseases ,and asthma
16	*Iris kashmiriana* [4, 24,27]	Mazarmund	Iridaceae	Whole plant	Joint pains
17	*Dioscorea deltoidea* [4,10,27,35]	Kraeth	Discoreaceae	Leaf	Opthalimic infections, urinary infections
18	*Lavetera kashmeriana* [4, 10,18, 25,26]	Sozposh	Malvaceae	Flower	Mumps, skin irritation in pregnant women
19	*Malva sylvestris* [4,10,28]	Sotal	Malvaceae	seeds	Cough, fever,eye sight
20	*Papaver somniferum* [4,10,33]	Kashkhas	Papaveraceae	Fruit	Dry cough, Diarrhea
21	*Datura stramonium* [4,29,30]	Datur	Solanaceae	Seeds	Rheumatism, Frost bite, toothache,tonic
22	*Urtica dioca* [10,31,32]	Soi	Urticaceae	Leaves and Roots	Rheumatism
23	*Viscum album* [4,6,10,27, 33, 34, 35]	Aal	Loranthaceae	Whole plant	Laxative and Fractures
24	*Ficus carica* [4,10,36,40]	Anjeer	Moraceae	Stem, milky latex, fruit pulp.	Birthrate control, insect bite and warts.
25	*Pinus roxburghii* [4,27]	Chad	Pinaceae	Seeds and gums	General weakness after child birth

26	*Rosa webbiana* [4,27,37]	Gulab	Rosaceae	Flowers	Cough and colds.
27	*Atropa acumniata* [4,27,38]	Chella lubbar	Solanaceae	Roots and leaves	Cough. And antispasmodic
28	*Berginia ligulata* [4,10,28,39]	Zakhmi hayat	Saxifraceae	Leaves and roots	Intestine complaints and stomach ulcers
29	*Viola odorata* [40,41]	Bunufsha	Violaceae	Leaves, seeds and flowers	Respiratory problems
30	*Nasturtium officinalle* [4,10,27,40]	Kulhak	Brasicaceae	Leaf	Stomachic
31	*Hyoscyamus niger* [10,18,41]	Bazarbang	Solanaceae	Seed	Tooth ache
32	*Prunellavulgaris* [4,10,27,42]	kulwauth	Lamiaceae	flower	Headache,Fever, muscular pain
33	*Salix wallichiana* [4,18,27,43]	Danthiveer	Salicaceae	Leaves	Fever, Head ache, Genral body pain
34	*Saussurea costus* [4,8,18,27]	kuth	Asteraceae	Rhizome	Joint pain, back pain, sole ulcers, dysentery, fever, urinary problems
35	*Stellaria media* [4,8,18,40]	Losdhi	Caryophyllaceae	Seed	Skin infection, allergy
36	*Viburnum grandiflorum* [4,10]	kulmanch	Caprifoliaceae	Seed	Typhoid, whooping cough
37	*Vitis vinifera* [4,10,8]	Daech	Vitaceae	Leaves	Skin rashes, sores, eruptions
38	*Zizyphus mauritiana* [27,40]		Rhamnaceae	Leaves	Skin rashes
39	*Cynodon dactylon* [27,40,4]	Daraunm	Poaceae	Whole plant	Common cold
40	*Corydalis govianiana* [4,10,27]	Sangi-harb	Fumariaceae	leaves	Respiratory disorders, chest infections, asthama
41	*Aconitum voilacium* [4,10,40]		Ranunculaceae	Root	Antidote for snake bites
42	*Androsace rotundifolia* [4,18,27]	Uzmposh	Primulaceae	Rhizome	Cataract
43	*Anemone obtusiloba* [14, 35]	Srub	Ranunculaceae	Seeds	Rheumatism
44	*Aquilegia fragrans* [4,35]	Daduejaid	Ranunculaceae	Flowers	Indigestion
45	*Arctium lappa* [4,35]	Phughood	Asteraceae	Leaves, root	Skin disease, Boils , Body pain
46	*Asparagus officinalis* [4,10,35]	Parglas	Liliaceae	whole plant, roots	Toothache, Rheumatism, Female infertility
47	*Cardamine impatiens* [4,10,35,27]	Pahal-laish	Brassicaceae	Whole plant	Asthma, Hay fever
48	*Cichorium intybus* [4,10,35,27]	Kazal-Handh	Asteraceae	Root	Rheumatism Sore throat,, jaundice,
49	*Fumaria indica* [4,10,27,28]	Pugsley, Shahtaur	Fumariaceae	Whole plant	Dyspepsia , Rheumatism
50	*Impatiens glandulifera* [4,5,10,27]	Trul	Balsaminaceae	Leaves	Skin burn, Joint pain
51	*Lamium album* [4,10,35,27]	Poshkar	Lamiaceae	Whole plant, leaves, flowers	Cough, Metrorrhagia
52	*Nepeta raphanorhiza* [4,10,35,27]	Vangogil	Lamiaceae	Whole plant, leaves	Dysentry, Toothache
53	*Oxalis corniculata* [10,35]	Tsok-tsen	Oxalidaceae	Whole plant, leaves.	Toothache, Convulsions, Blood purification, Diarrhoea
54	*Rheum emodi* [10,35]	Pambechalan	Polygonaceae	Leaves	Rheumatic pain, Wounds, Dislocated joints, Boils
55	*Rubia cordifolia* [4,10,35,40]	Rubes	Rubiaceae	Roots	Stomachache, Jaundice
56	*Sambaucus wightiana* [4,10,35,40]	Hapatfal	Caprifoliaceae	Root, leaves	Chest congestion, Boils
57	*Senecio graciliflorus* [4,10,35]	Mongol	Asteraceae	Leaves, flowers	Dermatitis, Stomachache
58	*Verbascum Thapsus* [4,10]	Wantamook	Scrophulariaceae	Flowers	Cough , Pneumonia
59	*Angelica glauca* [35,40,10]	Choora	Apiaceae	Root	Vomiting
60	*Ajuga bracteosa* [10,40]	Kauri booti	Lamiaceae	Stem, leaves	ulcer, colic and jaundice
61	*Gentiana kurroo* [10,40,27]	Desibangara	Gentianaceae	Root	Stomachache and urinary infections
62	*Caltha alba* [4,10,35,40]		Ranunculaceae	Leaves	pain and cramps, for menstrual disorders
63	*Gallium aparine* [4,10,35]	Loothar	Rubiaceae	Leaves	Jaundice, antiseptic
64	*Geum elatum* [10,40]	Shoonkar	Rosaceae	Root	Astringent, dysentery and diarrhoea
65	*Gnaphalium affine* [10,27]	Jangli dodal	Asteraceae	Leaves	antiperiodic, antitussive, expectorant and febrifuge
66	*Hackelia uncinatum* [10,27]	Neelaan	Boraginaceae	Flowers	Expectorant, healing wounds, treating tumors
67	*Indigofera heterantha* [10,27]	Jandi	Leguminosae	Leaves	internal body disorders

68	*Tussilago farfara* [4,10]	Bann Hulla	Asteraceae	Leaves	astringent, emollient, expectorant, stimulant and tonic
69	*Betula utilis* [4,27,10]	Bhuz	Betulaceae	bark	antiseptic
70	*Rhodiola himalensis* [4,10,27,40]	Dand jari	Crassulaceae	bark	infection of teeth
71	*Juniperus communis* [4,10,27,40]	Bithur	Curpessaceae	Leaves	rheumatism
72	*Juniperus recurva* [10,27,40]		Curpessaceae	Leaves	Rheumatism insecticide,
73	*Morina longifolia* [4,10,27,40]	Kim	Dipsacaceae	Roots	insecticide
74	*Juglans regia* [22,4,8,27]	Doan kul	Juglandaceae	Leaf , Bark	Tooth infection, scrofula, rickets and leucorrhoea
75	*Phytolacca acinosa* [40,10,5,43]	Brand	Phytolaccaceae	Root	narcotic effect, sedative
76	*Abies pindrow* [4,10,27]	Sal	Pinaceae	Bark	Rheumatism
77	*Cedrus deodara* [10,27,40]	Divdar	Pinaceae	Stem, Bark	skin rashes and external ulcers
78	*Punica granatum* [35,40,27]	Daan kul	Punicaceae	Seed	jaundice and anaemia
79	*Sambucus wightiana* [4,10,15,27]	Kown	Sambucaceae	roots, leaves and berries	Diuretic, purgative
80	*Picrorhiza kurrooa* [4,10,14,27]	Kour	Scrophulariaceae	Roots, Rhizome	Fever, appetizer
81	*Podophyllum hexandrum* [4,10]	Banwangun	Berberidaceae	leaves and roots	Skin diseases, Gastric problems

Table 2. Families with the largest number of medicinal plants [more than 2 species] in Kashmir valley, India.

S. No	Family	No. of species
1	*Asteraceae*	11
2	*Ranunculaceae*	5
3	*Lamiaceae*	4
4	*Pinaceae*	4
5	*Solanaceae*	3
6	*Rosaceae*	3
7	*Brassicaceae*	2
8	*Curpessaceae*	2
9	*Apiaceae*	2
10	*Brasicaceae*	2
11	*Fumariaceae*	2
12	*Rubiaceae*	2
13	*Boraginaceae*	2
14	*Euphorbiaceae*	2
15	*Caprifoliaceae*	2

The most commonly used plants were Taraxacum officinale, Artemesia absenthium, Malva sylvestris, Berginia ciliate, Rheum emodi, Vitis vinifera and Cedrus deodara. Dicots were dominant (89%) with followed by gymnosperms (7%) and monocots (4%). Among these plants 50 were endangered, 37 scattered and 13 were doutfull. Most of these plants were herbs (75%), most likely because they are more abundant **(Figure 1).** The more abundant a plant is, the more likely it is to be used. The next dominant growth habit of was tress (15%), followed by shrubs (8%) and climbers (2%).

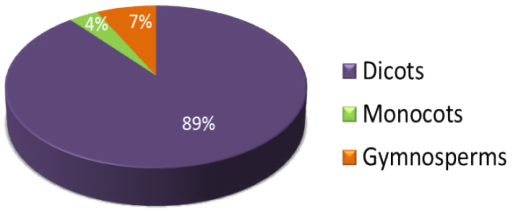

Figure 1. Percentage of different taxa of Spermatophytes reviewed in present study.

Diseases treated

A total of 12 major ailment categories were treated with medicinal plants **(Figure 2).** The main ailment catagories that are treated include dermatological, gastrointestinal, skeleto-muscular, cough and cold, respiratory, dental, wounds, genito-urinary, Fever, headache, circulatory and opthamological. A single plant species may be used to cure several human ailments. Some of the remedies were prepared by combining different plants.

For the treatment of ulcers, the powdered rhizome of Dioscorea deltoidea is mixed with powdered root of Berberis lycium [10]. Complex medicines of two or more plant species are thought to be more potent than those prepared with single species which may be attributed to interactive effects of the plants. In many cases two or more diseases are treated using one plant like Lavetera kashmeriana is used for the treatment of mumps and skin irritation in pregnant women [4]. Medicines used were prepared mainly by boiling to make pounding to paste, soaking in water to make infusions, decoctions, squeezing, burning to ash, grinding, to powder, chewing, and baking under hot ashes.

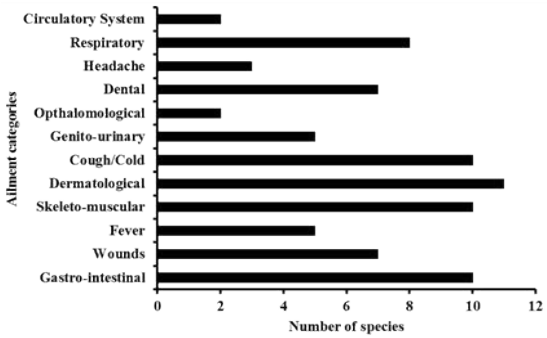

Figure 2. Use frequency of plant species in different disease categories.

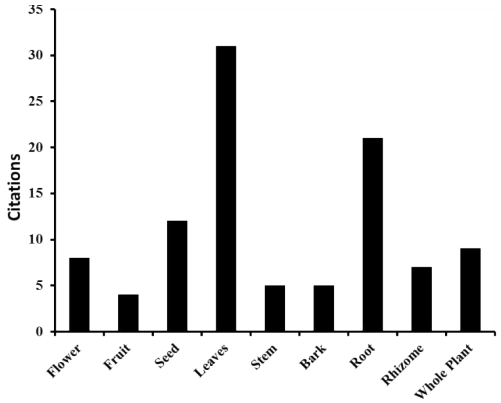

Figure 3. Status of plant parts used.

Plant parts used

The traditional hakims and healers utilize different parts of the plants as remedy for different ailments. However, the use of a particular plant part depends on the plant habit and user's needs.

The most frequently used plant parts in the preparation of herbal remedies include leaves , fruit, roots, rhizomes , whole plants , Seeds , flowers and bark **(Figure 3).** The use of specific plant parts suggests that these parts may be associated with strong medicinal properties and exhaustive phytochemical screening is required tom validate the ethanomedicinal claims scientifically. Our findings of the frequent use of green leaves and in the preparation of remedies corroborate the results of [11-13]. Different liquids such as water, juices, sugar, tea, honey, edible oil, and milk are mixed with plants or plant parts during the preparation of the remedies. The prepared remedies are mostly administered orally (63%), less frequently dermally (19%) or both orally and dermally (15%). Only 3% is administered through ears or eyes.

Conservation and management of medicinal plants in Kashmir

Conservation and management of traditional medicinal plants is an essential concern worldwide, especially in developing countries. The ever-escalating demand for the medicinal plants in pharmaceutical industries and in traditional system has resulted in overexploitation leading to the reduction of their natural populations. Besides, habitat loss due to anthropogenic activities has further intensified the concern. If overexploitation of these plants continues, many species may decrease in, and ultimately disappear from their natural habitats [10, 14]. Although, a number of studies have been carried out to study the diversity and distribution pattern of the medicinal plants in various Himalayan states of India, information on this aspect in not available in Jammu and Kashmir except for few fragmentary information like CAMP (Conservation Assessment and management Prioritization) workshop [15-17, 40]. Therefore, it is compulsory to study the diversity, distribution and utilization pattern of the medicinal plants, document folklore uses, identify nativity and endemism and suggest suitable conservation and management strategies. A concerted work plan, involving various stakeholders i.e., scientists, government organizations, NGOs and farmers, is required to implement the rule of section 8 of Biodiversity Act 2002, i.e., conservation of biological diversity, sustainable use of its components and fair and equitable sharing of benefits arising out of the use of biological resources and knowledge to meet out the market demands and conservation of threatened and economically important plant biodiversity of the J&K State. Plants should only be collected in such a manner that ensures their continued presence, both in specific collection locations and across the landscape. The most serious threats to medicinal plants of Kashmir are habitat loss and fragmentation, climate change, and invasive species [18, 19,27,40]. Special care has to be given when attributing a legal protection status to a species. Keeping in view the depletion of the medicinal resources, various government and non-government organizations are involved in conservation of these species in Himalayan region in general and particular. In Jammu and Kashmir, various organizations such as Indian Institute of Integrative Medicine, Jammu (formerly known as RRL, Jammu), Centre for Biodiversity Studies, BGSB University, Rajouri, University of Kashmir, Srignar, Sher-a-Kashmir Agriculture University of Science and Technology, Jammu and Srinagar, State forest Research Institute, J&K,

Defence Institute of High Altitude Research, Leh and Shree Mata Vaishno Devi University, University of Jammu, Jammu are keenly involved in developing conservation technologies for medicinal plants of the state. The In-situ conservation of biological resources has been attempted all over India both by the central and state governments. Presently, there are 4 National Parks and 15 Wildlife Sanctuaries for the in-situ conservation of biological diversity [1,4,10,27,40]. Besides this one Biosphere reserve has also been proposed recently. These areas cover different altitudinal zones ranging from tropical to alpine and are helping largely in the in-situ conservation of threatened and economically important medicinal plants of the state. However, fragmentary information is available on the diversity, geographical distribution, utilization pattern, and folklore information of threatened medicinal plants in the state. Thus, there is a pressing need to identify the areas (protected and unprotected) and report rich areas as Economically Important Plant Conservation Zones (EIPAZs) at different altitudes with the involvement of the native populations and the various other organizations (State, Central and NGOs). There is also an urgent need for the development of conservation repositories like herbal gardens, nurseries and encouraging farmers to cultivate threatened medicinal plants of the state. Although there are many Governmental and non-Governmental organizations putting their efforts for the conservation of these important plants, there are many other commercially important plants whose conservation technologies are yet to be standardized. Development of Conservation technologies for these plants will not only help in stimulating mass cultivation in fields but also, aid in reducing pressure on wild stock.

CONCLUSION

Medicinal plants represent and contribute significantly to human health. Use of medicinal plants by Kashmiri People from has a long history and here we reported on 81 medicinal plant species used in the traditional health care systems of Kashmir. This is the most comprehensive review to date and may provide a base for further endeavors knowledge related to medicinal plants of Kashmir. The multiple uses reported in this study indicate that scientific investigations are useful in the validation of traditional medicinal practices for the development of new therapeutic agents from medicinal plants of Kashmir

REFERENCES

1. Singh JS. The biodiversity crisis A multifaceted review. Curr Sci. 2002;82(6):638.
2. WHO World Health Organization. Traditional Medicine Strategy. 2002; PP: 11.
3. WHO. Traditional Medicine. Fact sheet. 2002;134.
4. Bhat TA et al. Traditional Use Of Medicinal Plants by Gujjar And Bakerwal Tribes in Pir Panjal Range of the Shopian District Kashmir India. Advances in Bioresearch. 2003;3: 74 – 80
5. Sharma AB. Global medicinal plants demand may touch $ 5 trillion by 2050. Indian Express. 2010
6. Malik AR et al. Ethnomedicinal Practices and Conservation Status of Medicinal Plants of North Kashmir Himalayas. Research Journal of Medicinal Plant. 2011;1-15.
7. Joshi K, Chavan P and Warude D. Molecular markers in herbal drug technology. Current Science. 2009;87:159- 165.
8. Pandey MM, Rastogi S and Rawat AK. Indian herbal drug for general health care- An over view. The Internet Journal of Alternative Medicine. 2008;6(1):1-10.
9. Dar GH., Khuroo, and A.A. Floristic Diversity in the Kashmir Himalaya Progress Problems and Prospects Sains Malaysian. 2013;42(10):1377–1386.
10. Akhtar N. Diversity and use of ethno-medicinal plants in the region of Swat North Pakistan. Journal of Ethnobiology and Ethnomedicine. 2013;9;25.
11. Baba Shoib A and Shahid A Malik. Determination of total phenolic and flavonoid content antimicrobial and antioxidant activity of a root extract of *Arisaema jacquemontii* Blume. Journal of Taibah University for Science. 2014;9:449–454.
12. Humeera N. Antimicrobial and antioxidant activities of alcoholic extracts of *Rumex dentatus* L. Microbial pathogenesis. 2013;57:17-20.
13. Yousuf M. In vitro antibacterial activity and phytochemical studies of methanolic extract of leaves of *Hypericum perforatum* L. growing wild in Kashmir Himalaya Asian. Journal of Plant Science and Research. 2012;2(4):414-420.
14. Pant S and Pant VS. Status and Conservation Management Strategies for Threatened Plants of Jammu and Kashmir. Journal of Phytology. 2011;3(7):50-56.
15. Samant SS, Dhar U and Palni LMS. Medicinal Plants of Indian Himalaya Diversity Distribution Potential Values. Gyanodaya Prakashan Nainital. 1998
16. Samant SS. Medicinal Plants in Himachal Pradesh north western Himalaya India. International Journal of Biodiversity Science and management. 2007;3:234- 251.
17. Kala CP. Medicinal Plants of the high altitude cold desert in India diversity distribution and traditional uses. International Journal of Biodiversity Science and Management. 2006b;2:43–56.

18. Mir MY. Ethno medicinal survey of plants from Kupwara j & k India. International Journal of Traditional and Herbal Medicine. 2013;1:181-189.
19. Baig BA, Ramamoorthy D and Bhat TA . Threatened medicinal plants of Menwarsar Pahalgam Kashmir Himalayas Distribution pattern and current conservation status. Proceedings of the International Academy of Ecology and Environmental Sciences. 2013;3:25-35.
20. Khan JA and Kumar S. Ethno medicinal uses of some medicinal plants used for snake bite in Poonch District of Jammu and Kashmir India. Life science leaflets. 2012;10:123-32.
21. Kumar M, Paul Y and Anand VK. An ethnobotanical study of medicinal plants used by the locals in Kishtwar Jammu and Kashmir India. Ethnobotanical Leaflets. 2009;2009(10):5.
22. Rashid A, Anand VK and Serwar J. Less known wild edible plants used by the Gujjar tribe of district Rajouri Jammu and Kashmir State-India. International Journal of Botany. 2008;4(2):219-24.
23. Samant S S and U. Dhar. Diversity endemism and economic potential of wild edible plants of Indian Himalaya. The International Journal of Sustainable Development & World Ecology. 1997;4(3):179-191.
24. Bhattacharyya A. Ethnobotanical observations in the Ladakh region of northern Jammu and Kashmir State India. Economic Botany. 1991;45(3):305-8.
25. Siddiqui BS. Evaluation of Viburnum grandiflorum for its in-vitro pharmacological screening. African Journal of Pharmacy and Pharmacology. 2012;6(22):1606-10.
26. Kapahi BK, Srivastava TN and Sarin YK. Traditional medicinal plants of gurez Kashmir–an ethnobotanical study. Ancient science of life. 1993;13(1-2):119.
27. Khan ZS, Khuroo AA and Dar GH. Ethnomedicinal survey of Uri Kashmir Himalaya. Indian Journal of Traditional Knowledge. 2004;3(4):351-7.
28. Ballabh B. Traditional medicinal plants of cold desert Ladakh—used against kidney and urinary disorders. Journal of ethnopharmacology. 2008;118(2):331-9.
29. Sharma PK and Singh V. Ethnobotanical studies in NorthWest AND Trans-Himalaya. V Ethno-veterinary medicinal plants used in Jammu and Kashmir India. Journal of ethnopharmacology. 1989;27(1):63-70.
30. Malik AH et al. Ethnomedicinal uses of some plants in the Kashmir Himalaya. Indian Journal of Traditional Knowledge. 2011;10(2):362-6.
31. Ballabh B and Chaurasia OP. Traditional medicinal plants of cold desert Ladakh—used in treatment of cold cough and fever. Journal of ethnopharmacology. 2007;112(2):341-9.
32. Koul M K. Medicinal plants of Kashmir and Ladakh and cold Arid Himalaya Indus Publishing Company New Delhi. 1997;
33. Mahmood T and Shah A. Medicinal plants used by traditional healers of poonch district. Lifescience leaflets. 2012;5:53-60.
34. Srivastava TN et al. An index of the available medicinal plants used in Indian system of Medicine from Jammu and Kashmir State. Ancient science of life. 1986;6(1):49.
35. Nawchoo IA, Buth GM and Sahni KC. Studies on the medicinal plants used by the Gujar and Bakarwal tribes of Jammu and Kashmir. Advances in plant sciences research. 1994;1:191-203.
36. Mala FA et al. Ethno-medicinal survey of Kajinaag range of Kashmir Himalaya India. International Journal of Pharmacy and Biological Sciences. 2012;3:B442-9.
37. Shah A et al. New ethnomedicinal claims from Gujjar and Bakerwals tribes of Rajouri and Poonch districts of Jammu and Kashmir India. Journal of ethnopharmacology. 2015;166:119-28.
38. Kirn HS, Kapahi BK and Srivastava TN. Taxo-ethnobotanical observations on the gymnosperms of Poonch district J. &. K state India. Journal of Economic and Taxonomic Botany. 1999;23(1):155-60.
39. Bhardwaj AK et al. Ethnoveterinary medicinal uses of Plants of district Bandipora of Jammu and Kashmir India. Int J Trad Nat Med. 2013;2(3):164-78.
40. Lone PA and Bhardwaj AK. Ethnomedicinal uses of certain locally available plants of Bandipora district of Jammu & Kashmir India. International Journal of Medicinal and Aromatic Plants. 2013;3(4):470-85.
41. Mir AH. Pharmacological and phytochemical properties of *Iris kashmiriana* baker as a potential medicinal plant of Kashmir Himalaya. Global Journal of Research on Medicinal Plants & Indigenous Medicine. 2014;3(12):460.
42. Dutt HC, Bhagat N and Pandita S. Oral traditional knowledge on medicinal plants in jeopardy among Gaddi shepherds in hills of northwestern Himalaya J&K India. Journal of ethnopharmacology. 2015;168:337-48.
43. Tariq A, Mussarat S and Adnan M. Review on ethnomedicinal phytochemical and pharmacological evidence of Himalayan anticancer plants. Journal of ethnopharmacology. 2015;164:96-119.