*Int.J.Curr.Microbiol.App.Sci* (2019) *8*(1): 829-837

*International Journal of Current Microbiology and Applied Sciences*
***ISSN: 2319-7706* Volume 8 Number 01 (2019)**
Journal homepage: http://www.ijcmas.com

**Original Research Article** https://doi.org/10.20546/ijcmas.2019.801.090

# Medicinal Plants Biodiversity of some Selected Villages of Zanskar Valley (Ladakh region)

**Tsering Lamo, Tashi Stobgais, Padma Gurmet, Tsewang Dolma, Sonam Dawa*, Tsering Angdus and Thinles Chosdup**

*National Research Institute for Sowa-Rigpa Leh Ladakh, Ministry of AYUSH, India*

**Corresponding author*

**Keywords**

Sowa rigpa, Amchi (traditional docter), Trans-Himalaya, Medicinal plants, Cultivation

**Article Info**

***Accepted:***
07 December 2018
***Available Online:***
10 January 2019

**A B S T R A C T**

The paper deals with the ethno-botanical studies of medicinal plants of some selected Zanskar valleys covering four villages Rangdum, Padum, Muney and Raru. Zanskar is one of the remote, under developed, hilly region and least populated valley of Ladakh. Because of its cold climatic condition and in accessibilities, the valley is cut off from rest of the world most of the time. Though the valley looks barren and lifeless still it represents a treasure house of diversity of plants with high medicinal, aromatic value and other useful properties like food, fodder, fuel and ritual purposes. Predominant species of these area are: *Meconopsis aculeate*, *Rhodiola tibetica*, *Rheum australe*, *Epilobium lantifolium*, *Artemisia dracanculus*. These medicinal plants listed below are highly used to prepare medicine for curing various diseases in Sowa rigpa. Sowa rigpa, a Tibetan system of medicine practicing by the people of trans-Himalayan region from long years ago. Raw material of indigenous species is used for preparation of medicine. People have strong belief and faith on Tibetan system of medicine therefore we need to develop it for the present and future generation. Paper enumerated 22 medicinal plants alphabetically along with detail information which belongs to different families and genera's. Conservation and cultivation of these medicinal plants are important for sustainable use because due to the unaware exploitation by locals, anthropogenic activities, overgrazing, etc may leads to the extinction of these rare species of medicinal plants. Other reason for the rarity of species may be change in climate and environmental pollution. With the rise in demand of herbal medicines globally, conservation and cultivation of medicinal plants becomes great significance for the farmer's and in turn improve their income generation.

## Introduction

Ladakh, the land of high passes is located in the northern part India (J&K state), covers 70,000 sq km$^2$ geographical area of the state which lies between 31$^o$44' 57''- 32$^o$ 59' 57''N latitude and 76$^o$ 46' 29''-8$^o$ 41' 34'' E longitude (Hamid and Raina, 2014). Zanskar lies to the north of main Himalaya lies between 11000ft to 14000ft of altitude with huge diversity of plants. The Indian trans-Himalaya covers 186,000 km$^2$ above natural tree line zone with sparsely distributed vegetation (Chaurasia and Gurmet, 2003). The

flora of Himalaya comes under alpine and subalpine zone and due to its unique climate condition plants are sparsely distributed, dominated by herbs, shrubs, grasses and bushes. The mountain slopes and barren land display a magnificient view of flowers of the region.

The entire Ladakh is categorised into five valleys namely, Indus, Nubra, Changthang, Suru and Zanskar (Kaul, 1997). And this paper deals with ethno-botanical study of Zanskar valley, Zanskar is one of the beautiful valley of Ladakh located in west. Ethnobotany is the study of interaction between people and plant with emphasis on traditional tribal culture (Mefsin *et al*., 2013). The valley is separated from rest part of the Ladakh with high mountain bounding the valley from all direction and Zanskar river. As we enter the Zanskar valley, there comes a mountain pass called Penzi La with 14450 ft, after crossing this pass the different villages of Zanskar valley visible one by one. The important villages with rich medicinal plants are Rangdum, Padum, Bardan and Raru. People of Zanskar valley depend on Amchi system of medicine (a traditional healer), during earlier period it was the only health care system but later allopathic medical system came into picture after the independence of India (Chaurasia *et al*., 2007) (Fig. 1).

## The people of Zanskar

The valley is inhabited by two tribe in Zanskar Bot tribe and Muslim tribe; mostly there is Bot tribe which are Buddhist community. Most of the people are illiterate and their main sources of income are animal rearing and agriculture. Food habit is generally both vegetarian and non vegetarian. There is a small patch of agricultural farm where they grow wheat, barley and pea. They grow vegetables in the garden for their own purpose.

## Climate condition of Zanskar valley

The valley comes under one of the extreme cold and hot climate condition where summer season is very short with high radiation, low precipitation, low humidity and winter season is long with the temperature below –27° result in heavy snowfall**.** Therefore, due to the harsh climate condition the valley is cut off from rest of the world by the huge mountain passes and that's why people of this valley have to rely upon their own traditional method of living where people store the vegetables grown during summer season (Gurmet *et al*., 2000). Due to the side effect and high cost of modern medicine people are mainly depend on traditional system of medicine. The rich diversity of medicinal plants is due to peculiar temperature and type of soil of Zanskar valley.

## Sowa-Ripa (The Himalayan art of healing)

Sowa-rigpa derived from Mongolian word "Am-rjay" means superior of all, commonly known as Amchi or Tibetan system of medicine and the practitioner of it is called Amchi. Since long years ago people have so much faith, trust and respect on traditional or Amchi system of medicine and this system of medicine is also very well known in Tibet, Mongolia, Bhutan, China, Nepal, Bhuriat Republic of Russia and Himalaya region of Himachal Pradesh and Sikkim in India (Wabe *et al*., 2011). It was the only healing method during the earlier time, later with much progress and development allopathic medicine was came. Every village have an Amchi, it takes several years to become a skillful Amchi. Earlier, it was knowledge passes from father to son now it can be practise by all. Amchis never ask for cost and services, it all depends on the people to present something beside's money like earlier time people offer wheat, barley or help the Amchi family during the time of harvesting the crops, etc (Gurmet, 2004). Rgyud-bzi, a fundamental text book of

sowa rigpa believed to taught by Buddha outlines a vast knowledge of medicine, basic principle of health and disease, method of diagnose disease and therapeutic approaches. The basic theory of sowa rigpa is based on the principles of Jung-wa-lna (English- five elements, Sanskrit ─ Panch-mahabhuta) and Nespa gsum (English ─ three humours, Sanskrit ─ Tri-dosh) (Yuthog 2008). All the medicine either in powder form or capsules are made up of 3 to 40 ingredients. Stan Gyur, a Buddism text book contain various aspects of medicine and treatment of many incurable disease (Phunstog, 2006).

## Study area

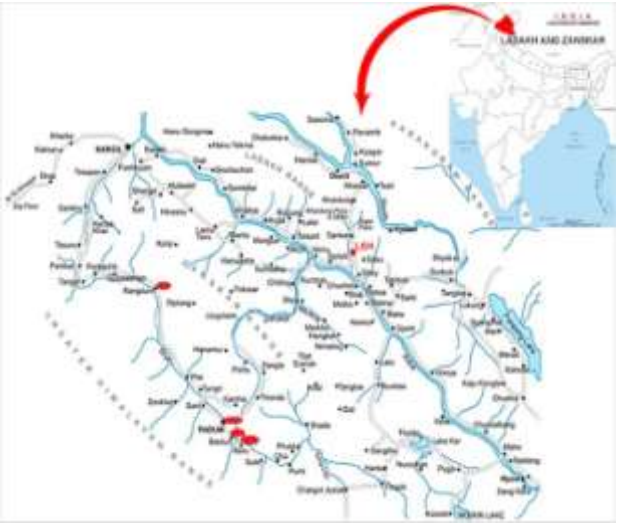

**Fig.1** Map of Zanskar valley showing the study area

## Materials and Methods

The survey is basically done with the aim to identify medicinal plants, to collect medicinal plants for documentation and herbarium preparation. Due to short growing season survey can carried out only during the summer season because it is very cold during winter.

The villages have been surveyed through rocky mountains, pastured land, wetlands, crossing the passes and agriculture land. Around 60 medicinal plants were collected out of which 22 were selected for present study. Plant specimens collected from the area were dried, pressed and kept in a herbarium sheet. Herbarium were made for all the plants and kept in National Research Institute for Sowa-rigpa, Leh. With the help of traditional healers uses of plants was documented. The botanical plant specimens were identified with the help of flora and literary survey. The essential medicinal plants used in Sowa-rigpa were given below in alphabetical order along with botanical name, family, local name, habitat, characteristic feature and Sorig uses.

## Results and Discussion

It is represented in table 1.

In conclusion since, Zanskar is one of the hotspot for medicinal plants and there is high risk of extinction of those medicinal plants due to lack of knowledge, over collection by traditional healer and researcher, unscientific exploration, uprooting for fuel, overgrazing and other activities. There are natural enemies also like pathogen, herbivores and predator (Kala *et al*., 2006).

Cultivation of medicinal plants can provide income for the people living in the remote area. It is therefore becomes important to conserve and cultivate those medicinal plants for future generation.

To cultivate medicinal plants, plant material should be of good quality, rich in active ingredients, pest and disease resistant and environment tolerant. Cultivation can be done either by *ex-situ* or *in-situ* method. Appropriate agro-techniques, awareness among interested farmer's, supportive government policies, protectable cultivation practise, and assured market are the key factors for successful medicinal plants cultivation.

**Table.1** Enumerations

| Botanical name | Sowa-rigpa name | Family | Habitat | Botanical feature | Part use | Sowa-rigpa uses |
|---|---|---|---|---|---|---|
| ***Arnebia euchroma* (Royle.) John. I. M Johnston.** | Demok, (‘bri-mog) | Boraginaceae | dry rocky slopes of Zanskar | A tufted, perennial herb. Stout rootstock. Stem erect, smooth, many arising from rootstock. Leaves sessile, alternate, pinnatisect, exstipulate, leaf outline lanceolate, leaf margin ciliate, leaf apex truncate and leaf base cuneate. Infloresence racemose. Flower blackish purple. | Root | It treats lungs and pulmonary diseases, blood disorder, nose bleeding, impure blood, hair losses,etc. |
| ***Astragalus rhizanthus* Royle ex Benth.** | (srad-ser) | Fabaceae | On open stony slopes of Zanskar valley | Stemless, perennial herb, densely covered with silky hairs. Leaves pinnate, pressed to the ground and radiating from the centre, imparipinnately compound, oblong, pilose beneath. Flowers bright yellow in dense stalkless at the centre, aggregate at the base. | leaves, stem, flower and fruit | It treats fever of nerve, fever of wounds, bleeding, high altitude sickness and weakness, etc. |
| ***Artemisia dracanculus* Linn. A.glauca ex Wild** | (Tshar-bong) | Asteraceae | on wastelands of Zanskar | An erect, strong perennial herb. Stem grooved, smooth. Leaves entire, linear-oblong, acute. Flower heads globular, short-stalk, forming long axillary raceme. Involucral bracts glacous with papery margin | all parts above ground | It treats pharyngitis, pulmonary diseases and swelling due to hot disorders etc. |
| ***Calvatia cyathiformis* (Bosc.) Morg** | (Pha-wa-sGo-go) | Lycoperdaceae | grassy area | a smooth, spherical, white at young and brown at maturity. As it reach the reproductive stage the exterior part shrunk and the spores will disperse, After the spores becomes disperse there left only a leathery cup shaped structure rooted at the ground. | Spores | The powder enclosed in this mushroom can be applied directly on the affected part to assist blood clotting and to heal ruptured capillaries and wounds. It is also mixed with water for external application against |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | burns. It can be formulated with other ingredient to treat snake poison and also used in preparing ink. |
| **Corydalis govaniana Wall.** | (sKra-bZang) | Papaveraceae | Forest area and moist places and humid condition | stout branched, annual herb. Rootstock woody often branched covered with leaf bases of old leaves. Leaves many, oblong, and 2-pinnatisect. Flowers many, dense, yellow in dense cluster. | all parts above ground. | It treats excessive impure blood, fever of blood, liver and gall bladder, pain due to hot disorders. |
| ***Delphinium cashmirianum* Royle.** | (cha-rKang) | Ranunculaceae | Snow melted alpine slopes | an erect, gladrous, perennial herb. Stem hispidaly hairy, branched, few leaves. Leaves deeply dissected, palmate with cuneate-ovate. Flower bluish-purple with short spur in terminal racemes, long stalk. | all parts above ground. | It treats dysentery, diarrhea with bleeding, inflammation wounds, lumph fluids etc. |
| ***Dianthus anatolicus* Boiss** | (sukpa-rigs) | Caryophyllaceae | dry places | A small, slender, densely tufted, perennial herb. Stem 6-10 inches. Leaves small, narrow, midrib and margin thick. Flowers rosy. Corolla toothed, blade small, broad, crenate toothed. | all parts above ground. | leaves use against stomach problem |
| ***Epilobium lantifolium* Linn.** | (charpan-chutsi) | Onagraceae | Damp places | An erect, leafy, perennial herb. Stem branched, glabrous, often spreading. Leaves narrowed above and below, oblong, elliptic, pubescent. Flower purplish pink in a spike like terminal cluster. Calyx lobes broad lanceolate, long pointed, free at base. Petals 4, rounded, short stalk. Capsule long and pubescent. | Above ground | Every part of this plant is edible. |
| ***Ephedra gerardiana* Wall.ex. Stapf.** | (mTshe-lDum) | Ephedraceae | stony dry area of | A low growing tufted shrub. Stem erect, tufted, branched. Branches | Fruit and stem | It treats various kinds of bleeding, spleenic diseases, |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | Zanskar | scaly on joints. Male cones ovate, solitary. Female cones solitary. Fruits ovoid, red, fleshy bracts. Seed two, black. | | hepatic diseases, new and chronic fever, wounds, tumuors, discomfort of breathing, cough, sweating, urine obstruction, physical exhaustion etc. |
| ***Gentianella moorcroftiana* (Wall. ex Griseb) Airy Shaw** | (Spang gain karpo) | Gentianaceae | Open slopes and moist places. | A slender, erect, annual herb. Stem erect, branched from the base. Leaves lanceolate or oblong, elliptic, narrowed below. Flowers blue to white, solitary in terminal or axillary raceme, long pedicillate, tubular to funnel shaped. | all parts above ground. | antitoxin and febrifuge. |
| ***Meconopsis aculeate* Royle.** | (Tsher-sNgon) | Papaveraceae | Rare on damp slopes | delicate perennial herb. Long stem with bristle hair. Leaves pinnatisect, bristly hair. Flower usually blue, borne on long stock. Petal usually rounded to obovate. Numerous yellow stamen. Capsule oblong, prickly. | all parts above ground. | It treats bone fractured, bones fever, head injured, wounds and strengthen bone marrow etc. |
| ***Melilotus officinalis* Linnn.** | (rGya-sPos-dMan-pa) | Fabaceae | wet places. | An erect, biennial herb. Stem slender, branched, glabrous. Leaves 3 pinnate, toothed, trifoliate, leaflet obovate, oblong. Flowers yellow in lax raceme, dense, shortly stalked bracteates. Corolla yellow, odorous, usually 3 times long as calyx. | all parts above ground. | It treats fever associated with poison, severe bacterial diseases, chronic fever, swelling, splenic cramps, diphtheria, microbial diseases, limbs puses etc. |
| ***Oxyria digyna* (Linn.) Hill.** | (Lug-sho) | Polygonaceae | Moist places | A fleshy acid flavoured, glabrous, succulent, perennial herb. Stem usually unbranched, reddish and hairless. Basal leaves fleshy, numerous, round to reniform, long petiolated with dichotomous venation. Flower minute, pink or green. | flower and stem. | It treats wound infectious and pimples etc. |
| ***Pleurospermum*** | (rtsad-rgod) | Apiaceae | On moist | A stout, perennial plant. Stem hollow, | fruit | It treats all kinds of poison like |

| | | | | | | |
|---|---|---|---|---|---|---|
| ***candollii* (DC.) Benth ex Clarke** | | | slopes | usually very thick. Base of the stem covered with persistent old leaf base. Leaves in basal rosette, pinnate, with sheathing leaf base, leaflet broad wedge shape to broad ovate, usually 3 lobed and toothed. Flower white borne in a solitary terminal compound umbel. Fruits oblong with narrow wings. | | green poison, meat poison, fragrance poison, gemstones poison and transmitted poison, heals all type of fever, maintain body, constipation, pain and amenorrhoea, etc. |
| ***Rhodiola tibetica* (Hk.f. & T.) Fu** | (Sro-lo-dmar-po) | Crassulaceae | common on moist alpine places | An erect, perennial herb. Stem fleshy, pubescent, green. Leaves fleshy, lanceolate, green. Flower reddish, stalkless, bractless, in a dense domed cluster | All parts above ground | It heals lungs disorder, fever of the lungs, asthma, any type of mouth-disorders, infectious cough and especially for body tonic etc. |
| ***Rheum australe* D. Don Syn. (*R.emodi* Wall. ex Meisser)** | (Chhu-rTsa) | Polygonaceae | Open slopes, alpine grassland | Perennial with stout stem. Leaves rounded to broadly ovate blade, basal leaves are very large, reddish brown at maturity. Rootstock stout. | root, leaves and trunk also use sometime | It treats bone fracture, indigestion, bloated stomach, cancers, severe bacterial disease tumours,dermatological disorders, wounds, internal wounds, fever of gall bladder and amenorrhoea etc. Also used for colouring wool and as fixative. Petioles are used as anthelmintic, and ingastritis and swellings. Also used as pickle. |
| ***Saussurea obvallata* (DC) Edgew** | (gZah-dug-nag-po) | Asteraceae | Grassy area. | An erect, robust, perennial herb with stout stem. Leaves amplexicaul, toothed, lower and upper leaf sessile, arcuate venation. Flower head purple in dense umble like cluster surrounded by large pale yellow boat shaped pappery bracts. | All parts is used | It treats evil spirits diseases, planetary diseases, wound and relief pain etc. |
| ***Sedum ewersii*** | (tsan-rigs) | Crassulaceae | moist | A small, succulent, glabrous, | all part | Leaves are used as a salad and for |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Ledeb.** | | | slopes. | perennial herb. Stem usually branched at the base, reddish. Leaves mostly opposite, ovate to round, younger leaves reddish and older leaves greenish. Flower small purple borne in cluster at the top. | above ground are used. | making sauce. |
| ***Tanacetum tibeticum* Hk.f & T. Ex Clarke** | (khanchung-srego) | Asteraceae | Open slopes and wasteland | Stem many arising from woody rootstock. Leaves much dissected. Flower head yellow, large, rounded, forming terminal corymbs. | all part above ground are used. | used as an antiseptic, against swelling gums |
| ***Thlaspi alpestre* Linn.ex.Hk.f.& T.Anders** | (dayga) | Brassicaceaea | Rocky area | A small perennial tufted herb. Stem erect, glabrous, simple or branched. Leaves orbicular, cauline leaves obovate, auricle. Flower large borne in a raceme. Pods triangular, winged. | fruit, leaves, flower | used against inflammation of lungs and kidney, seminal and vaginal discharges, kidney problem, pus in lungs, and appendicitis. |

DIHAR (Defence Institute of High Altitude Research) has cultivated the medicinal plants by vegetative propagation and they also conducted workshops and field demonstration on conservation practise of medicinal plants. NGO's, stakeholder's, scientist and government organization should work collaboratively to conserve the valuable medicinal plants for the sustainable use.

In spite of advancement in modern medicine people still rely on traditional healing practise of herbal based medicine for health care as old as human civilization. Traditional medicines are effective, safe, inexpensive and culturally acceptable while modern medicines are expensive and show side effect. About 80% of world population are based on herbal products for primary health care but due to lack of interest in younger generation this traditional knowledge has been started declining. Hence it becomes important for all of us to conserve traditional knowledge

## Acknowledgement

Authors are thankful to National Research Institute for Sowa-Rigpa (CCRAS), Ministry of AYUSH for support to make it successful.

## References

Chaurasia, O.P. and Gurmet, P. 2003. A Checklist on medicinal and aromatic plants of trans-himalaya cold desert.

Chaurasia, O.P., Ahmed, Z. and Ballabh, B. 2007. Ethnobotany and plants of trans-Himalaya.

Gurmet, P. 2004. Sowa-rigpa; Himalayan art of healing. *Indian Journal of Traditional Knowledge* 3(2): 212-218.

Gurmet, P. Chaurasia, O.P., Brahma and. Attery, D.P. 2000. Medico-Botanical Survey of Sapi valley of Kargil (Ladakh Himalayas). *Bulletin of Medico-Ethno-Botanical Research*. XXI: 1-10.

Hamid, A. and Raina, A.K. 2014. Ethnobotanical uses of Plants in and around Kanji Wildlife Sanctuary, North Himalaya. *International Journal of Science and Research* 3(11): 538-545.

Kala, C.P., Dhyani, P.P. and Sajwan, B.S. 2006. Developing the medicinal plants sector in northern India: challenges and opportunities. *Journal of Ethnobiology and Ethnomedicine* 2(32):1-15.

Kaul, M.K. 1997. Medicinal plants of Kashmir and Ladakh.

Mesfin, K., Tekle, G. and Tesfay, T. 2013. Ethnobotanical study of traditional medicinal plants used by indigenous people of Gemad district, Northern Ethiopia. *Journal of Medicinal Plants Studies* 1(4): 32-37.

Phuntsog: Ancient Materia Medica: Sowa rigpa (Tibetan Science of healing); 2006.

Wabe, N.T., Mohammed, A.M. and Raju, N.J. 2011. Ethnobotanical survey of medicinal plants in the Southeast Ethiopia used in traditional medicine. Spatula DD. 1(3):153-158.

Yuthog Yontan Gonpo. 2008. The basic tantra and the explanatory tantra from the secret quintessential instruction on the eight branches of the Ambrosia essence tantra.

**How to cite this article:**

Tsering Lamo, Tashi Stobgais, Padma Gurmet, Tsewang Dolma, Sonam Dawa, Tsering Angdus and Thinles Chosdup. 2019. Medicinal Plants Biodiversity of some Selected Villages of Zanskar Valley (Ladakh region). *Int.J.Curr.Microbiol.App.Sci.* 8(01): 829-837.
doi: https://doi.org/10.20546/ijcmas.2019.801.090