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Some High Altitude Medicinal Plants in Nepal (**)

It is a great privilege for me and I can not describe to you how honoured I feel by your very kind invitation to me to come here today and be able to speak before this distinguished gathering. I feel very honoured to have been given an opportunity to humbly lay before you some general descriptions about the high altitude medicinal plants of Nepal. The wealth of medicinal plants in Nepal may be considered as one of the important resources for the economy of this Himalayan Kingdom. Nepal lies in the central sector of the great Himalayas and occupies one-third of the total length.

The diversity of the physiography due to the altitudinal and climatic variations has made it possible to lodge almost all types of climate, broadly tropical, temperate and alpine, in a small country covering merely an area of 141,059 sq.km. Therefore many kinds of plants, i.e., a rich and varied flora ranging from alpine to tropical types grow here and a large number of them have been used for medicinal purposes. Of the 3500 flowering plant species in Nepal, 700 are reputedly used in indigenous remedies.

The use of plants and plant products as medicines could be traced as far back as the beginning of human civilization. Even now in a search for new drugs and cheaper substitutes plants are the natural choice. Plants of economic and medicinal value were known to the natives of this country from time immemorial, but the lack of communication made the people give different names to a single species of plants and vice versa. This obviously could be a major handicap to conduct any scientific research work on plants. However, the book on "Medicinal Plants of Nepal" includes 393 medicinal plants, both indigenous and exotic plants, occurring in Nepal with their local names, botanical names and other characteristic features.

In the present paper twenty-eight plants have been mentioned as important high altitude flora having medicinal importance. A brief summary of these plants in terms of their occurrence, altitude distribution, use and chemical constituents present in them, are given in the table below.

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Survey Study of High Altitude Flora of Nepal.

S. No.	Botanical (D. Don) Synch	Name of Plant English	Local	Altitude in 'm'	Region	Distribution Place of re- presentative collection	Parts used	Uses	Chemical components
1.	Abies speciosissima (D. Don) Spach	Fir	Talis Patra	2700- 3900	Himalaya	E. Nepal Sikkim Tibet Chumung	Leaves	Carminative, antiperistaltic, expectorant, used in asthma and bronchitis	Albucin, Biflavanoid
2.	Accotium bretzneri Walt.	Atis Ruot	Atis	1800- 4500	Alpine and sub- alpine areas of Nepal	Gurjakhari	Root	Antispasmodic, antiperistaltic, toxic in diarrhoea, dyspepsia and coughs	Alkaloids Heterocycloalkane
3.	Accotium bretzneri (D. Don)	Acrotie	Bikhama	3000- 4000	Himalaya (alpine area)	Lagang (Bagrami sovereign Ravara District)	Root	Root - toxic, antiperistaltic, in diarrhoea and rheumatism	Diterpene alkaloids Valerianine (C ₁₅ H ₂₀ O ₂ N) Valerianone (C ₁₅ H ₂₀ O ₂ N) Valerianolone (C ₁₅ H ₂₀ O ₂ N) Valerianidine (C ₁₅ H ₂₀ O ₂ N) Valerianone (C ₁₅ H ₂₀ O ₂ N)
4.	Betula utilis (D. Don)	Silver Birch	Bhof Patra	2100- 4200	Himalaya	Lamjung Danda 3000 m (Bagrami sovereign, Ravara District)	Bark	Tannin of Bark, Antispasitic, carminative and in hysteria	Triterpenoid Keranic acid

5.	<i>Rhusum emodi</i> Wallich.	Rhaubarb	Padamchal	3000-4200	E. Nepal Alps with sub-Alpine zone.	Langrang 3500 m (Bhagmati river, Rasawa District).	Root and Rhizome	Purgative, astringent, tonic in diarrhoea	Emodin, Rutilin, Chrysoptic acid and rutilin. Essential oil. Eragranol
6.	<i>Pterocarya scrophulariifolia</i> Pennell.	Kutki	Kutki	3600-4800				Used in febrile	Root contains sterols, terpenoids and phenols.
7.	<i>Syeria multicaulis</i> (D. Don.) DC.	Sarna gora	Sarna gora	4000-4800	Central Nepal				
8.	<i>Rhododendron arboreum</i> Smith.	Rhododendron	Lali guras	1200-4000	Western Himalaya	Phulchowki Shivapuri	Young leaves, flowers etc.	Young leaves are poisonous	Tannins, salicylic and isosalicylic acid. Leaves contain a pteridine, essential in flavonoid, frickidin, ursolic acid and triterpene. Flowers - pteridin, leucocyanthranine and flavones.
9.	<i>Epibedia ferruginea</i> Wall.	Epibedia	Sumbata	2100-4000	Himalaya	Changra above Khaungling in Langrang 3700 m.	Stems and Roots	Liquid extract for controlling asthma, paronychia, cardiac and circulatory stimulant. Decoction of stems and roots - remedy for rheumatism and syphilis. Epibedine effects on blood pressure bronchial	Roots contain Alkaloids Epibedasin A, Epibedasin D, Epibedasin A, Epibedasin B, Epibedasin C

10.	<i>Cordyline sinensis</i> (Bark) Sac.	Yana Gumba	Alpine field, in southern Range of Nilgiri Himalaya	Upper Lanang 4200 m.	Plants as a whole	Plant - toxic in Thak urac	Cordycepnic acid (1, 3, 4, 5 tetrahydroxy- cyclohexane carboxylic acid (C ₆ H ₁₀ O ₇)). Ergosterol, D-Mannitol. Amino acids 5%, 8% - epidiary - 3% ergonia - 6, 22 - decen - 3%ol
11.	<i>Dactylocten- arietaria</i> .	Panch aule	2800- 4000		Tubers	Tubers used medicinally	
12.	<i>Polygonum fruticosum</i> Linn.	Chishpa Pd.	2400- 4800	Lanang valley, 3900 m.	Leaves	Infusion of leaves used as a purgative, substitute for tea	
13.	<i>Delphinium mongolicum</i> Royle		4300- 5500	E. Nepal steep slopes	Leaves	Juices of leaves used as a remedy in ticks in animals	
14.	<i>Pinus uberica</i> Will.		3000- 4500				
15.	<i>Sesuvia chirata</i> Hamilt (Gentianaceae)	Chiveta	3000	Himalaya	Plant	Antibiotic, Antidiarrhoic, dyspepsia and tonic to poultry person etc.	Steroids, terpenoids
16.	<i>Berberis arizata</i> DC (Berberis dacco)	Chavra	1800- 3000	Himalaya	Root, bark and wood	Antirrhizal, stomachic, jaundice skin disease, diarrhoea etc.	Berberine

17.	<i>Nephrolepis lurmannii</i> (Valek- naceae)	Spike Nud	Jama- ica	3100- 5100	Himalaya	Cañalinda 3600 m. (Bagmati zone, Kasuya district)	Root	Antispas- modic, convulsive affection etc.	Alkaloids
18.	<i>Azoreus calamita</i> Linn (Arecaceae)	Sweet flag rhizome	Bojho	1800	Himalaya	Jumla 1800 (Kavali zone, Jumla district)	Rhizome	Tonic in bronchitis, dysentery, asthmapneumonie etc.	Aerona
19.	<i>Paris polyphylla</i> Smith (Liliaceae)		Salva	1800- 3000	Himalaya	Shimbu shyang (Narayan zone, Makwanpur district) Taplejung charibot	Rhizome	Antihel- minic	Steroids
20.	<i>Mahoeia napaulensis</i> DC. Berberis repalensis Spring (Berber- idaceae)		Jamaica Mandao, Derehahdi	1200- 2400	Himalaya	Godawari (Bagmati zone, Laligur district) Nagarjun (Bagmati zone, Kathmandu district)	Berries	Considered diuretic and decon- gestant dysentery	Unballazine and Neprazine (structure related to Berberine and Jamatribazine, respectively)
21.	<i>Bergenia Egleria</i> (Wall) Engl Saxifraga Egleria Wall (Saxifraga- ceae)	Rockfoil	Punhan val.	2100- 3000	Maha- bharat	Shimbu shyang (Narayan zone, Makwanpur district)	Root	Tonic used in fever, diarrhoea and pulmonary, infections, antiscorbic bols and ophthalmia	Flavonoids

22.	<i>Podophyllum hexandrum</i> Barle (Berberidaceae)	Indian Podophyllum	Laghu patra	2700- 4000	Himalaya		Rhizome and root	Hepatic stimulant, cholagogue and purgative	Podophyllotoxins
23.	<i>Valeriana wallichii</i> DC.	Indian valerian	Sugan- dhawal	1200- 3000	Himalaya	Goedwari (Bagmati zone, Lalitpur district)	Plant and root	Scapulant, crumulative, anxiopasmodic, used in hysteria, epilepsy, cancer, asthma, hypochloric dysuria, acrrvius waves of similar emotional states	Scapaterpenes
24.	<i>Ocellis latifolia</i> Linn. var <i>incarnata</i>	Orellid	Panch- mula	2400- 3600	Himalaya	Largatang (Bagmati zone, Rasuya district)	Tubers	Tonic	Furanoids
25.	<i>Oroxena schoides</i> (Berberidaceae)		Maha- rasgi	1200- 2700	Himalaya		Leaves and flowers	Purgative, stimulant in rheumatism and cardiotoxic	
26.	<i>Urena lobata</i> (Malvaceae)		Nalkano	1500	Tropical and sub tropical	Phakchi (Bagmati zone, Lalitpur district)	Root	Diuretic, emetic, remedy for rheumatism	

27.	<i>Solanum</i> <i>verbasculatum</i> (Solanaceae)	Dorsal	1500	Tropical and sub- tropical	Nagarjun (Bagmati zone, Karnataka district) Baramagar (Koshi zone, Zorang district)	Plant	Used externally to inflammation and burns
28.	<i>Trachypogon</i> <i>fragrans</i> (Apoynaceae)	Dualle- labra	1700	Temperate and sub- tropical Himalaya	Gokarna (Bagmati zone, Karnataka district) Pondhodi Godavari	Plant	Used as substitute for <i>Alstonia</i> scholaris in Kurnool

In conclusion I would like to draw your kind attention to some important observations made in connection with the use of plants for medicinal purposes. Firstly, that it is not the main crystalline compound alone that is as effective as its use in conjunction with some of the minor compounds present in plant extract; example, the crude extract of *Cannabis sativa* is biologically active but its main constituent, cannabinal, is entirely inactive. Similarly, as an auxiliary evidence to that, it has been found that the entire roots of *Rauwolfia serpentina* rather than the pure compound are preferable for use, because the former prevents harmful side effects like nausea, etc., that some patients experience on using reserpine.

Secondly, "Sat isaggol" or the husk of *Plantago Ovata* seed used as a mild laxative and for dysentery, is said to have different properties when taken with milk, with water and with curds, i.e., the particular medicinal property becomes effective only with and in conjunction with the other substance called "Anapan" or "Adjunned entity". Little work has been carried out to test this scientifically. Thirdly, the content of the active constituent of the medicinal plant varies remarkably with the period of collection of the plant and other factors such as the healthy or diseased condition of the plant.

Lastly, the particular part of the plant (root, leaves, fruits, seeds, etc.) and in a particular state (fresh, dried or incinerated) even becomes viable only for the particular medicinal properties. However, these remarks do not mean that we should stick to the *antique technique* of using the medicinal plants as drugs. Lack of standardisation of the crude drugs used in the traditional method is a problem which can now be solved by modern instrumentation. It is not necessary here to mention the tremendous scope of the instrumental and analytical studies for the utilization of medicinal plants. The following few observations made by us have been due to the interesting results shown by such studies.

1. Decoction of *Acacia* bark is useful for peptic ulcers.
2. Leaves of *Nerium oleander* (L.) is effective against leucoderma in conjunction with vitamin therapy.
3. Semi-purified extract of *Vinca rosea* is useful for cancer patients.
4. Hot water decoction of *Wedelia calendulacea* is a well known cure of jaundice in Unani system of medicine and also recommended by allopaths.

Therefore we feel that it will be a good idea if an extensive screening and testing program of medicinal plants of Nepal could be carried out in a collaborative Research Programme between Academies such as RONAST and National Academies of Sciences of Italy and others. A collaborative program seeking to study the effects of the medicinal herbs and to isolate the active constituents is also highly desirable and may lead to useful results. For example, crude extract of nutshell of *Malbuca butyracea*, which is a good anti-inflammatory agent and is one-sixth as effective as hydrocortisone, has been found to contain the active ingredient, a reduced flavonoid quercetin. Similarly, the crude extracts of *Mimiteps manilkara* and *Pithecolobium dulce* which is significantly active against car-

rageenin-induced oedema and formaldehyde-induced arthritis has been shown to contain the active ingredient, as triterpenoid saponins of oleanane type.

In the end, I would like to thank you all for giving me this opportunity, especially the National Academy of Science, Italy, and the organizers of this international congress on medicinal plants.

Medicinal Plants of China, Production and Trade

Introduction

China is a vast country with a population of 700 million people. It is the second largest country in the world. The area of the country is 9,600,000 km². The country is rich in natural resources. There are many kinds of medicinal plants in China. The country is the largest producer and exporter of medicinal plants in the world. The country is also the largest consumer of medicinal plants in the world. The country is the largest importer of medicinal plants in the world. The country is the largest producer and exporter of medicinal plants in the world. The country is also the largest consumer of medicinal plants in the world. The country is the largest importer of medicinal plants in the world.

Production

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