



Research Journal of
**Medicinal
Plant**

ISSN 1819-3455



Academic
Journals Inc.

www.academicjournals.com

Ethnomedicinal Practices and Conservation Status of Medicinal Plants of North Kashmir Himalayas

¹A.R. Malik, ²M.A.A. Siddique, ³P.A. Sofi and ⁴J.S. Butola

¹Regional Agricultural Research Station/KVK (SKUAST-K), Stakna-Leh-194 101, Ladakh (Jammu and Kashmir), India

²Division of Floriculture, Medicinal and Aromatic Plants, SKUAST-K, Shalimar, Srinagar-191121 (J and K), India

³Division of Forestry, SKUAST-K, Shalimar, Srinagar-191121 (J and K), India

⁴Herbal Research and Development Institute, Mandal, Chamoli-246 401 (Uttarakhand), India

Corresponding Author: J.S. Butola, Herbal Research and Development Institute, Mandal, Chamoli-246 401 (Uttarakhand), India

ABSTRACT

The present study reports ethno-medicinal uses and conservation status of medicinal plants in the northern region of Kashmir Himalayas. Surveys were conducted in district Baramulla and Kupwara for documentation of traditional knowledge and practices (mode of administration and dosages) of medicinal plants. Eighty medicinal plant species (69 herbs, 7 shrubs and 2 trees), representing 43 families and 72 genus, were recorded to be used under traditional health care system. Amongst the species, 71 species were collected from the wild, 4 species from cultivation and 5 species from both the sources. An IUCN criterion based assessment of conservation status of these species showed 9 species as Critically endangered, 14 Endangered, 24 Vulnerable, 28 Rare and only 5 Secure in study the region. Likewise other parts of the IHR, wild populations of medicinal plants of this region are under severe pressure of over-harvesting coupled with over grazing. Moreover, the prevalent practice of premature harvesting of the whole plant is leading to unrecoverable loss of their germplasm. The present communication also depicts market chain of medicinal plant trade in the region which is highly unregulated and lacking equitable share of benefits. Keeping all above issues in mind, an appropriate strategy and action plan for the conservation and sustainable utilization of medicinal plants of the region need to be formulated and implemented, effectively.

Key words: Medicinal plants, folk medicine, threats, ethno-medicinal uses, conservation, Himalayas

INTRODUCTION

According to WHO (World Health Organization), 70% population of the world depend on Traditional Health Care System (THCS) for curing various diseases (WHO, 2002). It is well known that this system offers minimal side effects and relatively low cost as compared to other systems of medicine. This is the reason that patients in developing countries such as Bangladesh (90%), Myanmar (85%), India (80%), Nepal (75%), Srilanka (65%) and Indonesia (60%) have strong conviction in this system. In the Asia-Pacific region, 14 countries namely Bangladesh, India, Nepal and Sri Lanka in South Asia; Indonesia, Malaysia, the Philippines, Thailand and Vietnam in Southeast Asia; China, Mongolia and South Korea in East Asia; and Fiji and Papua New Guinea in the South Pacific are actively involved in research and development of medicinal plants

(Batugal *et al.*, 2004). India is amongst the most important medicinal plant collection centers as it has about 27% of the total known medicinal plant species of the world (Kumar and Katakam, 2002). The potency of herbal plants is significant and they have negligible side effects than the synthetic antidiabetic drugs. There is increasing demand by patients to use the natural products with antidiabetic activity. In recent times there has been renewed interest in the plant remedies. Plants hold definite promises in the management of Diabetes mellitus. Isolation and identification of active constituents from these plants, preparation of standardized dose and dosage regimen can play a significant role in improving the hypoglycaemic action (Joseph and Jiinni, 2011) Across the country, 90% diversity of medicinal plants occurs in the wide range of forest types (21 forest types) and only about 10% are restricted to non-forest habitats. Particularly, the Indian Himalayan Region (IHR) supports major part of this diversity of medicinal plants is clearly evident in the records revealing 1,748 species in the region (Samant *et al.*, 1998). This is the reason that major part of the exported raw material originates from the Himalayan region (Rawat and Garg, 2005). Shawl *et al.* (2006) proposed that Oil produced under Kashmir conditions is quite competitive to best geranium oil produced in South India. Moreover the odor and evaluation studied by a leading perfumer have found that the oil is highly acceptable to the user industry.

India occupies a premier position in the use of herbal drugs utilizing nearly 2,500 plant species in different formulations. Estimated number of medicinal drug-manufacturing units in India is over 7800 which consume about 2000 tonnes of herbs annually (Ramakrishnappa, 2002). Over 500 million people of the country receive the benefits of THCS with nearly 460,000 practitioners of the system. The traditional knowledge of medicinal plant diversity and THCS are main income generating resources of underprivileged communities (Myers, 1991; Lacuna-Richman, 2002). It is interesting to know that the ancient Indians were acquainted with larger number of plants than the natives of any other country of the world. This is clearly evident by the ancient Indian treatise such as 'Materia Medica', 'Nighantus' and 'Koshas'. The documentation of traditional knowledge of medicine has gained a wide recognition due to an escalating faith in herbal medicines (Jain, 1991; Kaul *et al.*, 1995). The knowledge of herbal remedies in ethnic communities (#4,635) across the various ecosystems from Trans-Himalayas to southern tips and West-cost to four corners of the North-East part of India is very high. Kashmir Himalayas, one of the most beautiful parts of the IHR harbors a large number of medicinal plants (Singh, 1995). A perusal of literature indicates that the documentation of ethno-botany of Lidder valley (Sharma and Jamwal, 1988) Ladakh (Bhattacharyya 1989; Kaul *et al.*, 1995) Doda (Kaul *et al.*, 1994; Singh 1995) Baderwah hills (Kapur, 1995) Little Tibet (Sharma, 1995) Uri sector (Lone, 2003) Muzaffarabad (Dar, 2003) and Samahni valley (Ishtiaq *et al.*, 2006a,b, 2007) of Kashmir Himalayas has been done. However, northern region of Kashmir in spite of being great repository of medicinal plants (Dhar and Kachroo, 1983) remained unexplored in this regards. Also, there is no information available on conservation status and trade of medicinal plants of the region. Therefore, the present study was carried out (i) to document traditional knowledge and practices among rural communities; (ii) to assess conservation status of medicinal plants; and (iii) to understand market chain of medicinal plants trade in the northern region of Kashmir Himalayas.

MATERIALS AND METHODS

Description of the study area: Kashmir is one of the provinces of Jammu & Kashmir State located in the laps of Himalaya decorated with snow covered, silver-headed mountains, magical halcyon lakes and green grass lands. The study area falls under north Kashmir comprises of district

Baramulla and Kupwara lies between 33° 22' and 37° 06' N latitude and 72° 30' and 77° 03' E longitude. The climate of the area is of Mediterranean type with four distinct seasons, viz., Spring (March-May), Summer (June-August), Autumn (September-November) and Winter (December-February). The monthly mean temperature ranges from -00.3°C in January to 30.4°C in August. Geologically, the mountains enclosing the area are comprised of complex crystalline rocks such as granite, genesis and schists and sedimentary rocks such as slates, phyllites and schists with embedded lime stone.

Survey, sampling and documentation of traditional knowledge: During 2003-2004, the ethno-medicinally important six areas/sites in each district: Baramulla (Tangmerg, Yarikheh, Buniyar, Shadara, Bonakote and Wanpora) and Kupwara (Kalaroce, Khurhama, Tangdhar, Keran, Jungund and Budnamel) were selected for the study. The areas/sites were visited regularly for one year with special emphasis to the period of collection/extraction of medicinal plants during April to November. Professional herbalists (Hakeems), occasional practitioners and experienced established prescribers were approached, brought into confidence and interviewed. To avoid erroneous identification, knowledgeable persons and herbalists were taken to the forests to verify the plant samples. Questionnaire method was adopted to gather quantitative information about the medicinal plants and their utilization by the local peoples. The common name of the plant, medicinal uses and practices (mode of administration and dosages) were recorded for each claim. Each specimen having an accession number was identified with the help of local floras (Dhar and Kachroo, 1983; Sharma and Jamwal, 1998) and deposited in Herbarium section of Sheri Kashmir University of Agricultural Science and Technology, Shalimar, Srinagar (J and K). This study was carried out to fulfill the partial requirement of the degree of Master of Science by the first author.

Conservation status of medicinal plants: The valuable information regarding plant abundance, distribution and localities of their maximum availability were collected from the local people especially from plant collectors of the area. This information was confirmed with regular field visits. Keeping some parameters in to consideration, personal observations including range of extent, area of occupancy, exploitation level, plant availability, habitat alternation, conservation efforts, plant part collection techniques, threats (pollution, urbanization, lack of awareness, deforestation, etc.) were also made in the field. Based on the above, these species were categorized into Critically endangered (CR), Endangered (EN), Vulnerable (VU) and Rare (R) following IUCN criteria (IUCN, 1993). The plants which did not fall in these categories were considered as 'Secure' (S) in the study area.

Trade of medicinal plants: Collectors, Traders, Hakeems and Consumers were interviewed to understand the market chain of medicinal plants in the region

RESULTS AND DISCUSSION

Traditional uses and practices: A brief set of information including botanical name, local name, family, source of raw material, conservation status and traditional knowledge and practices (part used, mode of administration and dosages) of medicinal plants used by the inhabitants of north Kashmir is given in Table 1. A sum of eighty species (69 herbs (2 fungus), 7 shrubs and 2 trees) of medicinal plants representing 43 families and 72 genus were recorded. Lamiaceae (11 spp.), Asteraceae (9 spp.), Apiaceae (4 spp.), Rosaceae and Polygonaceae (3 spp. each) were dominant

Table 1: Traditional knowledge and practices of medicinal plants used by the inhabitants of north-Kashmir Himalaya

Botanical/Local name (Family)	Habit	W/C	Status	Indications	Part (s) used	Mode of administration	Dosages
<i>Aconitum heterophyllum</i> (Patriis (Ranunculaceae)	H	W	CR	Diarrhea, dysentery, high fever, throat swelling, vomiting, cough, stomach, abdominal pain	RS	The root is used in the form of pieces or powder or as an extract.	The extract of 2-3 mL, twice a day and twice a week.
<i>Acorus calamus</i> (Vai (Araceae)	H	W	VU	Stomach pain, diarrhea, fever, rheumatism, liver and kidney trouble, insecticide	RS	Root is used in the powdered form. A paste of the powdered is also made in ghee.	The powder of 2-5 g, twice a day with milk or hot water.
<i>Adiantum capillus-veneris</i> (Geutheer (Adiantaceae)	H	W	VU	Expectorant, hair tonic, stomach pain	WP	Paste or extract. The paste is made in ghee and is applied externally on affected parts.	The extract of 2-5 mL, once a day till recovery.
<i>Adiantum venustum</i> (Kackeyw (Filicinae)	H	W	EN	Diarrhea, digestive, stomach pain, diuretic, expectorant	F	The whole fern is crushed and extract is obtained for subsequent use.	The extract of 1-2 mL per day.
<i>Ajuga reptans</i> (Jain-i-adam (Lamiaceae)	H	W	VU	Blood purifier, fever, rheumatism, hair-tonic, abdominal pain, wounds	WP	The extract of herb and paste is used. The dried powder and ghee is mixed to make paste.	The extract of 2-4 mL mixed with sugar of 10-15 g, once a day. Paste applied externally on affected portion.
<i>Allium stoliczkae</i> / Schothach (Liliaceae)	H	W	R	Hepatitis-B, abdominal gas, stomach pain, hypertension and hypotension	WP	The plant is crushed and extract made out of it.	The extract of 2-5 mL twice a day.
<i>Althaea rosea</i> / Sazeposh (Malvaceae)	H	W,C	R	Throat swelling and infection, asthma, cough, urinary irritation	FL and RS	The dried flowers are kept closed in a tin for 10-40 days and made into a "Khambir". The root is crushed to make powder. The paste of flower also made by mixing it with ghee.	The powder of 5-10 g with milk twice a day. A half spoon of "Khambir" early in the morning once a week.
<i>Amaranthus caudatus</i> / Leesa (Amaranthaceae)	H	C	R	Expectorant, high fever	WP	The extract of leaves and inflorescence are used. The herb is used as a vegetable.	The extract of 5-6 mL early in the morning for 2-3 weeks.
<i>Anagallis arvensis</i> /Chaire seben (Primulaceae)	H	W	R	Allergy, killing of lice	WP	Extract of the herb is mixed with hee and applied for killing lice. The xtract is also used against he allergy.	The extract of 2-6 mL for snake bite 4-5 times a day for about 40 days
<i>Anaphalis nubigena</i> (Daderi Dawa (Asteraceae)	H	W	R	kin eruptions, wounds.	P	he herb is dried and crushed into powder mixed with ghee or il to make paste.	Paste is applied on affected portion externally.
<i>Angelica glauca</i> /Chorche (Apiaceae)	H	W	CR	Expectorant, dysentery, vomiting, influenza, asthma.	RS	The root is dried and made into a powder. Also used as a spice.	The powder of 10-15 g, early in the morning for 10-15 days.

Table 1: Continued

Botanical/Local name (Family)	Habit	W/C	Status	Indications	Part (s) used	Mode of administration	Dosages
<i>Aquilegia vulgaris</i> /Dadue jaid (Ranunculaceae)	H	W	VU	Used against weakness in livestock and for increasing milk yield	WP	Extract of the herb.	The extract of 5-15 mL with one liter of water once a day for two days.
<i>Arisaema jacquemontii</i> / Hapat makhe (Araceae)	H	W	R	Boils	RS	The root is dried then crushed to make powder. The powder is mixed with ghee or oil to make paste. (The plant is poisonous).	Paste is applied on affected portion externally.
<i>Arnebia benthamii</i> /Kahzaban (Boraginaceae)	H	W	CR	Diseases of tongue, throat and heart, fever	LE	The decoction of leaves is used. Also taken as an expectorant.	The extract of 1-2 mL twice a day for 7-10 days.
<i>Artemisia absinthium</i> /Teethwan (Asteraceae)	H	W	EN	Abdominal pain, chronic fever	WP	The plant is crushed and extract is obtained.	The extract of 2-7 mL early in the morning.
<i>Artemisia moerocroftiana</i> /Jangli Teethwan (Asteraceae)	H	W	EN	Abdominal pain, wormicide, high fever	WP	The extract is prepared out of the herb.	The extract of 2-7 mL twice a day.
<i>Asplenium falcatum</i> /Dade (Filicinae)	H	W	VU	Burn, expectorant, headache, sterility in women	WP	The herb is dried and crushed into powder; the powder is mixed with ghee to make the paste. The whole herb is boiled in water and then the water is used as extract.	The extract of 2-4 mL twice a day for 15-20 days. Paste is applied on affected portion.
<i>Atropa acuminata</i> /Brand (Solanaceae)	H	W	VU	Asthma, rheumatic pain, eye disease, cough	RS and LE	The root is dried and powdered and mixed with oil or ghee to make paste. The extract of leaves is also used.	The extract of half spoon twice a day till recovery. Paste is applied on affected portion externally.
<i>Berberis aristata</i> /Dandleder (Berberidaceae)	S	W	CR	Jaundices, back pain, weakness, fractures	BR	The bark of the root is dried and crushed to make powder. The powder is taken orally.	The powder of half spoon early in the morning with milk till recovery.
<i>Bergenia ligulata</i> /Pulfort/Zakhmi hayat (Saxifragaceae)	H	W	VU	Wounds, internal injury, acidity, dysentery, cough, fever, headache	RS	The root is dried and crushed to make powder. The powder and oil or ghee is mixed to make it paste.	The powder of half spoon early in the morning twice a day till recovery. Paste is applied on affected portion externally.
<i>Bunium persicum</i> /Jangli zeer (Apiaceae)	H	W	EN	Carminative, stomachic, general debility	SE	The seeds are dried in open sun then packed till used.	The seed of 5-10 g once a day.
<i>Bupleurum falcatum</i> /Bormuje (Apiaceae)	H	W	R	Hepatitis-B, abdominal pain	RS	The extract of root is prepared.	The extract of 5-7 mL thrice a day for 7-14 days.
<i>Cannabis sativa</i> /Bang or charis (Cannabinaceae)	H	W	VU	Diarrhea, cholera, rheumatism, wormicide, skin disease, narcotic	WP	The leaves are bruised and smoked by people. The leaves and stem are crushed and made into a powder, mixed with ghee to make paste and extract is also obtained from it.	The extract of 1-2 mL once a day. Paste is applied on affected portion externally.

Table 1: Continued

Botanical/Local name (Family)	Habit	W/C	Status	Indications	Part (s) used	Mode of administration	Dosages
<i>Cardamine macrophylla</i> /Pahal laish (Brassicaceae)	H	W	VU	High fever, wormicide, diuretic asthma, tumor. Also believed to restore fertility in women	WP	The extract is prepared from it.	The extract of 2-12 mL twice a day.
<i>Chenopodium botrys</i> /Kulkuli akh (Chenopodiaceae)	H	W	VU	Asthma, expectorant, stomach diseases, antihelmintic, weakness, vomiting	WP	The extract is prepared.	The extract of 2-6 mL twice a day till recovery from disease. Also taken as vegetable to cure the disease.
<i>Chenopodium umbrosum</i> /Zewa dawda kual (Chenopodiaceae)	H	W	R	Killing of lice, falling hair, headache	WP	Either the extract or paste is prepared out of the herb.	The extract or paste is rubbed on head.
<i>Cichorium intybus</i> /Saze hand/ Kaw hand (Asteraceae)	H	W	R	Rheumatic pain, high fever, internal ulcer, stomach diseases, blood purifier	WP	The whole plant is crushed and made into a powder or decoction. The leaves are also used as vegetables to women after delivery.	The extract of 1-3 mL or 5-10 g decoction once a day.
<i>Codonopsis rotundifolia</i> /Tunda jaide (Campanulaceae)	Fg	W	VU	A livestock medicine used against asthma and general weakness	WP	Extract of the herb.	The extract of 2-5 mL once day.
<i>Cuscuta reflexa</i> /Kul kuli pot (Cuscutaceae)	H	W	R	Fever, skin disease, swelling of testicles, falling of hairs, sores, headache	WP	The herb is dried and crushed into powder and mixed with ghee or oil to make paste. An extract is prepared from the crushed herb.	The extract of 1 spoon twice a day for 5-10 days. Paste is applied on affected portion externally.
<i>Datura stramonium</i> /Datur (Solanaceae)	H	W	VU	Intoxicating, asthma, teeth pain, loss of hairs and dandruff, anti-septic, narcotic	WP	The leaves and seeds are dried for making powder. The whole plant is crushed and extract is prepared, the powder is mixed with oil or ghee to make paste.	The extract of 1-2 mL or powder of 3-5 g twice a day. Paste is applied on affected portion externally.
<i>Equisetum arvense</i> /Sategandie/Gandum Gud (Equisetaceae)	H	W	R	Acidity, weakness, kidney infection, scabies, toothaches	WP	An extract is made and also used in powder.	The extract of 2-7 mL early in the morning alternately for 7-10 days. The powder is used to clean the teeth.
<i>Foeniculum vulgare</i> /Jangli bodian (Apiaceae)	H	W	EN	Disease of chest, spleen and kidney, vermicide	SE	The seeds are ground to make powder or used as such. The powder is mixed with warm water.	The extract of 6-10 mL early in the morning alternately for 10-15 days
<i>Fragaria vesca</i> /Maw kual (Rosaceae)	H	W	R	Rheumatism, General weakness	RS	The root is dried and cut into pieces.	One cup of tea once a day mostly in the morning.

Table 1: Continued

Botanical/Local name (Family)	Habit	W/C	Status	Indications	Part (s) used	Mode of administration	Dosages
<i>Geranium wallichianum</i> (Geraniaceae)	H	W	CR	Weakness, rheumatism, diarrhea, infection of throat, toothache. It is applied externally on the eyelids to remove black scars around eyelids.	RS	The root is ground or crushed and an extract prepared with warm water. The root is also made into tea.	The extract of 4-6 mL once a day or one cup of tea once a week.
<i>Hypericum perforatum</i> /Therma (Hypericaceae)	H	W	EN	General weakness, rheumatism, urinary irritation	WP	The herb is dried and crushed to make tea.	The tea of half- one cup once a day.
<i>Indigofera heterantha</i> /Zand (Papilionaceae)	S	W	VU	Toothache	ST	Brush is made out of its one year old branches.	The brush of its branch is used against tooth pain.
<i>Inula racemosa</i> /Hasub kual (Asteraceae)	H	W	CR	"Hasub" (Frequent diarrhea in children), abdominal pain	RS	An extract prepared from the roots.	The extract of 0.5-1 mL once day in alternate days till cure.
<i>Iris nepalensis</i> /Mazermund (Iridaceae)	H	C	R	Rheumatic pain, expectorant, swelling in throat	RS	The root is dried, crushed to make powder. The powder and ghee is to make paste. The root is also cut into small pieces and dried.	The powder of 0.5-1 g once a day.
<i>Lamium album</i> /Zakhmi Dawa (Lamiaceae)	H	W	R	Wounds, burns, bleeding of nose	WP	The whole plant is crushed and extract is obtained. The herb is also dried and powdered. The powder is mixed with oil to make a paste.	The extract of 0.5-1 mL twice a day. Paste is applied on affected portion externally.
<i>Lychnis coronaria</i> /Shosh gass (Caryophyllaceae)	H	W	VU	Liver and lung troubles	RS and FL	The roots and flowers are used to prepare extract.	The extract of 1-2 mL once a day for 7-10 days.
<i>Malva neglecta</i> /Sochal (Malvaceae)	H	W	R	Stomach cramps, nerve tonic, wounds, swellings, cough and ulcer, appetizer	LE	The leaves are used as vegetables. They are also made into decoction, or paste by crushing and mixing with ghee or oil. The leaves are also crushed and extract is made out of them.	The extract of 5-7 mL twice a day for 10-15 days. Paste is applied on affected portion externally.
<i>Malva sylvestris</i> /Gur sachal (Malvaceae)	H	W	VU	Stomach cramps, diarrhoea, dysentery	WP	The root is made into powder or extract of whole plant is used.	The extract of 0.5-1 mL or 1 g root powder once a day for 3-7 days.
<i>Matricaria chamomilla</i> (Fuck gass) (Asteraceae)	H	W	S	Insecticide and fungicide	WP	The whole plant is crushed or ground and extract is obtained.	The extract of 1 spoon dissolved in 10 liters of water and sprayed as an insecticide.
<i>Mentha arvensis</i> /Pudina (Lamiaceae)	H	W,C	S	Asthma, cough, rheumatism, indigestion, diarrhea	WP	An extract, decoction or paste of the herb is used.	The extract of 1-2 mL once a day for 10-20 days.
<i>Mentha longifolia</i> /Jangli pudina (Lamiaceae)	H	W	R	Fever, asthma, indigestion, appetizer	FL and LE	The extract is obtained from the herb. Leaves are eaten by people and believed to act as a carminative.	The extract of 2-3 mL once a day mostly at bed time.

Table 1: Continued

Botanical/Local name (Family)	Habit	W/C	Status	Indications	Part (s) used	Mode of administration	Dosages
<i>Morcheilla esculenta</i> /Guchi (<i>Helvellaceae</i>)	Fg	W	CR	Back pain, rheumatism, anticancer	WF	The whole fruiting body is dried in sunlight, and then crushed into powder. The powder is mixed with oil or ghee and eggs without yolk to make a paste.	The extract of 0.5-1 mL once a day for 25-60 days. Paste is rubbed over painful portion externally twice a day.
<i>Nepeta cataria</i> /Gand soi (<i>Lamiaceae</i>)	H	C	VU	High fever, worms, wounds, abdominal pain, dysentery	WP	The whole plant is crushed and extract is collected. A paste is also made from it. The leaves are chewed.	The extract of 1/2-1 glass once in fifteen days in early morning. 1-2 leaves chewed for toothache.
<i>Nymphaea stellata</i> /Bumposh (<i>Nymphaeaceae</i>)	S	W	EN	Kidney stone	FL	The extract of flowers is prepared and mixed with the root extract of <i>Arnebia benthamii</i> in warm water.	The extract of 10-15 mL twice a day mostly in the morning and at bed till recovery.
<i>Organum vulgare</i> /Baber (<i>Lamiaceae</i>)	H	W	R	Promote menstrual flow. Also used in summer for cooling effect, diuretic, fever	SE and LE	The herb is made into infusion; the oil is also prepared from it.	The extract of 1-2 mL at bed time till recovery. The extract is also used for bath after delivery.
<i>Oxalis corniculata</i> /Cheek chein (<i>Oxalidaceae</i>)	H	W	VU	Antimalarial, hepatitis B, abdominal pain, blood purifier	WP	The extract is a prepared from the herb.	The extract of 5-10 mL twice a day after meal till recovery.
<i>Parrotiopsis jacquemontiana</i> Poh (<i>Hamamelidaceae</i>)	S	W	EN	Skin infection and eruptions; general body pain	ST	The stem is pressed by hot iron and the oil is extracted from it.	The extracted oil is pasted on affected portion externally.
<i>Phytolacca acinosa</i> /Hapat chuir (<i>Phytolaccaceae</i>)	H	W	VU	Diarrhea, stomach cramps, dysentery, wounds	RS	The root is cut into small pieces and then dried.	1-2 g root powder in hot water twice a day.
<i>Plantago lanceolata</i> /Gull (<i>Plantaginaceae</i>)	H	W	R	Heart disease, cough, asthma, urinary irritation, boils, wounds	WP	Paste of the herb is used. The young leaves are used as vegetable.	The extract of 5-10 mL twice a day for 5-10 days. Paste is applied on affected portion externally.
<i>Plantago major</i> /Bud gull (<i>Plantaginaceae</i>)	H	W	R	Fever, dysentery, back pain, rheumatism, cough, urinary irritation	WP	An extract of whole herb is employed.	The extract of 5-15 mL once a day for 10-15 days.
<i>Plectranthus rugosus</i> /Solie (<i>Lamiaceae</i>)	S	W,C	R	Snake bite, insect bite, abdominal pain, ophthalmic disease	LE	Leaves are taken orally or crushed and then extract is collected and used.	The extract of 5-10 mL early in the morning for 10-20 days. Only half a drop is drawn in eyes twice a day for 3-4 days.
<i>Podophyllum hexandrum</i> /Wanwagan (<i>Podophyllaceae</i>)	H	W	EN	Acidity, diarrhea, tumor, heart abnormalities and chronic constipation	RS and FR	The juice of fruit and seed extract is used. The root is also crushed, mixed with warm water and filtered. The filtrate is then used.	The extract of 1-2 mL twice a day (early in the morning and at the bed time).
<i>Polygonum amplexicaulis</i> /Machrum chaay (<i>Polygonaceae</i>)	H	W	EN	Rheumatism, headache, whitening of tongue, high fever, coldness, stomach pain, indigestion	RS	Tea is made out of its roots or shoots.	The powder of 1-2 g with milk 10-20 days. One cup of tea daily for 7-10 days.

Table 1: Continued

Botanical/Local name (Family)	Habit	W/C	Status	Indications	Part (s) used	Mode of administration	Dosages
<i>Potemilla fruticosoides</i> /Jangli saban (Rosaceae)	H	W	VU	High fever, antibacterial, allergy	WP	Extract of whole plant is used. It is also made into a paste by mixing with ghee.	The extract of 2-3 mL twice a day for till recovery. Paste is applied on affected portion externally.
<i>Protulaca oleracea</i> /Nuneer (Protulacaceae)	H	W	R	Ulcer, liver, heart, kidney and bladder diseases, cough	WP	Taken as a vegetable. Also the juice is extracted from herb.	The extract of 2-6 mL thrice a day for 5-10 days.
<i>Prunilla vulgaris</i> /Kalyat (Lamiaceae)	H	W	R	Sore throat, diarrhea, relieving gas, frost bite, Headache, anti-neuralgic, gastric	FL and LE	The extract is obtained from the flower and leaves.	The extract of 5-10 mL twice a day. The extract is used to wash the affected part of body.
<i>Prunus persica</i> / Chachen kual/Aru (Rosaceae)	T	W,C	S	Insecticidal, vermicide, wound	LE	The leaves are used to prepare extract and paste.	The extract of 5-15 mL before meal. Paste is applied on affected portion externally.
<i>Rheum emodi</i> /Pumba chalan (Polygonaceae)	H	W	CR	Rheumatic pain, wounds	RS	The root is powdered and sometimes paste is also prepared.	The powder of 3-5 g once in week with milk. Paste is applied on affected portion externally.
<i>Robinia pseudoacacia</i> /Kekar (Papilionaceae)	T	C	S	Wounds, digestive disorders, poison	LE	The leaves are crushed and made into a paste. Sometimes juice is extracted from leaves; the leaves are poisonous to poultry.	The extract of 1-3 mL once a day. Paste is applied on affected portion externally.
<i>Rumex acetosa</i> /Albie (Polygonaceae)	H	W	VU	Chest involvement, astringent and hardness of muscles, asthma, skin disease	WP	As a vegetable in juvenile stage. The plant is dried and crushed to make powder, which is mixed with oil, or ghee to make paste, sometimes the herb is crushed and extract is obtained.	The extract of 5-10 mL twice a day. Paste is applied on affected portion externally.
<i>Salvia moercroftiana</i> /Gankual (Lamiaceae)	H	W	VU	Cough, stomach pain, deformis, wounds, chronic infection of skin, dysentery, high fever	WP	The root is dried, then crushed and made into a powder. Extract of the whole plant is also used.	The extract of 0.5-1 mL or powder of 1-3 g once a day. Paste or powder is applied on affected portion externally.
<i>Salvia sclarea</i> /Buder tunde (Lamiaceae)	H	W	VU	Wounds, burns	WP	The whole plant is crushed into a powder which is mixed with ghee or oil to make paste.	Paste is applied on affected portion externally.
<i>Sambucus wightiana</i> /Faqual (Caprifoliaceae)	S	W	R	Poliomyelitis, expectorant, diuretic	WP	The extract of root and leaves are prepared, the extract is only used for babies.	The root extract of 1-1.5 drops twice a day once a week.

Table 1: Continued

Botanical/Local name (Family)	Habit	W/C	Status	Indications	Part (s) used	Mode of administration	Dosages
<i>Saussurea costus</i> /Kuth (Asteraceae)	H	W	CR	Cough, asthma, joint pains, insecticide	RS	The extract of root is prepared. The root is also crushed and powdered.	The extract of 1-3 mL once in a day once in a week. Paste is applied on affected portion externally.
<i>Skimmia lauroloa</i> /Butputer (Rutaceae)	S	W	VU	Abdominal pain, wormicide	LE	The leaves are used to prepare the extract.	The extract of half cup for adults and 4-7 drops for children.
<i>Solanum nigrum</i> /Kumb kual (Solanaceae)	H	W	EN	Abdominal pain, narcotic, heart diseases, antiperiodic, hepatitis	WP	The seeds and leaves are crushed and decoction is made. The extract is also prepared from it.	The extract of 5-10 mL twice a day for 7-14 days.
<i>Sonchus oleraceus</i> /Dudije (Asteraceae)	H	W	R	Internal ulcer, high fever, indigestion, infection	WP	It is used as vegetable by women after delivery. In addition an extract is prepared out of the plant.	The extract of 2-5 mL once a day for 5-10 days.
<i>Sorghum halepense</i> /Durrhum (Gramineae)	H	W	S	Antidote, boils, skin infection	RS	The roots are dried and then crushed into a powder. The powder and oil or ghee is mixed to make paste.	Paste is applied on affected portion externally for 12-14 h.
<i>Stellaria media</i> /Nickhaek (Caryophyllaceae)	H	W	R	High fever, stomach pain, cough, chest involvement, diuretic	WP	The herb is used as vegetable.	Used as vegetable to cure the diseases.
<i>Taraxacum officinale</i> /Madan hand (Asteraceae)	H	W	R	Chronic cough, asthma, infection, internal ulcer, abdominal swelling, stomach cramps, acidity, urine irritation	WP	At the juvenile stage its leaves are used as vegetables. The herb is also crushed and juice extracted from it.	The extract of 2-7 mL once a day for 10-15 days. It is taken as vegetables after delivery of ladies.
<i>Thymus serpyllum</i> /Jangli javind (Lamiaceae)	H	W	EN	Skin infection, stomachic, weak vision, antiseptic, carminative cooling effect	WP	The whole herb is crushed and extract is obtained from it.	The extract of 1-3 mL early in the morning for 10-15 days. The extract is also given to pregnant ladies for safe delivery. The seed powder of 5-10 g given to cattle's for heating effect during winter.
<i>Urtica dioica</i> /Soi (Urticaceae)	H	W	R	Fever, fractures, stomach pain, wounds, dandruff, skin infection, paralyzed limbs, nose bleeding	WP	The whole herb is crushed and extract is obtained from it, sometimes the crushed herb is made into paste.	The extract of 3-5 mL twice a day for 10-15 days. The extract is mixed with water and washes the hairs. For flagellation slapping with bundles of fresh twigs for 1-2 min twice a day.
<i>Valeriana jatamansi</i> /Mushkbal/Budjeeth (Valerianaceae)	H	W	EN	Abdominal pain, wormicide, heart disease, diarrhea, dysentery	RS	Either the extract or the powder of the root is used.	The extract of 1-4 mL or 2-3 g powder with cold water for chronic abdominal diseases.

Table 1: Continued

Botanical/Local name (Family)	Habit	W/C	Status	Indications	Part (s) used	Mode of administration	Dosages
<i>Verbena officinalis</i> /Hutmool (Verbenaceae)	H	W	VU	Food poisoning, indigestion, wounds, antihelmintic, menstrual and nervous disorders	WP	The whole herb is crushed and then extract prepared.	The extract of 3-7 mL in case of food poisoning. The extract of 1-3 mL once a day for 7-10 days.
<i>Viola biflora</i> /Banfsha (Violaceae)	H	W,C	R	Asthma, cough and cold, diaphoretic, antiseptic, high fever	WP	The extract and paste is prepared from the herb.	The extract of 2-5 mL thrice a day. Paste is applied on affected portion externally.
<i>Viola odorata</i> /Numposh/Bumfsha (Violaceae)	H	W	EN	Throat infection or swelling, chest involvement	FL	The flowers and sugar are mixed in 1:3 ratios and kept in closed tin for 20-40 days. This is locally called "Khambir".	Half spoon of Khambir once a day mostly early in the morning.

Abbreviations used: W: Wild, C: Cultivated, H: Herb, S: Shrub, T: Tree, Fg: Fungus, CR: Critically Endangered, EN: Endangered, VU: Vulnerable, R: Rare, S: Secure, WP: Whole Plant, RS: Root stock, WF: Whole fruiting body, BR: Bark of roots, ST: Stem, SE: Seeds, LE: Leaves, FL: Flowers, F: Fruits and FR: Fruits

families and 29 families were monotypic. *Adiantum*, *Artemisia*, *Chenopodium*, *Malva*, *Mentha*, *Plantago*, *Salvia* and *Viola* (2 spp. each) were dominant genus. Analysis of utilization pattern of these species indicates that the whole plant (43 spp.), root stock (16 spp.), leaves (4 spp.), flowers (4 spp.), stem (2 spp.), seeds (2 spp.), bark of roots (1 spp.) and fronds (1 spp.) have been used to cure various diseases. In some diseases, plant parts (7 spp.) are used in combination. Major diseases and conditions cured by these plants include "Hasub", asthma, rheumatism, ulcer, diarrhea, poliomyelitis, chronic fever, stomach pain, abdominal pain, sterility in females, snake bite, dysentery, body swellings, boils, headache, burns, wounds, cough, allergies, eye diseases, general weakness, throat infection, etc. and some species as antiseptic, hair tonic and insecticides. The "Hasub" has been found to be the most prevalent disease among children at the age group of 1 month to 3 years old and is characterized by frequent diarrhea, with green stool. This disease is cured by 0.5-1mL extract of root of *Inula racemosa* which is taken once a day in alternate days till cure. According to local people, this disease is not cured by allopathic medicines and they are urged to resort to local herbalist. Poliomyelitis is another acute disease among the children of 2 to 5 years of age. The extract of roots and leaves of *Sambucus wightiana* are prepared and its 1-1.5 drops are given orally twice a day once a week. Likewise, asthma is the most prevalent disease among the adults which is cured by using the species like *Angelica glauca*, *Althaea rosa*, *Atropa acuminata*, *Polygonum amplexicaulis*, etc. *Morchella esculenta* is claimed to be used for back pain, rheumatism and as an anticancerous drug. The whole fruiting body of this fungus is dried in sunlight and then crushed into powder. The powder is mixed with oil or ghee and eggs without yolk to make a paste. Paste is rubbed over painful portion twice a day or 0.5-1mL of extract is taken once a day for 25-60 days. Besides above, one interesting claim for throat infection or swelling and chest congestion was recorded. In which, the flowers of *Viola odorata* and sugar are mixed in 1:3 ratios and kept in closed tin for 20-40 days. This is locally called as "Khambir". Half spoon of "Khambir" is taken once a day mostly early in the morning. Some of the these claims are very similar to that reported by Sharma and Jamwal (1988), Bhattacharyya (1989), Kaul *et al.* (1995), Singh (1995), Kapur (1995), Sharma (1995), Lone (2003) from different part of Kashmir Himalayas.

Conservation status: In recent years, the demand of Indian medicinal plants has increased considerably at national and global markets. India is second largest volume exporter of raw herbal drugs to the global market (Lange, 1997). Keeping this in view, the country has planned to increase the trade of medicinal plant extracts to 3,000 Crores by year 2005 and 10,000 Crores by year 2010 (Bhattacharya and Mittra 2002). In fact, a huge volume of raw material of medicinal plants is required to meet this goal within stipulated time. For that, wild populations of medicinal plants have been targeted which are the main source of raw materials and only a minor fraction of the requirement is met from cultivation (Dhar *et al.*, 2000). Of the total medicinal plants known worldwide, agrotechnology of about 1% and propagation protocol of <10% species is available so far (Lozoya, 1994; Khan and Khanum, 2000). The overharvesting or unsustainable manner of harvesting coupled with other biotic and abiotic factors have brought a sizeable number of medicinal plants to the brink of extinction (Nayar and Sastry, 1987, 1988, 1990) or facing various categories of threats (CAMP, 2003). The situation assumes more alarming with respect to the species endemic to Himalayan ecosystem and if lasts, they will lost from biological world itself. It is estimated that 4000 to 10,000 medicinal plant species might now be endangered at global level (Edwards, 2004). In the present study, it was noted that the majority of the species (71 species) used for medicine were collected from the wild, only 4 species from cultivation and 5 species from

the both sources (Table 1). It is a well known fact that the wild populations of medicinal plants are the main source of raw materials to the pharmaceutical industries (Ved *et al.*, 1998). Assessment of conservation status of the above medicinal plants showed 9 species viz., *Aconitum heterophyllum*, *Angelica glauca*, *Arnebia benthamii*, *Berberis aristata*, *Geranium wallichianum*, *Morchella esculantum*, *Inula racemosa*, *Saussurea costus* and *Rheum emodi* as Critically endangered, 14 Endangered, 24 Vulnerable, 28 Rare and only 5 species as Secure in the area. Except *Geranium wallichianum* and *Morchella esculantum* all these species have already been reported as threatened for Jammu and Kashmir, Himachal Pradesh and Uttarakhand (CAMP, 2003). Although, earlier these herbs were gathered especially for own consumption or by local herbalist, but due to increasing demand of raw materials at local, national and international markets, they are being indiscriminately harvested for the commercial purposes. Such malpractices prevalent throughout the Himalayan region have posed these plants at the brink of extinction (Ved *et al.*, 1998; Dhar *et al.*, 2000; Kala, 2000). It was also noted in the present study that due to absence of adequate modern healthcare facilities in the region the dependency of local inhabitants on indigenous medicine is very high.

Trade: The market sector of medicinal plants in Indian Himalaya is not well established and is generally unregulated. In the study region, local people are involved in collection and trade of medicinal plants to sustain their basic needs of livelihood. The market channel of medicinal plants trade in north Kashmir is shown in Fig. 1 which is identical to the market channel existed in Himachal Pradesh (Butola and Badola, 2008). According to local collectors and traders of medicinal plants, the demand of some species like *Aconitum heterophyllum*, *Angelica glauca*, *Podophyllum hexandrum* and *Saussurea costus* is very high but supply is low which is due to rare populations and absence of cultivation of these medicinal plants. Generally, three main stakeholders viz., collectors, traders and pharmaceutical industries, are involved in medicinal plants trade. Amongst them, the major beneficiaries are traders and pharmaceutical industries. The collectors, generally the villagers, are not aware of the end products (formulations) and huge profits earned by the traders.

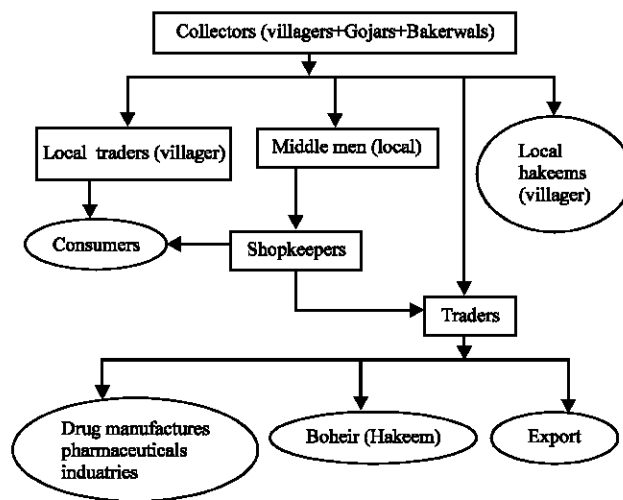


Fig. 1: Market channel and representatives involved in medicinal plant trade in North Kashmir

CONCLUSIONS AND RECOMMENDATIONS

Medicinal plants are now emerging as an important bio-resource. Earlier they have been used only by specialized herbal healers and rural communities, but now the herbal products have become the first choice of every household. Undoubtedly, their efficiency in controlling human ailments together with no side effect has brought a great recognition to these valuable species. Documentation of rare and highly efficacious claims of health care among the hill communities have been practiced by different institutions and interested individuals. Such documents are widely considered as an asset for welfare of the present and future generations. The traditional knowledge and practices of medicinal plants among rural communities of north Kashmir against different diseases like "Hasub", asthma, rheumatism, ulcer, diarrhea, poliomyelitis, chronic fever, stomach pain, abdominal pain, sterility in females, snake bite, dysentery, body swellings, boils, headache, burns, wounds, cough, allergies, eye diseases, general weakness, throat infection, etc. have great significance considering high cost and side effects of allopathic medicine. On the other hand, due to unsustainable harvesting, over harvesting, deforestation and uncontrolled grazing, medicinal plant diversity of north Kashmir is being largely threatened and many species have come under Critically endangered category. It is high time that a feasible conservation strategy and action plan should be formulated and implemented effectively in order to save this high value dwindling resource. The situation is more alarming in absence of any cultivation practices and therefore, the cultivation of these species should be promoted on priority basis. The indigenous extraction and drug formation practices recorded in the present study should be tested and standardized on scientific scale. The commercial harvesting of threatened medicinal plants should be banned, strictly. Most importantly, the native communities need to be sensitized to the sustainable use and conservation value of these species.

ACKNOWLEDGMENTS

We gratefully acknowledge SKUAST-K, Shalimar, Srinagar (J and K) for providing key facilities to manuscript preparation. Thanks are also due to local people especially to Hakeems, Traders and Forest workers for kind co-operation and providing desired information during the course of study.

REFERENCES

- Batugal, P.A., J. Kanniah, S.Y. Lee and J.T. Oliver, 2004. Medicinal Plants Research in Asia: The Framework and Project Workplans. Vol. 1, International Plant Genetic Resources Institute, Regional Office for Asia, Serdang, Selangor, Malaysia, pp: 221.
- Bhattacharya, P. and B. Mitra, 2002. The healing touch MP case study of sustainable medicinal plants conservation in JFM areas. *Wasteland News*, 17: 32-38.
- Bhattacharyya, A., 1989. Ethnobotanical observations in the Ladakh region of northern Jammu and Kashmir state, India. *Econ. Bot.*, 25: 305-308.
- Butola, J.S. and H.K. Badola, 2008. Threatened Himalayan medicinal plants and their conservation in Himachal Pradesh. *J. Trop. Med. Plant*, 9: 125-142.
- CAMP, 2003. CAMP workshop report: Conservation assessment and management prioritisation for the medicinal plants of J and K, H.P. and Uttaranchal. Workshop Report, FRLHT, Bangalore, India, pp: 206.

- Dhar, U. and P. Kachroo, 1983. *Alpine Flora of Kashmir Himalaya*. Scientific Publishers, Jodhpur, pp: 280.
- Dhar, U., R.S. Rawal and J. Upreti, 2000. Setting priorities for conservation of medicinal plants: A case study in the Indian Himalaya. *J. Biol. Conserv.*, 95: 57-65.
- Edwards, R., 2004. No remedy in sight for herbal ransack. *New Scientist*, 181: 10-11.
- Ejaz-ul-Islam Dar, M., 2003. Ethnobotanical uses of plants of lawat District Muzaffarabad, Azad Jammu and Kashmir. *Asian J. Plant Sci.*, 2: 680-682.
- IUCN, WHO and WWF, 1993. *Guidelines on the Conservation of Medicinal Plants*. IUCN., Gland, Switzerland, ISBN: 2-8317-0136-8.
- Ishtiaq, Ch. M., M.A. Khan and W. Hanif, 2006. Ethno veterinary medicinal uses of plants from Samahni valley dist. Bhimber, (Azad Kashmir) Pakistan. *Asian J. Plant Sci.*, 5: 390-396.
- Ishtiaq, Ch.M., M.A. Khan and W. Hanif, 2006. An ethnomedicinal inventory of plants used for family planning and sex diseases treatment in Samahni valley, (A.K.) Pakistan. *Pak. J. Biol. Sci.*, 9: 2546-2555.
- Ishtiaq, M., W. Hanif, M.A. Khan, M. Ashraf and A.M. Butt, 2007. An ethnomedicinal survey and documentation of important medicinal folklore food phytonims of flora of Samahni valley, (Azad Kashmir) Pakistan. *Pak. J. Biol. Sci.*, 10: 2241-2256.
- Jain, S.K., 1991. *Dictionary of Indian Folk Medicine and Ethnobotany*. Deep Publications, New Delhi.
- Joseph, B. and D. Jini, 2011. Insight into the hypoglycaemic effect of traditional indian herbs used in the treatment of diabetes. *Res. J. Med. Plant*, 5: 352-376.
- Kala, C.P., 2000. Status and conservation of rare and endangered medicinal plants in the India Trans-Himalaya. *Biol. Conserv.*, 93: 371-379.
- Kapur, S.K., 1995. Traditionally important medicinal plants of Bhaderwah hills, Jammu province. *Proceeding of the International Conference Current Programme Aromatic Plants Research, (CPAPR'95)*, Calcutta, India, pp: 103-103.
- Kaul, M.K., P.K. Sharma and V. Singh, 1994. Contribution to the ethno-botany of paradise of Doda in (J&K) State, India. *Bull. Bot. Survey India*, 33: 267-275.
- Kaul, M.K., P.K. Sharma and V. Singh, 1995. Crude Drugs of Zanskar (Ladakh) used in Amchi System of Traditional Medicine. *Glimpses of Indian Ethno Pharmacology*, India, pp: 163-172.
- Khan, I.A. and A. Khanum, 2000. *Role of Biotechnology in Medicinal and Aromatic Plants*. Ukaaz Publications, Hyderabad.
- Kumar, A.K. and A. Katakam, 2002. Credit for conservation. *Frontline*, 19: 9-22.
- Lacuna-Richman, C., 2002. The socio-economic significance of subsistence non-wood forest products in Leyte, philippines. *Environ. Conserv.*, 29: 253-262.
- Lange, D., 1997. Trade figures for botanical drugs world-wide. *Med. Plant Conserv.*, 3: 16-17.
- Lone, F.A., 2003. Folklore medicinal system of Uri sector Kashmir valley, India. *Proceeding of the 2nd World Congress on Biotechnology D evelopment of Herbal Medicine*, Feb. 20-22, India, pp: 91-91.
- Lozoya, X., 1994. *Ethnobotany and the Search of New Drugs*. John Wiley and Sons, England.
- Myers, N., 1991. The worlds forests and human population: The environmental interconnections. *Popul. Dev. Rev.*, 16: 1-15.
- Nayar, M.P. and A.R.K. Sastry, 1987. *Red Data Book of Indian Plants*. Vol. 1, Botanical Survey of India, Calcutta.

- Nayar, M.P. and A.R.K. Sastry, 1988. Red Data Book of Indian Plants. Vol. 2, Botanical Survey of India, Calcutta.
- Nayar, M.P. and A.R.K. Sastry, 1990. Red Data Book of Indian Plants. Vol. 3, Botanical Survey of India, Calcutta.
- Ramakrishnappa, K., 2002. Impact of Cultivation and Gathering of Medicinal Plants on Biodiversity: Case Studies from India. Forestry and Fisheries, FAO, Rome.
- Rawat, R.B.S. and G.P. Garg, 2005. Medicinal plants: Trade and commerce opportunities with India. *Indian For.*, 131: 275-287.
- Samant, S.S., U. Dhar and L.M.S. Palni, 1998. Medicinal Plants of Indian Himalaya: Diversity, Distribution and Potential Values. G.B. Pant Institute of Himalayan, India, pp: 163.
- Sharma, B.M. and P.S. Jamwal, 1988. Flora of upper Lidder valley. *J. Eco. Bot.*, 40: 112-116.
- Sharma, B.M. and P.S. Jamwal, 1998. Flora of Upper Lidder valleys of Kashmir Himalayas. Vol. 1, Scientific Publishers, Jodhpur, pp: 269.
- Sharma, G.K., 1995. Medicinal flora of Ladakh (Little Tibet). *Flora Faun.*, 1: 105-106.
- Shawl, A.S., T. Kumar, N. Chishti and S. Shabir, 2006. Cultivation of rose scented geranium (*Pelargonium* sp.) as a cash crop in Kashmir Valley. *Asian J. Plant Sci.*, 5: 673-675.
- Singh, V., 1995. Herbal remedies in traditional medicines of the local valley in Kashmir Himalayas, India, round progress in medicinal plants. *Ethno-Medi. Pharmacol.*, 1: 63-71.
- Ved, D.K., A. Mudappa and D. Shankar, 1998. Regulating export of endangered medicinal plant species: Need for scientific rigour. *Curr. Sci.*, 75: 341-344.
- WHO, 2002. World Health Organization Traditional Medicine Strategy 2002-2005. WHO, Geneva, pp: 11.