

**Original Research Article**

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## **Studies on Some Medicinal Plants of Suru Valley of Ladakh Used in Sowa-Rigpa System of Medicine**

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The present study reveals that Suru valley is rich in medicinal flora. The traditional knowledge on native plants species indicates the Sowa-Rigpa (Amchi) system of medicine which has been the traditional medicine of this region. Sowa-Rigpa has been the only medical system prevalent for centuries in the entire Ladakh region and Suru valley has been known for its rich medicinal wealth since ages. Though the inhabitant of this regions are follower of Shia sect of Islam known as Balti schedule tribe but the people have great respect and believe in Sowa-Rigpa system of medicine for treating various diseases. The flora of Suru valley is a mixture of temperate as well as of alpine desert vegetation it is known for its rich medicinal plants wealth. The present study attempts to study 33 medicinal plants of Suru valley used in Sowa-rigpa system of medicine.

### **Introduction**

Suru valley is one of the most beautiful regions of Ladakh. It stretches between 33° 55' N to 34° 17' N latitudes and 75° 57' E to 76° 21' longitude. It lies in northeastern foothills of the great Himalayas. The average altitude of the valley is 3000 m. In general topography of the valley is rugged and mountainous with extremely irregular boundaries. The valley is bounded on the north-west with Drass and on north-east with Zanskar. The summer seasons are longer and warmer as compare to other valleys of Ladakh

region and the soil quality is also fertile. The valley's most significant town is Kargil. The other places in this valley are Sanku, Paskum, Batalic, Shakar-Chiktan, Panikhar, Mulbekh, Bodhkharbu, etc. The majority of inhabitants of this valley are known as Baltis which were follower of Shia-sect of Islam followed by few Sunni populations. The people of this valley are mostly depending on Agriculture for livelihood. According to a survey conducted by Tribal Health Care Research Project on Ministry of AYUSH by the National Research Institute for Sowa-Rigpa the population of these regions has prevalence

of disease like arthritis, digestive disorders, pulmonary problem, skin diseases and hypertension etc. Within a few kilometers apart from Sanku there is giant rock cut statue of Maitreya Buddha which is 23ft signifies that long time back Buddhism was prevalent in this region. Majority of people know little about the indigenous uses of the plants but Amchis are well aware of medicinal plants of the area. The local people largely depends on traditional medicinal for the health care.

The flora of this valley is a mixture of temperate as well as of alpine desert vegetation it is known for valuable medicinal plants like *Podophyllum hexandrum*, *Aconitum heterophyllum*, *Dactylorhiza hatagirea* etc. Suru valley is also known for good production of apricot. Even plantation of willow and poplar trees made this region relatively lush and attractive. The white topped mountain peaks of the Nun (7135m) Kun (7090m) massif topping 7000m are visible from several places in the valley. Due to comparatively lower altitude most of the areas of Suru valley are double cropped.

In the present investigation ethno-medico botanical survey of Suru valley has been undertaken in which out of 61 plant species collected detail study of thirty three medicinal plants are presented.

### **Herbal treasure**

It is well known that Himalaya is considered as treasure house of medicinal plants since the time immemorial. The people of Ladakh region still prefer herbal prescription based on traditional system of medicine known as Sowa-Rigpa or Amchis system and practitioners of this medicine are popularly known as Aba in Suru valley. Amchis used has been collecting medicinal plant from Suru areas and it is one of the medicinal plants hot spot of Ladakh region (Samal *et al.*, 2004; Kaul, 1997). The medicine are most of the

time combination of various plants and are rarely made up of single plant and most often it is a combination of 3 to 40 ingredients (Samant *et al.*, 2001, Phunstog, 2006).

Gradually traditional medicine has gained considerable impetus in western countries due to the growing awareness about the side effect of allopathic medicine (Kala 2000; 2005; Olsen and Larsen, 2003). The consumption of herbal medicine is widespread and increasing in recent years and approximately 80% of the people in developing countries depend on traditional medicine for primary health care (Farnsworth *et al.*, 1985; Dhyani and Kala, 2005; Kala *et al.*, 2006). The global market for herbal medicine is estimated to be worth US \$800 billion a year (Rajasekharan and Ganeshan 2002; Raven, 1998; Kuniyal, 2005). India is one of the leading countries in Asia in terms of wealth of medicinal plants.

### **Materials and Methods**

Ethno-botanical survey and collection were done during the summer month. Collection was done all along the road sides, passes, hills as well as along the river beds. A total of 61 medicinal plants species were collected out of which 33 plants of medicinal uses were identified with the help of available literature, at the same time ethno-botanical information were gathered from the local people, shepherd and same were verified through various like Amchis, literature and old aged people. Herbarium and field notes are prepared and kept at National Research Institute for Sowa-Rigpa- Leh.

### **Results and Discussion**

#### **Observation**

Thirty three medicinal plants which were collected are arranged in alphabetical order providing information on their families (Table 1 and Fig. 1).

**Table.1**

<b>Botanical name</b>	<b>Sowa-rigpa name</b>	<b>Family</b>	<b>Habitat</b>	<b>Botanical feature</b>	<b>Part use</b>	<b>Sowa-rigpa uses</b>
<i>Aconitum heterophyllum</i>	Bong-dkar	Ranunculaceae	Moist places and in open field	An erect perennial herb, stem branched, roots are tuberous and leaves are ovate heart shaped to round blade. Lower leaves are deeply lobed, long stalked and flowers are large, greenish purple usually in spike like clusters.	Roots	It treats arthritis, gout, swelling pain and inflammation, body pain, lymph fluid diseases, intestinal worms, cardiac diseases, leprosy and paralysis etc.
<i>Arctium lappa</i>	Byi-bzyung	Asteraceae	Commonly found in dry and wet places	A tall coarse herb, stems are much branched; leaves are petiole, ovate-cordate. Flower heads are terminal and hooked.	Roots	It treats kidney diseases, urinary bladder cysts, tumors in uterus, cancer, nerve disorders. Roots are especially used for cancer and tumors.
<i>Artemesia brevifolia</i>	Mkhan-dkar	Asteraceae	Dry and stony slopes and along the roadsides	A much branched highly aromatic perennial plant. Leaves are ovate, stalked, dissected into linear blunt segments. Flower heads are small, yellowish to reddish in auxiliary cluster of spike.	Leaves	A leave extract is used against stomach complaints, digestion, seeds are considered to be useful against obesity they also reduce fat deposition in stomach.
<i>Artemisia dracunculus</i>	Tsar-bong	Asteraceae	Dry and sandy areas	A perennial herb flower heads racemose, panicle globose. Leaves are trifid at the points, lanceolate. Stems are erect and branched.	Leaves	The extract of leaves and flowers is useful in stomach complaints.
<i>Anaphalis trilinervis</i>	Ta-wa	Compositae	Open slopes	Dwarf usually tufted woolly haired perennial herb. Leaves narrow-lanceolate, white woolly. Flowers white in color, solitary or few borne on an erect stem.	Leaves, stems, flowers and fruits	It treats epidemic fever, antidote against poisons, bleeding and swelling.

<i>Cremanthodium ellisiae</i>	Ming-chang-nagpo	Asteraceae	Open slopes and rocks	It is a perennial herb of about 25 to 40 cm tall with numerous long roots which look like spitted tendons. Basal leaves are broad sword shaped with their petioles flattened at the base. Unevenly lobed, slightly thick and green in colour with light purplish base about 1 to 4.5cm wide and 20 to 30cm long including petiole.	Leaves, flower, trunks and fruits	It is used for diphtheria, inflammation muscular tissue, infectious diseases including cold, inflammation and act as antidote for poisoning.
<i>Codonopsis ovata</i>	Klu-bdud-rdo-rje	Campanulaceae	Cultivated fields, moist places and alpine slopes.	A sweet scented sub-erect hairy perennial herb. Stem are much branched, covered with glandular hairs. Leaves are compound, flowers are cream in color with mild fragrance and hooked spurs.	Leaves, trunks, flower and fruits	It treats the arthritis, gout, rheumatism, elephantiasis, leprosy, nerves disorder, stiffening of ligaments and tendons, joints pains, planetary diseases, evil and spirits diseases
<i>Clematis vernayi</i>	E-mong Nakpo	Ranunculaceae	Cultivated areas	A woody perennial climber. Leaves are pinnate, lanceolate-ovate leaflet lobed, long stalked. Flower dull reddish yellowish green with broad blunt spreading petals which are densely hairy inside and hairless outside.	Leaves, flowers and fruits	Treats indigestion, loss of digestive heat, badkan and long related growth or tumours and various other types of tumours and pus related problems.
<i>Carum carvi</i>	Go-Snyod	Apiaceae	Cultivated fields	An annual or biennial glabrous herb with procumbent or erect stem, 30-60cm. Leaves bi-pinnately dissected, linear, bracteates with white pink flowers, leaflet ovate, dentate lobes.	Fruit	The fruits and seeds are used as febrifuge, improve eye vision, digestive. It is useful for hot disorders, weak eye sight, ingestion and poisoning.
<i>Cynoglossum wallichii</i>	Nad-ma Byar-ma	Boraginaceae	Dry Alpine slopes	An erect biennial herb. Stem are solitary. Basal leaves are petiolate, lanceolate to obovate, lower cauline leaves usually longer and broader	Leaves, flowers, trunks and	The whole plant is used against vomiting.

				than basal ones. Flowers pale to deep blue.	Fruits	
<i>Capsella bursa-pastoris</i>	So-ka-pa	Brassicaceae	Found in loamy soils, pastures, gardens and abandoned lands	A small annual herb. Stem 15-20cm long. Leaves shortly stalked, caudate, linear, sessile small. Flowers white, pedicel on long corymbs. Fruits silique glabrous seeds numerous ellipsoid oblong punctuate	Fruits	It stops vomiting and restore kidney functions, bronchitis, nerve disorders, obstruction of urine and stops bleeding.
<i>Dactylorhiza hatagirea</i>	Wang-bolak-pa	Orchidaceae	Common along damp places	A tuberous perennial herb. Stem tall upto 80cm. Flower spotted purple arranged in dense spike. Sepals and petals are nearly equal. Lower bracts are longer than the flower.	Roots	Tubers are astringent, expectorant, used as nervine tonic. Roots yield mucilage with water and form a jelly which is nutritious and useful in diarrhoea, dysentery and chronic fever. It has been used by the locals in the treatment of kidney complaints.
<i>Delphinium cashmirianum</i>	Cha-rkyang	Ranunculaceae	Snow melts alpine slopes	An erect, glabrous, perennial herb. Stems are hairy, branched and leaves are deeply lobed. Flowers are bluish-purple with short spur in terminal racemes, long stalked.	Leaves, trunks, flowers and fruits	It treats dysentery, diarrhoea with bleeding, inflammation, wounds, lymph fluids.
<i>Datura stramonium</i>	Dha-du-ra	Solanaceae	Cultivated areas, wasteland and often on poor soil in sunny places and along the road sides.	A strong smelling hairless annual with few large erect white narrow funnel shaped flower with ovate coarsely lobed or toothed leaves. Capsule ovoid 4-valved covered with sharp slender spikes and with the enlarged base of the calyx below.	Flower and fruits	It treats various kinds of pathogenic diseases like sinusitis, tooth, head and any other diseases associated with micro-organisms, lymph fluid in limbs, severe pain in stomach, diarrhoea etc. Whereas the flower possesses anaesthetic property. This plant has medicinal use similar to that of the plant

							<i>Hysocymus niger</i> (Henbane), it is especially effective in treating decayed teeth caused by bacteria.
<i>Geranium wallichianum</i>	Le-gha-dur	Geraniaceae	Wet slopes and along road sides	An erect perennial herb, flower paired rose to red purple. Plant readily distinguished by its large ovate often coloured stipules. Sepals bristly haired on veins stamen filament 5-7 mm and leaves mostly 4-8cm.	Roots		It treats contagious fever, fever of lungs, spleen, poisonous, swelling limbs and also to reduce pain and inflammation.
<i>Gentiana ssp.</i>	Ke-lche	Gentianaceae	Wet and marshy areas	An annual herb, leaves are numerous, weak and little divided, cauline leaves are small ovate. Flowers are blue in color.	Roots		Roots are used in preparation of health tonic.
<i>Heracleum pinnatum</i>	Tu-dkar	Apiaceae	Rocky and dry slopes	A tall perennial herb, stem upto 100cm, branched while pubescent. Leaves are large pinnate with 1-3 pairs of widely space small ovate leaflet. Flowers are white in color.	Roots and fruits		It treats bleeding, skin diseases, tumors, inflammation, pain caused by vulnerable fever. Abdominal cramps caused by intestinal worms, internal cancer and leprosy. It seed is particularly beneficial in treating wind (rlung) disorders and relieving pain.
<i>Hippophae rhamnoides</i>	Tsarmang or Sasta-lu-lu	Elaeagnaceae	River belt and wasteland	A dwarf thorny perennial shrub tree, stems are woody, erect, along with silvery waxy covering on the old shoots. Leaves are variable, oblong blunt to green above and silvery scaly on both sides. Flowers are small greenish or yellowish. Male in clusters female dull yellow, short stalked. Fruits sub globose, orange or red.	Fruits		It treats pulmonary diseases, blockish blood vessel, blood cysts, gynaecological blood tumors, blood circulation, high altitude diseases and phlegm (Bad-kan) diseases.

<i>Inula racemosa</i>	Manu	Asteraceae	On moist slopes	A small prostrate annual or perennial herb, leaves pressed to the ground. Flowers heads many, yellow, densely clustered at the centre, ray florets are yellow.	Roots	The dried roots used against cold, cough and chest pain.
<i>Lancea tibetica</i>	Spa-yak-rtsa-ba	Scrophulariaceae	Moist places	A small stem less herb, leaves are oblong ovate to spatulate with blue flower. Fruits enriched by persistent enlarged calyx.	Roots, flowers, leaves and fruits	It treats various kinds of lungs diseases like pulmonary diseases, diphtheria, lungs inflammation, cardiac diseases, amenorrhea, blood tumours, wounds, large intestine tumors.
<i>Mentha longifolia</i>	Pho-lo-ling	Lamiaceae	Along the water channels and moist place	An erect aromatic perennial herb, stems are hairy, delicate much branched. Leaves are sessile ovate toothed round to kidney shaped. Flower is tiny lilac borne on terminal spikes.	Leaves	It treats purgation phlegm (Bad-khan) diseases, cancer, swelling and indigestion.
<i>Nepeta clarkei</i>	Che-ruk	Lamiaceae	Open dry clumps	A low spreading erect aromatic perennial herb, stem branched reaching up to 60 cm high. Leaves ovate to lanceolate, flower blue with pales lower lip and a slender corolla tube borne in dense widely spaced whorls and forming terminal spikes of 8-15cm long.	Leaves	The whole plant is useful against septic wounds.
<i>Physochlaina praelata</i>	Lang-thang	Solanaceae	Along road sides	An erect leafy perennial robust herb, stem grooved 40-100cm. Leaves are petioled ovate-oblong, entire or wavy margin. Flower dull yellow funnel shaped in terminal clusters.	Seeds	It treats bacterial diseases, diphtheria, serous fluid, severe pain, disorders caused by micro-organisms, sinusitis, subsides pain caused by pathogens in the gastro-centric region, inflammation.

<i>Podophyllum hexandrum</i>	Olmose	Berberidaceae	Cultivated fields	A perennial herb, stem modified into underground rhizomes. Leaves 2 blade rounded in outline deeply cut into 3 ovate toothed lobes, sometimes further lobed. Flowers are solitary, terminal white or pink, cup shape. Fruits are large, scarlet or reddish berry.	Fruits	The entire plant is used for gynaecological diseases like menstrual irregularity, disease of uterus and improves lung and blood circulation, helps in delivery of baby and placenta. The roots are used against skin problems. The young and ripe fruits are edible and are useful against high altitude mountain sickness.
<i>Parnassia cabulica</i>	Dnyul-tik	Parnassiaceae	Damp sites on water channels	Readily distinguished by its solitary white flower borne on a slender stem with a single stalk less clasping ovate leaf arising from below the middle of the stem and with many basal leaves. Flowers are white in colour.	Leaves, stems and flowers	This herb is used to treat various trigs-pa diseases and alleviate side effects caused by wrong medications.
<i>Pedicularis punctata</i>	Lugru-mug-po	Scrophulariaceae	Found on high meadow hills	Erect perennial herb, leaves with oblong, toothed lobes. Flowers are bright red or purplish pink with white throats in terminal clusters, corolla tube is long. Upper lip curved into bifid beak, lower lip broader, 3-lobed, lateral lobes broad rounded and mid lobe notching and in liver disorder, fever and headaches.	Flowers	It also treats bacterial diseases, diphtheria, serous fluid, severe pain, disorders caused by micro-organisms, sinusitis, subsides pain caused by pathogens in the gastro-enteric region, inflammation.
<i>Pisum sativum</i>	Sad-ma	Fabaceae	Found in cultivated areas.	A hairless glaucous climbing annual with large white auxiliary flower or with standard lilac or red purple and with pinnate leaves ending in a branched tendril. Flower 1-3 borne on a stalk shorter than the	Flowers and fruits	This plant is used in treating irregular menstruation, nose bleeding and ruptured blood vessels.

				subtending leaves. Leaves with 2-8 oval leaflets and larger and broader.		
<i>Ranuculus tricuspis</i>	Chu-ruk-balak	Ranunculaceae	Moist places and fast moving water	It is a submerged perennial herb, leaves are much dissected. Flower minute and yellow in colour, petals widely spread.	Leaves, stem, fruits and flower	The decoction of whole plant is useful against diarrhoea. It is also used in fever by Amchis.
<i>Rumex patientia</i>	Lhung-sho	Polygonaceae	Near water channels	An erect, robust perennial herb. Stem upto 110 cm long and leaves are linear lanceolate, entire margin petioled. Flowers are small, yellowish green in spike like cluster forming a long compact inflorescence.	Whole plant	The whole herb is used as febrifuge, heal wounds, purgative, vermifuge and also this herb is used against inflammation of lungs, constipation, influenza, wounds and skin diseases.
<i>Swertia petiolata</i>	Lchags-tig	Gentianaceae	Open moist slopes	It is perennial herb with stripped tendon like yellow root with scarce fibrous rootless and extremely bitter taste. A few slender, short-lanceolate or oblong leaves grow from the base of stem. Flower white in color with 5 lingulate petals which are 3-5mm broad.	Leaves, stem and flowers	The whole plant is considered to be effective in fever and headache and this plant is also use as tonic. Also effective for hot disorder of gall bladder, infectious fever and wounds.
<i>Silene tenuis</i>	Lug-sug	Caryophyllaceae	Cultivated fields and found in hilly slopes and in meadows	An erect herbaceous perennial herb with several erect branched stems bearing terminal rather crowded elongate clusters of dull purple, brownish purple or yellowish brown flowers. Flowers petal with deep narrow lobes calyx cylindrical to narrow bell shaped. Leaves mostly linear to narrow lanceolate pointed usually 2-5cm.	Roots	Treats nasal problems and hearing defects. The roots are used as a detergent by the local people.

<i>Taraxacum officinale</i>	Khur-mong	Asteraceae	Along the water channel	It is a small herb, roots with milky latex. Leaves are stalk less long with backward directed triangular tooth – edge lobes. Flowers are yellow in color	Roots, flower, leaves and fruit	Roots are used as diuretics, tonic and as a blood purifier in human beings. The whole plants is used as febrifuge, analgesic, hot disorder of rLung, mKhris-pa, Badkan and blood, chronic fever, dyspepsia due to improper diet, gall bladder.
<i>Verbascum Thapsus</i>	Yug-pa-gser-pcha	Scrophulariaceae	Wasteland	A very distinctive tomentose perennial herb. Stem simple reaching upto 70-150cm high. Flower golden yellow color. Corolla tubes are short with spreading lobes.	Seeds	Leaves and seeds are use for asthma and chest pain. Leaves and seeds are smoked to cure breathing problem. The dried leaves are smoked to relieve irritation of the upper respiratory tract and spasmodic cough.

**Fig.1** Pictures of some important medicinal plants of Suru valley of Ladakh region



*Meconopsis aculeata*



*Inula racemosa*



*Gentiana ssp.*



*Dactylorhiza hatagirea*



*Codonopsis ovata*



*Anaphalis triplinervis*



*Aconitum heterophyllum*



*Verbascum thapsus*



*Lancea tibetica*



*Rheum emodi*



*Podophyllum hexandrum*



*Pedicularis punctata*

It is concluded that the present paper is an attempt to document thirty three traditional medicinal plants growing around the Suru valley. The ethno-medicinal information gathers during the floristic survey are important to document and further systematic development of medicinal plants sector. If properly and scientifically develop the medicinal plants sector, it has great economic potential to uplift the economic condition of farmers and local public in Suru valley. The authors are thankful to officers and staff members of National Research Institute for Sowa-rigpa, Leh for their help during the study and Central Council for Research in Ayurvedic Sciences and Ministry of AYUSH for funding the study.

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