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Ethnobotanical Studies of Nubra Valley - A Cold Arid Zone of Himalaya

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Abstract

An attempt has been made to explore traditional medicinal knowledge of Nubra valley, the cold arid zone of Himalaya. Ethnobotanical information were gathered through several visits, group discussions and cross checked with local medicine men. The study identified 65 plant species belonging to 30 families have been used to cure various diseases and ailments. Maximum number of species was recorded to be used in kidney complaints (14 spp.), cold & cough (13 spp.) and fever (11 spp.). Leaves of 27 species; whole plant extract of 20 species and root/bulb of 19 species were mostly used. Juice, raw items, paste and decoction of plant species were the common method of usage. A large number of ethnic groups with varied culture inhabiting the remote and isolated valleys of Ladakh offer a great scope for ethnobotanical studies. Over exploitation of medicinal herbs can lead to the local extinction of the valuable herbs indicating an urgent need to draw up the necessary plans for medicinal plant utilization and conservation.

Key words: Ethnobotany; Nubra valley; Ladakh; Trans-himalayas; Amchi system.

Introduction

Traditional medicine has long history of serving people all over the world. The use of plants as medicine goes back to early man. Ethnobotany is a multidisciplinary science that deals with direct relationship between man and plants. The use of plants in curing and healing is as old as man himself

(Hedberg, 1987). Plants containing beneficial and medicinal properties have been known and used in some form or other, even by primitive people. So far, most of ethnobotanical studies have been conducted in the lower Himalayan zones. However, the cold arid areas lying in the Indian Trans-Himalaya with respect to Nubra valley of Ladakh have not received adequate attention.

Human societies living in the high-altitude areas have remained isolated due to poor accessibility and harsh climatic and geographical conditions over the centuries, this isolation has shaped their unique art, culture and traditions of therapy (Uniyal *et al*., 1973). The system of traditional medicine in Ladakh known as 'Amchi system of medicine', is an adaptation of Tibetan traditional medicine (Kala, 2005). A large number of ethnic groups with varied culture inhabiting the remote and isolated valleys of Ladakh offer a great scope for ethnobotanical studies. Over exploitation of medicinal herbs can lead to the local extinction of the valuable herbs. Therefore, there has been an urgent need to drew up the necessary plans for medicinal plant utilization and conservation (Kala, 2005).

Joshi (2000 and 2004) studied ethno botanical observations of Nepal Himalayas and reported dependency of locals on medicinal plants. The flora of cold desert areas and their ethnobotanical importance were studied earlier by several authors (Aswal and Mehrotra, 1987; Jain, 1991 and Kaul, 1997). They focused on plant diversity, its documentation and scattered ethnobotanical uses by the tribal communities. Keeping in view the rich ethno-medicinal wealth of Nubra valley, Defence Institute of High Altitude Research, an establishment of Defence Research and Development Organisation (DRDO) has carried out extensive survey with the help of local tribals and Amchis.

Study Area

The Nubra valley in Ladakh comprises the valley of Shyok river from its acute-angled bend down to its confluence with Nubra and further towards Indus. It is northern most valley of Ladakh. Khardung La pass (18,380 ft) is the gate way of the valley and it includes Siachin glacier. The area lies between two great mountain ranges, i.e. Ladakh (on the south) and Karakoram (on the north). Approximately, 34^0 15' 45 to 35^0 30' N latitude and 76^0 55' to 78^0 05' E longitude. The topography of the valley is entirely different from other valleys of Ladakh. There is a great variation in altitude and ranges approximately between 8000 ft to 24000 ft mean sea level. The climate of the region is extreme cold desert and characterized by high wind velocity continues throughout the year causes great variation in temperatures. Winter temperatures go below zero (minimum -25^0 C) and summers as high as 38^0 C. Precipitation is scanty with less than 80 mm per annum. The valley remains cut off from other parts of country during winter months due to extreme weather conditions.

Materials and Methods

The present information on the 65 medicinal plants used by the local people of Nubra valley has been collected during 2006-2008. Two to three attempts were undertaken in each village for the interview and discussion with the local medicine man to gather maximum information of the plants used in the local medicine. The information was further verified by crosschecking and validated by the common response from all villages on same species treatment. The plants were identified comparing with authentic specimens at Defence Institute of High Altitude Research (DIHAR), Leh. All the recorded plants have been documented in the paper along with their scientific and local names, useful parts, use and mode of administration. The methods adopted for investigation are those of Schultes (1962) and Jain (1984).

Results and discussion

Medicinal uses of different plants have been recorded in numerous literatures standing since ages (Kirtikar and Basu, 1984). It is evident that many valuable herbal drugs have been discovered by knowing that particular plant was used by the ancient folk healers for the treatment of some kind of ailment (Ekka & Dixit, 2007). In the present report, sixty five plant species belonging to 30 families are listed in alphabetical order by their scientific names along with their family name; followed by vernacular names; and uses.

Of total 65 species of ethnomedicinal plants, 14 species have the medicinal property against kidney complaints followed by 13 plants for curing cold and cough. 11 species are being used in treating fever and decoction of 7 species is used to treat respiratory problems like asthma and bronchitis etc. Other plants of ethnomedicinal importance occurring in the Nubra valley have the property for curing wide range of diseases and disorders related to digestive system, liver ailments, blood purification, antibacterial, rheumatism, diseases of ear and teeth etc. All the observations of ethnobotanical uses of plants are listed in table-1.

The Amchi's (medicine men) are still looking after more than 60% public health of tribal communities (Chaurasia and Singh, 1996-2001) and they are totally depend upon natural resources for collection of plants and their parts (Kala, 2005). Traditional and indigenous system of medicine persists in all over the world (Kalita and Bikash, 2004). The present investigation has highlighted the therapeutic value of some Trans-Himalayan plant species to cure cold, cough, fever, stomach problems, kidney disorders, urinogenital complaints, skin diseases, diarrhoea, nausea, problems in menstrual cycle etc.

Majority of above enlisted plants belong to rare, endangered and threatened category (RET) due to fragile ecosystems of Ladakh Himalayas (Kala, 1999). The medicinal plants used in the local health traditions are gradually becoming extinct due to developmental activities, population explosion and

other anthropogenic reasons (Kala and Manjrekar, 1999). In order to reverse this trend, domestication of wild medicinal plants is of utmost importance. New approaches of biotechnology and conservation strategy can help pressure and utilize the indigenous knowledge of medicinal plants for human kind (Uniyal and Shiva, 2005).

Table 1. Ethnobotanical observations of Nubra Valley.

Botanical Name	**Family Name**	**Local Name**	**Ethnobotanical Uses**
Acantholimon lycopodioides (Girard) Boiss.	Plumbaginaceae	Longze	Leaf is useful in cardiac disorders
Achillea millefolium Linn.	Asteraceae		Leaf past directly applied on treatment of wounds.
Aconitum heterophyllum Wall. ex Royle	Rananculaceae	Buma, Kerpopoma	Root is astringent, febrifuge, aphrodisiac and used to stop menstrual cycle.
Aconitum violaceum Jacq. ex Stapf.	Rananculaceae	Yangtso	Root is used to come down cough, high fever and other stomach problems.
Actinocarya tibetica Benth.	Boraginaceae		Decoction of root intakes in case of fever
Allium przewalskianum Regel.	Amarylidaceae	Skotche	Leaf decoction is used against stomach complaints.
Anaphalis cuneifolia Hk. f.	Asteraceae	Simula	Plant extract is applied to cure skin diseases
Androsace mucronifolia Watt.	Primulaceae	Zigsolo	Whole plant is used to control abdominal pains
Arabidopsis wallichii (Hk. F. & Th.).N. Busch.	Boraginaceae	Imatso.	Leaf decoction is used as appetizer.
Arabis glandulosa Kar.& Kir.	Brassicaceae	Umnako	All parts used in lowering diarrhea
Arnebia euchroma (Royle) John.	Boraginaceae	Demock	Leaf is used to control cough and improve hair growth

Artemisia dracunculus Linn.	Asteraceae	Burtse	Leaves are made into paste and applied to treat wounds on the legs of Donkeys and Yaks. Extraction of whole plant is used to control menstrual cycle, to relief toothache, against intestinal worms and also used as anti diuretic agent.
Astragalus subulatus Pallas	Fabaceae	Rungentso	The extract of root is used as purify blood.
Astragalus tribulifolius Benth.	Fabaceae	Yanglo	Whole plant is used as diuretic agent and to lower kidney disorders; Root extract purifies blood.
Berberis ulcina Hk. f. & Th.	Berberidaceae	Shinnar	Stem bark is used to cure arthritis, cough, fever and ring worm infections; Root extract is used against skin diseases; Fruits are eaten as laxative.
Berberis zabeliana Schn.	Berberidaceae	Shinnar	Root and leaf extractions are used to control fever and dysentery respectively.
Biebersteinia odora Steph. ex Fish.	Geraniaceae		Root stock is used as antiseptic, blood purifier and controller of urinogenital disorders.
Bunium persicum (Boiss) Fedtsch.	Apiaceae		Fruit is used as remedy for abdominal and colic pains.
Carum curvi Linn.	Apiaceae	Kosnyot.	Root is antispasmodic, carminative and promotes one set of menstruation.

Cichorium intybus Linn.	Asteraceae		Whole plant is anti rheumatic and controls high fever.
Corydalis rutifolia (Smith) DC.	Papaveraceae	Chimlo	Plant paste is applied in skin diseases; Root is used in against ophthalmic diseases
Cuscuta approximata Babington	Cuscutaceae		Extract of whole plant is applied in treating warts and sores
Dactylorhiza hatagirea (D. Don) Soo.	Orchidaceae	Sanchu	Root controls kidney disorders, skin disorders, wounds, asthma; increases vitality, vigour and restoring regenerative fluids.
Dracocephalum heterophyllum Benth.	Lamiaceae		Whole plant is used to control cough and headache
Dracocephalum stamineum Kar. & Kir	Lamiaceae	Ghiromanko	Whole plant is used to control cough, cold and headache.
Ephedra gerardiana Wall. ex Stapf.	Ephedraceae	Cheldymb, Chhapat, Asmania	Leaf used as blood purifier, cardiac stimulant, anti rheumatic; and lower cough, asthma (bronchial), liver disorders, fever. Given donkeys in case of cough.
Galium serpylloides Royle ex Hk. F.	Rubiaceae	Pemantso	Leaf is diuretic, purgative and controls kidney disorders; Whole plant heals local injuries.
Gentiana carinata (D.Don) Griseb.	Gentianaceae		Whole plant heals local injuries and controls stomach disorders.

Gentianella moorcroftiana (Wall. ex G. Don) Airy Shah	Gentianaceae	Chhumbitikt	Flower and leaves are used in backache, headache; Leaf extract is used in treating fever, cough and acidity.
Geranium sibiricum Linn.	Gentianaceae	Eyamlomentok.	Leaf and root paste is applies as antidandruff. Leaf extract is used in treating diarrhea.
Geranium wallichianum D. Don ex Sweet	Gentianaceae		Whole plant is used to control stomachache, cough, cold and throat infections.
Herminium monorchis (Linn.) R. Br.	Orchidaceae	Paliksket	Bulb is used in kidney disorders and anti septic
Hippophae rhamnoides var. turkestanica Rousi	Elaegnaceae	Sermang	Fruit juiced is used as multivitamin source tonic, especially for Vitamin ‘C’.
Hippophae salicifolia D. Don.	Elaegnaceae	Sermang.	Fruit used in cold, cough and lung complaints.
Hyoscyamus niger Linn.	Solanaceae	Gyelamtag	Leaves are narcotic, mydiatric and also used in nervous diseases
Inula rhizocephala Shrenk	Asteraceae	Riamko	Whole plant is used in cold, cough and chest complaints
Juglans regia Linn.	Juglandaceae	Starga	Decoction of leaves is given in case of itch; Leaf and fruit are used in rheumatism and cleaning toothache.
Juniperus recurva Buch-Ham. ex. Don.	Cupressaceae	Sukpa	Leaf decoction intakes to lower fever especially to children.

Jurinea ceratocarpa (Decne.) Benth. ex Clarke	Asteraceae	Turjit, Chholmong	Leaf extract is applied to cure wounds, joint pains, kidney disorders, intestinal complaints; purify blood; lower B.P, lung T.B, constipation, respiratory problems like asthma and bronchitis.
Lancea tibetica Hk. f. & T.	Scrophulariaceae	Raikse	Plant juice is used as tonic.
Lloydia serotina (L.) Rchb.	Liliaceae	Kngkar	Bulb is used as blood purifier.
Lycium ruthenicum Murr. ex Dunal	Solanaceae	Umila	Leaf is used as diuretic agent.
Meconopsis aculeata Royle.	*(*Papaveraceae	Achatsarmum	Leaves are ground and paste applied to treat the swelling of legs due to long walk.
Mentha longifolia (L.) Huds.	Lamiaceae	Phololing	Dried leaves are used to treat abdominal pains, stimulant, diuretic, headache and rheumatism.
Myricaria germanica (Linn.) Desv.	Tamaricaceae	Umbo	Leaf controls chronic bronchitis.
Nepeta discolor Royle. ex Benth.	Lamiaceae	Nyomalo	Leaf is used to lower cold, cough and eye conjunctivitis.
Nepeta glutinosa Benth.	Lamiaceae	Gimaanko, Jatukpa	Decoction of leaves intakes to lower diarrhoea, pneumonia and fever.
Nepeta longibracteata Benth.	Lamiaceae		Whole plant is used in stomach disorders.
Paracaryum thomsonii Clarke ex Hk.f.	Boraginaceae	Phenan.	Leaf is diuretic and anti-helminthic.

Peganum harmala Linn.	Rubiaceae	Sepan.	Stem is abortificient, narcotic, aphrodisiac; seeds are used against the complaints of asthma, fever and rheumatic pains.
Perovskia abrotanoides Karelin.	Lamiaceae		Plant extract controls cough and headache.
Physochlaena praelata (Walp.) Miers	Solanaceae	Langthang	Leaf is used as vermifuge and controls ulcer
Plantago depressa Willd.	Plantaginaceae	Ramboosuk.	Whole plant is used in control stomach disorders, dysentery and gastritis.
Potentilla fulgens Wall	Rosaceae		Leaf paste is used in curing stomachache, cough cold, sore throat and ulcer.
Rheum spiciforme Royle.	Polygonaceae		Root paste is applied on swellings, wounds, chronic bronchitis, piles and as purgative.
Rheum webbianum Royle.	Polygonaceae	Lacchu	Leaf is useful in control piles, chronic bronchitis; Root used as purgative, stringent and laxative.
Salix alba Linn.	Salicaceae	Mulchang	Newly sprouted leaves are used to treat fever.
Saussurea bracteata Decne	Asteraceae	Phansi	Whole plant is used in cough and cold.
Saussurea gnaphalodes (Royle) Sch-Bip.	Asteraceae	Yuliang.	Root is used to treated pains especially arthritis.
Saussurea obvallata (DC.) Edgew.	Asteraceae		Root paste is applied on cuts and bruises.
Saxifraga oppositifolia Linn.	Saxifragaceae	Sasomantso	Plant juice is used as tonic.

Solanum nigrum Linn.	Solanaceae	Tsigma	Seed paste is applied in face as UV protectant.
Tanacetum fruticosum Ledeb	Asteraceae		Leaf is used as antispasmodic, carminative and antipyretic.
Taraxacum officinale Wigg.	Asteraceae	Han	Leaf extract is used against kidney complaints, liver and skin disorders; Root powder cures backache, high fiver, stomachache; also using as diuretic and hepatic stimulant.
Waldheimia glabra (Decne.) Regel.	Asteraceae		Paste of whole plant is applied over wounds as antiseptic

Conclusion

The ethno-medico-botanical survey of the area revealed that the people of the area are possessing good knowledge of herbal drug but, as the people of the societies are in progressive exposure to modernization; their knowledge of traditional uses of plants may be lost in due course. So it is important to study and record the uses of the plant by different tribe and sub tribe for future study. Such studies may also provide some information to phyto-chemists and pharmacologists in screening of individual species in rapid accessing of phyto constituents. Farmers should be involved in the cultivation of medicinal plants at least in their barren and fallow land; this would augment their income and in turn help in the conservation of the species. Appropriate research should be carried out in institutions in the hills to develop agro-techniques for the cultivation of medicinal plants on priority basis.

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