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ETHNOPHARMACOLOGY, INDIGENOUS COLLECTION AND PRESERVATION TECHNIQUES OF SOME FREQUENTLY USED MEDICINAL PLANTS OF UTROR AND GABRAL, DISTRICT SWAT, PAKISTAN

***Muhammad Hamayun[1], Sumera Afzal[2] and Mir Ajab Khan[3]**

[1]Lecturer, Govt. Degree College Kotha, District Swabi, Pakistan, [2]Lecturer, Centre of Biotechnology, University of Peshawar, Pakistan, [3]Associate Professor, Department of Biological Sciences, Quaid-i-Azam University, Pakistan
E-mail: *hamayun73@gmail.com , Fax: 0092-91-841594

Abstract

An ethnomedicinal study was conducted in the remote Hindukush-Himalayan valleys of Utror and Gabral, during which 36 common folk medicinal recipes of the area were documented. The indigenous methods of medicinal plants collection and their further processing were also explored. It was also observed that huge quantities of valuable medicinal plants are lost every year due to lack of proper collection, cleaning, packing and storage techniques on the part of local collectors.

Key words: Medicinal plants; Folk recipes; Hindukush-Himalayas

Introduction

Utror valley is situated between 35° 20′ to 35° 48′ N latitudes and 72° 12′ and 72° 32′ E longitudes. The population of Utror is 6,888 and the area of the valley is about 47,400 hectares. Utror valley is surrounded by Kalam and Bhan valleys on the east, upper Dir district on the west, Behrain valley on the south and Gabral valley on the north. It is 15 km from Kalam, the centre of Swat Kohistan. The altitude of the valley ranges from 2,000 m at Karin to 2,900 m at Kandol Lake. Gabral valley lies between 35° 20′ to 35° 48′ N latitudes and 72° 12′ and 72° 32′ E[1] longitudes over an area of about 38,733 hectares. The population of Gabral is 3,238. The valley is surrounded by Chitral District in the north, Utror valley in the south, upper

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Dir in the west and Bhan and Mahodand valleys in the east. It is about 5 km from Utror valley and 20 km from Kalam. The altitude of the valley ranges from 2,580 m at Baila to 5,160 m at Karkaray Lake top.

The inhabitants of Kohistan are Kohistanis and all Kohistanis are believed to be of the same ethnic origin. However, the Kohistanis living on the eastern bank of river Indus are different from the rest as their language is similar to the people of the northern areas and Kashmir.

The area has a typical dry temperate zone climate. The winter season is very cold and as a result large number of the inhabitants in the upper parts migrate to lower areas along with their livestock. These migrants return on the onset of spring. The coldest months are December, January and February during which snowfalls are frequent. The valleys remain under snow cover for about four months. The snow starts to melt in April; June, July and August are the hottest months of the year while the climate in September and October is very pleasant. Rain is received in large amounts during March and April. The summer and autumn are relatively dry seasons.

Medicinal Plants

Medicinal plants still provide health security to people living in the rural areas of under developed and poor countries of Africa, Asia and South America. According to W.H.O., more than 80% of the developing countries population still depends on traditional medicines for their primary health care. In Pakistan, a large portion of rural population use indigenous medicinal plants for curing their ailments. Pakistan has about 50,000 registered practitioners of traditional medicines known as tibb-e-unani and majority of the population, especially rural, is getting health care by Tabbibs (Practitioners of eastern system of medicine). It is estimated that 60% of the population used herbal medicines prescribed by traditional practitioners (Hamayun et al., 2003).

Material and Methods

The research area of Utror and Gabral was visited during 2002 and 2003 for data collection pertinent to medicinal plants usage in the area and to explore traditional techniques of medicinal plant collection and storage. Medicinal plant specimens were collected, identified and preserved in the herbarium of Quaid-i-Azam University, Islamabad. People of the area were interviewed for getting indigenous folk knowledge prevailing in the area. The informants include men and women. 50 local medicinal plant collectors were interviewed in order to get data for indigenous medicinal plants collection, cleaning, drying and storage. Questionnaire method was adopted during these investigations.

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Results

Medicinal plants play an important role as it not only provide crude drugs for curing different ailments but also support the weaker economy of the area. A survey was conducted in the area which showed that about 65% old aged people (above 60 years) have knowledge of folk uses and local names of medicinal plants, while 30 % adult (20 –59 years) and 5% children (up to 19 years of age) have knowledge about the uses and collection of medicinal plants. During the study, it was revealed that about 80% of the respondents were illiterate while 20% were literate.

During the present study common folk recipes, which are still in use in the area are documented.

Family Amaranthaceae
Achyranthus aspera L.
Local Name: Geskay/Spay botay
Common Name: Chirchilla (U), Prickly chaff flower & Rough chaff tree (E)
Voucher Specimen No: 24
Part Used: Leaves
Flowering Period: March-November
Chemical Constituents: The plant contains oleanolic acid, saponins, galactose, xylose, rhamnose, glucose and ash.
Folk Medicinal Recipe: The juice obtained from the leaves is mixed with small amounts of opium and is used by the locals in primary sores of syphilis. The ash of the weed is added to honey and used for curing cough and asthma. A fresh juice of the leaves is applied in piles and other wounds. An infusion of the leaves is used in bowel complaints, night blindness and skin diseases. Roots are used for teeth cleaning.

Family Apiaceae
Trachyspermum ammi (L.) Sprague
Local name: Spairkai
Common Name: Ajwain (U)
Voucher Specimen No: 77
Part used: Seeds
Flowering Period: March-July
Chemical constituents: The plant contains oil, arachidic acid, behenic acid, myristic acid, linoleic acid, oleic acid, palmitic acid, visnagin, visnadin, xanthtoxin, methyl ester and chromone.
Folk Medicinal Recipe: The seeds are eaten with water or milk for the treatment of stomachache and normalization of digestive system. The seeds are taken before meal. The seeds are used for the treatment of fever. 10 grams of seeds are extracted in water and put under the shade during daytime and outside the household and under the sky at night. In the morning, the extract in water is used before taking breakfast. Use of this water for 8 to 10 times relieves the patient of the fever completely. Its use also removes kidney stones.

Family Araceae
Acorus calamus L.
Local name: Skhwaja

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Common Name: Warch (U); Sweet flag, Calamus root (E)
Voucher Specimen No: 117
Part used: Rhizome
Flowering Period: May-September
Chemical constituents: The plant contains oxalic acid, essential oil, volatile oil, humulene, tricyclic sesquiterpene, calamine, azulene, enanthylic acid, palmitic acid, starch and mucilage.
Folk Medicinal Recipe: The dried rhizome of Acorus calamus is crushed to powder and used in dysentery and chronic diarrhea. The powder is mixed with mustard oil and applied externally for rheumatism. The rhizome is given to children to bite during the period of teeth cutting. It is also used against snakebites.
Family Asteraceae
Artemisia scoparia Walds & Kit.
Local name: Loom
Common Name: Dona jhan (U); Santhonica, Worm seed (E)
Voucher Specimen No: 170
Part used: Whole plant
Flowering Period: July-October
Chemical constituents: The plant contains artemisin, santonin, essential oil, scoparone, alkaloids, scoparin, palmatic acid, stearic acid, oleic acid, terpenes, bicyclic hydrocarbons, celluloses and hemicelluloses.
Folk Medicinal Recipe: The plant is boiled in water. This water is drunk during the night for removing intestinal parasites from the body.
Achillea millefolium L.
Local name: Kingha
Common Name: Biranj saif, Akarkara (U); Yarrow, devils nettle (E)
Voucher Specimen No: 165
Part used: Whole plant
Flowering Period: March-August
Chemical Constituents: The plant contains essential oil, volatile oil, proazulene, azulene, prochamazulene, chamazulene, L-camphor.
Folk Medicinal Recipe: The plant contains volatile oil, which is used as stimulant tonic, astringent and stops intestinal bleeding. The whole plant is used as diuretic, stimulant, in cold and stop perspiration.
Saussurea lappa (Dene) Sch.
Local name: Kuth
Common Name: Kunth (U); The Costus (E)
Voucher Specimen No: 132
Part used: Roots
Flowering Period: August-September
Chemical constituents: Root contains essential oil, alkaloid, saussurine, kushtine and bitter resin.

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Folk Medicinal Recipe: The dried roots are crushed and mixed with egg and Desi Ghee and used twice a day as anti spasmodic and carminative agent. The dried roots are crushed and mixed with mustard oil and applied on skin for curing skin diseases.

Family Berberidaceae

Berberis lycium Royle

Local name: Hez/ Khawaray

Common Name: Kashmal (U); Berberry (E)

Voucher Specimen No: 104

Part used: Rhizome

Flowering Period: March-June

Chemical constituents: The major alkaloids present are umbellatine and berberine.

Folk Medicinal Recipe: The rhizome is used locally for body and bones pain. Rhizome bark is used for stomachache, strengthening sex organs and broken bones.

The rhizome is dried and then crushed to powder. The powder is then mixed in a local sweet dish called Halwa. Some times the powder is administered with milk for giving relief in pains. The bark of rhizome is dried and crushed and used for stomachache, strengthening sex organs and healing of broken bones.

Family Chladophoraceae

Chladophora crispata L.

Local name: Jaloos

Voucher Specimen No: 45

Part used: Filamentous hypha

Flowering Period: No flowers

Folk Medicinal Recipe: The filamentous hypha is cooked in a pot until converted to a paste. The paste is placed on a clean cloth and applied to external injuries. Applications of two to three bandages would completely heal the injured body part.

Family Ephedraceae

Ephedra gerardiana Wall. ex Stapf

Local name: Someni

Common Name: Huma, somakalpa (U); Ma-haung, Ephedra (E)

Voucher Specimen No: 87

Part used: Stem

Flowering Period: May -July

Chemical constituents: Plant contains alkaloids, ephedrine and pseudo-ephedrine. The total alkaloid content ranges from 0.7 to 2.33% of which only 10.0% is ephedrine while the rest is pseudo-ephedrine.

Folk Medicinal Recipe: The stem is dried and crushed to powder form. The powder is boiled in water and used in the morning and evening after meal for curing hay fever and cold.

Family Fagaceae

Quercus dilatata Royle

Local name: Tor Banj

Common Name: Barungi (U); Moru, Oak (E)

Voucher Specimen No: 9

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Part used: Acorns
Flowering Period: April-May
Chemical constituents: The plant is reported to contain tannin.
Folk Medicinal Recipe:
Acorns are half roasted, and then ground into powder form. A little amount is taken with Desi ghee. It is used in urinary infections, especially when urine oozes drop by drop.
Family Geraniaceae
Geranium wallichianum D. Don ex Sweet.
Local name: Rattan Jook, Srajarai
Common Name: Lijahri (U); Shepherds needle (E)
Voucher Specimen No: 113
Part used: Whole plant
Flowering Period: April-May
Chemical constituents: The plant contains gallic acid, tannin, red colouring matter, starch, pectin and sugar. Root contains essential oils, glucoside, genin and enzyme.
Folk Medicinal Recipe: The leaves and flowers are dried and crushed to powder. Sugar is added to it and used for curing stomach acidity, stomachache and gastric problems. The roots are crushed and mixed with wheat flour. It is then placed on fire and when it becomes warm, applied for curing back pain and arthritis.
Family Helveliaceae
Morchella esculenta (L.) Pers. ex Fr.
Local name: Kasee
Common Name: Guchi (U); Morel (E)
Voucher Specimen No: 59
Part used: Whole plant
Flowering Period: No flowers
Folk Medicinal Recipe: The plant is crushed to powder and used for stopping extensive bleeding from an injury. Morels are also fried with Desi Ghee and taken after meal as general body tonic. The plant is also used for aromatic purposes.
Family Juglandaceae
Juglans regia L.
Local Name: Ghuz
Common Name: Akhrot (U); Walnut (E)
Voucher Specimen No: 135
Part used: Leaves/bark/nuts
Flowering Period: March-April
Chemical constituents: Seeds yield fixed oil, juglandic acid and a resin. Kernels also yield oil. Fruit contains oxalic acid.
Folk Medicinal Recipe: Decoction of leaves is given in eczema and intestinal worms. Bark (Dandasa) is used for cleaning and sparkling teeth. Leaves are also used as lips make-up. Nuts can infect throat due to its oily nature. It has warm nature and can cause jaundice. The fresh fruit epicarp is used as a dye.
Family Lamiaceae
Mentha longifolia L.

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Local name: Dhoop
Common Name: Jangali podina (U); Horse mint (E)
Voucher Specimen No: 97
Part used: Leaves
Flowering Period: June-August
Chemical constituents: It contains pale yellow oil with mint odour. The plant also contains piperitone oxide (45%), diosphenole, piperitienone, piperitenone oxide and disphenolene.
Folk Medicinal Recipe: The leaves are used locally for stomachache, vomiting and acnes. The leaves are dried and then crushed. The powder of leaves is then used for treatment of stomachache and vomiting. For curing acne, 5 grams of crushed leaves are mixed with 3 grams of wheat flour and 2 pieces of Ghur (Local raw sugar) and the mixture is placed on acnes.

Ajuga bracteosa Wall. ex Benth.
Local name: Panrkash
Common Name: Kauri buti, Karku (U)
Voucher Specimen No: 28
Part used: Leaves
Flowering Period: March-August
Chemical constituents: The plant contains ceryl alcohal, cerotic acid, palmitic acid, oleic acid, linoleic acid, phenolic acids and neutral bitter components, alkaloids, diterpenoids and triterpenoids.
Folk Medicinal Recipe: The leaves are used locally for curing headache, pimples, measles and stomach acidity. The leaves are kept in a glass of water for a single night and the water extract is used in the morning.

Colchicum luteum Baker.
Local name: Ziargulay, Surenjan
Common Name: Suranjan-e-talkh (U); Meadow safron (E)
Voucher Specimen No: 61
Part used: Corm
Flowering Period: Feb-April
Chemical constituents: The corms contain alkaloid colchicines (0.21-0.25%), tannic acid, gallic acid, starch, sugar and gum. Seed contains (0.1-0.43%) alkaloid.
Folk Medicinal Recipe: Corm of *Colchicum luteum* are mixed with egg and then fried in Desi Ghee. Aged people for curing joints pain then use it. The drug is taken before going to bed at night.

Salvia moorcroftiana Wall. ex Benth
Local Name: Khardug
Common Name: Tukm-e-kanocha (U)
Voucher Specimen No: 151
Part used: Leaves
Flowering Period: May-June
Chemical constituents: Plant contains essential oil and mucilage.
Folk Medicinal Recipe: The leaves are warmed in mustard oil and applied on the swollen skin to release puss, while the inner part of the stem is chewed as an aphrodisiac agent.

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Leaves are boiled and used as mouthwash and gargle for inflammation of mouth and throat.

Origanum vulgare L.
Local name: Shamakai
Common Name: Mirzanjosh (U); Marjoram (E)
Voucher Specimen No: 70
Part used: Whole plant
Flowering Period: June-September
Chemical constituents: The plant contains essential oil (0.45-0.525%) containing 50% thymol, carvacol, origanene and tannin.
Folk Medicinal Recipe: The plant is crushed and the juice released is used for curing fever and stomach pain. The juice is also diuretic. Some locals also believe that the plant juice give comfort in toothache and earache.

Thymus linearis Benth.
Local name: Kaneesh
Common Name: Satar farsi (U); Wild thyme, Creeping thyme (E)
Voucher Specimen No: 99
Part used: Leaves/rhizome
Flowering Period: May-October
Chemical constituents: Thyme contains 0.15-0.6% volatile oil containing phenol, thymol, linalool, terpenes, terpene alcohol, tannins and resin).
Folk Medicinal Recipe: The leaves are used for the treatment of cold and breast pain. The rhizome is used for healing of wounds. The leaves are crushed to powder and are used in tea. This tea is taken for curing cold and breast pains. The rhizome after drying is crushed into powder form and placed on wounds. The wounds are healed up as a result of this application. The dried plant is crushed to powder and mixed with wheat flour. It is then given to cow, goat and sheep for increasing milk production.

Family Paeoniaceae
Paeonia emodi Wall. ex Hk. f.
Local name: Mamaikh
Common Name: Mammekh (U); Paeony (E)
Voucher Specimen No: 14
Part used: Rhizome
Flowering Period: April-June
Chemical constituents: The plant contains oxalic acid and tannins.
Folk Medicinal Recipe: The rhizome is used locally for body and bones pain. The rhizome is dried and then crushed to powder. The powder is then mixed in a local sweet dish called Halwa. Some times the powder is administered with milk for giving relief in pains.

Family Papaveraceae
Corydalis govaniana Wall.
Local name: Zangalee Surma/ Mamera
Common Name: Mamiran (U)
Voucher Specimen No: 26
Part used: Sap of the plant

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Flowering Period: March-May
Chemical constituents: The plant contains corydaline and bulbocapnine.
Folk Medicinal Recipe: The fresh roots are crushed and the liquid obtained is applied to eyes for cleaning and improving eyesight.
Papaver somniferum L.
Local name: Apeem/ Doddha
Common Name: Koknar, Afyun (U); Opium Poppy (E)
Voucher Specimen No: 38
Part used: Seeds/latex
Flowering Period: March-April
Chemical constituents: Sap contains oxalic acids. The plant contains more than 40 different alkaloids of which morphine (up to 20%), codeine (about 1%), narcotine (about 5%) and papaverine (about 1%) are prominent. It also contains meconic acid, albumen, mucilage, sugars, resin and wax.
Folk Medicinal Recipe: The seeds are used for brain relief and sharpening memory. For this, 15 grams of poppy seeds are mixed with 10 grams of Badam (*Prunus amygdalus*) seeds and are crushed. The powder is taken with milk. The dried fruit of opium and pomegranate is boiled in water. This water is used for curing cough and diarrhea in children.
Family Papilionaceae
Indigofera heterantha Wall. ex Brand
Local name: Ghoreja
Common Name: Jangli methi (U)
Voucher Specimen No: 15
Part used: Bark
Flowering Period: April-May
Chemical constituents: The plant yields a lactone, linifolin and a wax.
Folk Medicinal Recipe: The bark is peeled off from the rhizome and crushed. It is then added to a glass of water and kept for an hour. The water is used for relieving abdominal pain.
Family Primulaceae
Primula denticulata W.W.Smith
Local name: Zanghali Surma
Common Name: Mamerra Aslee (U)
Voucher Specimen No: 3
Part used: Rhizome
Flowering Period: April-June
Folk Medicinal Recipe: The rhizome is crushed in to powder and used like arsenic for cleaning eyes. The powder is considered to sharpen eyesight.
Family Plantaginaceae
Plantago lanceolata L.
Local Name: Speen Ispaghul
Common Name: Ispaghol (U); Plantain (E)
Voucher Specimen No: 64

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Part used: Seeds
Flowering Period: April-July
Chemical constituents: Plant contains glucoside aucubin, resin, waxes and large quantity of mucilage.
Folk Medicinal Recipe: The seeds are used in dysentery. The seeds are also crushed and mixed with oil and used for curing rheumatism and gouty swellings. The mucilage obtained from the seeds is applied on the fore head as treatment for headache.
Family Podophyllaceae
Podophyllum emodi Wall
Local name: Kakora/ Banasher
Common Name: Papra (U); May apple, Mandrake (E)
Voucher Specimen No: 6
Part used: Rhizome
Flowering Period: May-June
Chemical constituents: Plant contains podophyllin, podophyllotoxin. Roots of local plants yield higher resin (active principle 10-12%) as compared to American plants (4%). The rhizome gives podophyllol (8%), a sticky resin, quercetin and podophyllotoxin.
Folk Medicinal Recipe: The rhizome is cleaned, dried and crushed. The powder is used in toothache and curing hepatitis. Tablets are made from the rhizome powder mixed with Ghur (Desi sugar) and used for curing abdominal pain.
Family Polygonaceae
Rheum australe D. Don
Local name: Chottal
Common Name: Revand chini (U); Indian rhubarb (E)
Voucher Specimen No: 78
Part used: Whole plant
Flowering Period: April-July
Chemical constituents: The chief constituents of rhizome and roots are anthraquinone derivative. Root contains rhein and emodin. The leaves contain oxalic acid (1.34%). Rhizome yields glucosiderhaponticin and chrysophanic acid, and essential oil (0.05%) containing eugenol, a terpene alcohol and methyl heptyl ketone.
Folk Medicinal Recipe: The whole plant is dried and crushed. The powder is administered with water for curing constipation. The rhizome is cleaned, dried and crushed. The powder is added to whey (whey is made by adding water to yogurt) and used for curing constipation in livestock. The powder rhizome is mixed with egg, fried in Desi Ghee and used twice a day for the removal of kidney stones and other kidney problems.
The rhizome is crushed and mixed with wheat flour and then boiled. The recipe is administered to cows, sheep, donkeys and goats as purgative agent.
Family Pinaceae
Cedrus deodara (Roxb. ex Lamb.) G. Don
Local name: Diyar
Common Name: Deodar (U); Cedar (E)
Voucher Specimen No: 21
Part used: Resin, bark, gum

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Flowering Period: September-October
Chemical constituents: Plant contains gum, essential oil, cholesterin. The oil from wood possess balsamic odor. Needles contain ascorbic acid.
Folk Medicinal Recipe: Resin extract (2 to 3 drops) are added to a glass of milk and are taken early in the morning before breakfast for the treatment of urticaria and other skin diseases. Bark is crushed and taken with milk for curing fever, diarrhea and dysentery. The oil is applied on body for skin diseases and ulcer.
Family Juniperaceae
Juniperus communis L.
Local name: Ghoghar
Common Name: Abahal, Saru (U)
Voucher Specimen No: 53
Part used: Dry ripe fruits
Flowering Period: May-July
Chemical constituents: Local juniper yields as low as 0.25% of essential oil. It also contains resin (about 10%), fermentable sugar (about 33%), a bitter substance, juniperin, tannins, diterpenes and organic acids.
Folk Medicinal Recipe: The dry ripe fruits is crushed and added to mustard oil and kept over night. The oil is filtered and then applied on the body for curing itching.
Family Ranunculaceae
Aconitum violaceum Jacq. ex Stapf
Local name: Zahar mora
Common Name: Atees (U); Monkshood (E)
Voucher Specimen No: 13
Part used: Roots
Flowering Period: April-July
Chemical Constituents: The plant contains aconitine, aconine, sparteine, aconitic acid, benzoic acid, resins and tannins. The roots contain 4.3% indacotinine, aconitic acid and starch.
Folk Medicinal Recipe: The rhizome is crushed and kept in the intestine of a sheep. The intestine is then closed from both sides and boiled in water. It is eaten every morning before taking breakfast for curing arthritis.
The rhizome is crushed and added to wheat flour. It is then given to livestock for the treatment of lung diseases.
Aconitum heterophyllum Wall.
Local name: Sarba Zailay
Common Name: Atees (U)
Voucher Specimen No: 76
Part used: Roots
Flowering Period: April-July
Chemical Constituents: The plant contains aconitic acid, aconitine, tannic acid, mixture of oleic, palmitic and stearic glycerides and ash. The roots contain 4.3% indacotinine, aconitic acid and starch.

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Folk Medicinal Recipe: The fresh rhizome from the male plant is given to weak children along with mutton for enhancing their growth and weight. When the rhizome is administered with milk, it makes the color fairer. The rhizome is also used by adults for gaining weight. There is a popular myth that whenever a person use the rhizome, he should talk to a tree before talking to any body. If he did not do so, the rhizome will show opposite results.

Family Rosaceae

Sorbaria tomentosa Lindl.

Local Name: Beree

Voucher Specimen No: 147

Part used: Inflorescence

Flowering Period: July-August

Chemical constituents: The plant contains gallic acid and tannins.

Folk Medicinal Recipe: The inflorescence of Sorbaria is mixed with mustard oil and applied on the skin of newly born babe to remove skin rashes and also applied to the wounds as anti septic agent.

Family Rutaceae

Skimmia laureola (DC.) Sieb. & Zucc. ex Walp.

Local Name: Namer

Common Name: Baru, Nor (U)

Voucher Specimen No: 180

Part used: Leaves

Flowering Period: April-May

Chemical constituents: Plant contains essential oil containing terpines, l-linalool, l-linalyl acetate, azuline and bergaptene. It also contains alkaloid skimnianin, furocoumarin, isopimpinellin, umbelliferone, laureoline.

Folk Medicinal Recipe: The leaves are dried and crushed to powder form, then added to wheat flour. It is then given to livestock as anthelmintic. The smoke produced by burning leaves and small twigs are considered to be demon repellent.

Family Saxifragaceae

Bergenia ciliata (Haw.) Sternb.

Local name: Barmia

Common Name: Zakhm-e-hayat (U); Yeo (E)

Voucher Specimen No: 114

Part used: Rhizome

Flowering Period: March-August

Chemical constituents: The plant contains tannic acid, gallic acid, glucose, mucilage, wax, metarbin, albumen and mineral salts.

Folk Medicinal Recipe: The rhizome is used for the treatment of burns and wounds. The rhizome is dried and crushed into powder form. This powder is applied to burns and wounds for healing.

The dried rhizome is crushed to powder form and mixed with wheat flour, boiled in water and then given to cow, goat and sheep for curing diarrheoa.

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Family Verbinaceae
Verbascum thapsus L.
Local name: kherkanr
Common Name: Gidhar tambaku (U); Great mullein (E)
Voucher Specimen No: 91
Part used: Whole plant
Flowering Period: March-October
Chemical constituents: Roots contain bitter substance, saponin, mucilage, volatile oil, tannin and wax.
Folk Medicinal Recipe: Used in diarrheoa and dysentery of cattle, analgesic and antiseptic and wound healer. Leaves and flowers are used against cough and pulmonary diseases in the form of paste. Seeds are narcotic and fish poison. The leaves are also applied to injuries and swollen parts of the body.
Family Violaceae
Viola canescens Wall. ex Roxb.
Local name: Banafsha
Common Name: Banafsha (U); Sweet violet, Pansy (E)
Voucher Specimen No: 43
Part used: Whole plant
Flowering Period: March-May
Chemical constituents: The plant contains glucosides, methyl salicylate, alkaloid violine, a glycoside violaquercitrin, saponin.
Folk Medicinal Recipe: The herb is applied externally for eczema. The whole plant is boiled in water and the decoction obtained is used for curing cough, jaundice and body weakness. The flowers are used for the treatment of sore throat, kidney diseases, liver disorders and infantile disorders.

Collection, cleaning, drying and storage of medicinal plants

Medicinal plants are collected extensively during the summer season starting from March when the snow has almost melted to September. The collectors include men, women and children. The women and children collect plants while on their way to work in the fields and surrounding areas of their work place. The women and children of Ajar families collect medicinal plants while grazing their livestock. This type of collection of medicinal plants is carried out on daily basis. The men collectors belong to poor families of both Kohistani and Gujar tribes of the area. They are selective in their collection and collect only those plants that are profitable and can be sold easily in the local markets. They also collect morels from the forest. These people are experts, as they know the exact locations from where they can get their required plants. Their collection trips are long, as they comprise about 2 to 7 days in the forest. In majority of circumstances the collection is sold in the local market in fresh form. However, some plants are stored for several months in order to get higher price for them.

The indigenous procedure of plant collection, cleaning, drying and storage is briefly discussed. Drawbacks pertinent to these techniques are also documented.

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Collection of medicinal plants

The plant collectors are usually unskilled people in the sense that they are totally unaware about the modern techniques of medicinal plant collection. These people carry hoe and other tools for digging these plants. The plants collected are packed in bundles and are carried to their homes. The plants collected are washed with water to remove mud attached to the rhizomes of these plants.

Drawbacks

The collectors do not know about the proper time of collection of medicinal plants. An early or late collection of medicinal plants result in an inferior quality of drug. The ideal time of a plant collection is that when the plant contains maximum amount of therapeutically active principles. Beside this, all the rhizomes are collected which have resulted in a drastic decrease of these medicinal plants in the area.

Drying of medicinal plants

The plants collected are mostly dried under the sun and kept under open sky.

Drawbacks

Medicinal plants degrade in terms of their active constituents if they are not properly dried. The local collectors are also unaware of the bleaching effect of sunrays on colored or other light sensitive drugs. The night dew and humidity also deteriorates the quality of these drugs.

Packing and storage of medicinal plants

The plants after collection are packed in bags, sacks and cotton cloths. The collectors use same packing material again and again until fully rotten. The collectors could not afford to buy canisters and other appropriate packing materials. The plants are stored in mud huts and some times in the rooms used for dinning and sleeping. Large amounts of medicinal plants are thus wasted during packing and storage process.

Drawbacks

Medicinal plants deteriorate if the material is not properly packed and stored. The nature of the packing material has its bearing on the conditions and quality of the stored material. Similarly, the nature of storing place also has a significant effect on the stored material. Factors like temperature, humidity, light can have both direct and indirect adverse effects on the stored material. Improper storage also results in the attacks of moths, insects, beetles and ants. All these factors greatly damage the quality and quantity of the drug.

Folk preservation techniques

Colchicum luteum is collected from the wild. Root bark of *Juglans regia* is crushed to powder and applied to the collected *Colchicum luteum.* The collection is then boiled in

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water and dried in shade. The bark is then removed and dried under the sun. It is then stored. The rhizomes of *Valeriana jatamansi*, *Podophyllum hexandrum*, *Paeonia emodi* and *Calendula arvensis* are boiled in water, dried and cleaned. The rhizomes are then stored in bags in the storerooms for 3 to 4 months.

Discussion

Pakistan has about 6,000 species of wild plants of which about 400 to 600 are considered to be medicinally important. A survey by Pakistan Forest Institute concluded that 75 crude herbal drugs are extensively exported and more than 200 are locally traded in Pakistan. Indigenous people, who have no training in sustainable harvesting, post-harvesting care and storing of medicinal plants, collect 85 percent of these crude herbs from the wild. Such activity is causing a rapid depletion of medicinal plant resources. In addition, indigenous knowledge used to identify, evaluate and apply medicinal plants is dying out and no systematic documentation of the ethnobotanic information exists. The local population use these plants for long times and their efficacy is proven. In many cases, the local uses are different from those given in literature and thus they are of paramount importance and need to be documented before they are lost. According to recent estimates, 25 percent of all prescribed medicines in the developed world contain ingredients derived from plants and roughly 80 percent of the world's population living in the developing world relies on herbal remedies for their primary health care needs (Shinwari *et al*., 2003).

In Pakistan Unani system of medicine provide basic health care facilities to large portion of the population that are poor and cannot afford the expensive allopathic drugs. In Utror and Gabral, however, the local people are primarily dependent on indigenous plant recipes, prepared locally and have been used for a long time. The recipes documented in this study are different from the recipes documented in different pharmacopoeias. For instance the medicinal use of *Indigofera heterantha* is never reported in other works based on medicinal plants.

In Utror and Gabral valleys, medicinal plants are collected by low-income villagers who collect medicinal plants. Most of these medicinal plants are used for the treatment of different ailments in the area. The crude drugs are primarily given to children and used by aged people as these drugs cost nothing to the locals and aged people still got the habit of using it although the young generation prefers to use allopathic medicines for curing their ailments. Ethnobotanically, most of the species reported has multiple uses. Besides medicinal uses, these plants are also used as fuel, fodder, timber, ornamental, and pot herbs. For example, the nuts of *Juglans regia* are edible, and are also used in culinary preparations. Its roots, fruits and leaves are locally used for dying clothes; womenfolk use the bark for cleaning teeth (Dandasa) and coloring lips. Wood is used for making furniture and leaves as fodder for cattle.

Hamayun et al. (2003) reported that medicinal plants are collected in District Buner by the local people and are used to cure various ailments. For example the leaves decoction of *Ajuga bracteosa* Wall ex. Bth. is used in jaundice, hypertension and sore throat. Roots of *Adathoda vasica* L. is used in rheumatism, pneumonia and cough, while leaves are used as antiseptic, expectorant, antispasmodic, and demulcent. Gum of *Acacia modesta* Wall. is

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used as tonic and stimulant. Leaves of *Datura innoxia* Mill is used in toothache, headache and epilepsy, the seeds are antipyretic, and narcotic. *Paeonia emodi* Wall. HKf. is used in backache, dropsy, epilepsy, convulsions, hysteria and uterine diseases. The chemical constituents of these plants justify the local uses but more investigations are required on the chemical constituents of these medicinal plant species.

No economic analysis exists to date for the marketing chain from collection to consumption systems. It is essential to know exact amounts of plant material collected, refined and get to local, national and International markets as it will give us the rough picture of the whole system from collection to consumption. It may also be the one reason of overexploitation of highly valuable and endangered medicinal plants. All available data are related to quantities traded in markets at specific time and their approximate values.

A survey conducted by Hamayun et al. (2003) showed that medicinal plants collectors in Utror and Gabral valleys include womenfolk (48.26%), men folk (27.0%) and children (24.74%). Almost 90% of these medicinal plants are sold in the local market in fresh form as the collectors are poor and needy. Some species are cleaned, dried in the sun and stored in plastic bags. The percentage of losses is much higher in the storage because the collectors are unaware of the proper storage methods of these plants.

The availability of medicinal plants decreased during the past 20 years. According to aged villagers, medicinal plants were abundant in the vicinities of human settlements some 20 years back. However, the population of medicinal plants drastically decreased due to increased marketing pressure on medicinal plants, lack of job opportunities in the area, non-sustainable harvesting methods like digging of whole plant and increased population of the area. The medicinal plants are now collected in large volumes from remote areas of Desan, Ghos, Ladhu, Pala-Shair, Sind, Molat, Gozba, Deej, Tosi and Kagishdin (Hamayun et al., 2003).

Market survey of medicinal plants revealed that there is monopoly by one or two persons in the whole market at local as well as national level. However, all other shops situated in an area sell drug plants at small scale. Due to this monopoly, these local traders buy items from the locals at a very low price and sell them at exorbitant price to users.

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