

Full Length Research Paper

An ethnobotanical survey of medicinal plants used by Gujjar Community of Trikuta Hills in Jammu and Kashmir, India

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Plants are integral source of medicine in the rural areas, particularly in the tribal communities. An ethnobotanical survey on the medicinal plants used by the Gujjar community of the Trikuta hills, one of the least explored areas of the Jammu and Kashmir state of India, was undertaken. Information on the medicinal plants was mainly gathered from local people and traditional healers through questionnaires, and formal and informal discussions by undertaking frequent field trips. Seventy plants belonging to 43 different taxonomic families were recorded in the study area. Majority of the plants were herbs, though trees, shrubs, climbers and some epiphytes were also found. Leaves were ranked as the commonest part being used followed by roots and whole plants. More than one plant part was in use for the cure of different ailments. Most of these plants were used as decoctions, pastes, herbal teas or tonics and administered orally. Some of the plants encountered in the study area were rare and endangered thus inviting the attention for their conservation and preservation.

Key words: Folk herbal remedies, Gujjar community, traditional medicines, Trikuta hills (Jammu and Kashmir).

INTRODUCTION

Plants have served as the basis of traditional medicine system for thousands of years in countries such as China and India (Gurib-Fakim, 2006). These plant based systems continue to play an essential role in health care medicines. The development of clinically effective anticancer agents such as taxol (from *Taxus brevifolia*) and the discovery of potential anti AIDS agent such as michellamine B (an alkaloid from woody vine, *Ancistrocladus* species) and calanolide A (from *Calophyllum teysmanii*) demonstrate the value of plants as source of potential new drugs and highlight the importance of conserving these valuable resources (Gurib-Fakim, 2006). There is also a renewal of interest in the natural plant products as these are biologically more compatible with the system and have little

toxicological concerns. As per World Health Organization (WHO), nearly 80% of the world inhabitants, especially living in the rural areas of developing countries, rely mainly on traditional medicines for their primary health care (WHO, 2003). There are several areas world over where a vast knowledge on the use of plants against different illnesses exists. In fact, medicinal plants and their traditional uses have been an integral part of social, cultural, religious aspect of ancient civilization (Folke, 2004). Plants have been the basis of traditional medicinal systems including Ayurvedic, Unani and Chinese. Unfortunately, due to scarcity of written documents, relative low income and lack of interest of younger generations, the traditional knowledge on medicinal plants is highly threatened and fast eroding (Huntingto,

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2000). Of late, rediscovery of traditional knowledge about medicinal plant usage by local communities has been viewed as an important tool for natural resource management (DeWalt, 1994). The importance of local people and traditional knowledge in biodiversity conservation and ecosystem management has been well recognized by the international agencies, organizations and conventions such as Center for Biological Diversity (CBD) (Cormier-Salem and Roussel, 2002). Efforts are, therefore, required for assessing and documenting such knowledge and methods of utilizing these resources (Cunningham, 2001).

India has rich plant diversity and is one among the mega biodiversity countries of the world. Indians have been using medicinal plants since antiquity and the Ayurvedic methods date back to 5000 B.C (Kapoor, 1990). However, due to rapid industrialization and urbanisation, the knowledge has now been restricted to a few elderly people in the rural /tribal areas, who largely remain delinked from those in the urban areas. In order to bridge this gap, documentation and investigation on the medicinal uses of the plants by the rural people/tribes living in the remote areas is required.

Jammu and Kashmir, the northernmost state of India, has a rich repository of biodiversity including a diverse variety of medicinal plants (Dar et al., 2002). Previous studies have documented ethnobotanical information from Kashmir-Jhelum (Naqshi et al., 1992), Shopian (Tantray et al., 2009), Guries Valley (Ara and Naqshi, 1992), Kashmir valley (Dar et al., 1984), and Ladakh (Bhattacharyya, 1991), and Poonch valley (Khan et al., 2011). However, Trikuta hills in the Jammu region and inhabited by Gujjars are largely unexplored. Since Gujjars are shepherd by occupation, they keep on shifting from one place to another and mostly stay in the upper reaches of hills. Due to nomadic life style and remote area, primary health services are very low. Additionally, being illiterate, they believe more in traditional healing practices and have strong faith in them. However, studies documenting the traditional knowledge of medicinal plants used by Gujjars in this region are lacking. We therefore conducted a study to document and assess knowledge on the medicinal plants used by the Gujjar community of the Trikuta hills.

MATERIALS AND METHODS

Description of the study site

Trikuta hills (Map shown in Figure 1) lie between 32° 59' and 33° 10' N latitude and 74° 55' and 75° 50' E longitude and the altitude ranging from 360 m (at Bhabber of Katra) to 3000 m (at the top of Trikuta ridge). Climate is extremely cold in the months of December to February; temperature rises abruptly towards the end of April and remains hot till end of July. The region receives snowfall in the month of January in the area situated above 2000 m. The flora of this state is diverse (ranging from sub-tropical to temperate) due to its unique location and diverse climatic conditions.

Methods of data collection

Ethnomedicinal data were collected between August, 2009 and April, 2011. The information was obtained through semi-structured questionnaires and interviews with key informants like local residents, health workers, renowned herbalists, etc., and through. Semi-structured questionnaires consist of closed and open questions, helps to accommodate responses from different groups, and get both qualitative and quantitative responses. The questionnaire /interview focussed mainly on the local names of the plants, plant part used and the ailment being cured, and the preparation and use of medicinal plants. The specimens of the ethnomedicinal plants were collected, identified, dried and a voucher specimen have been deposited at the Herbarium, Panjab University (PAN), Chandigarh, India. In all, information was collected from 25 persons (20 men and 5 women in the age group of 45 to 75 years). In one day, nearly 2 h were spent with one informant to gather the information and three informants were interviewed. Regular field visits were undertaken to the study area to get information on the uses of medicinal plants from various sections of the community and validate the gathered information (Figure 4). The reliability of the gathered information was confirmed by visiting and interviewing the informant thrice.

RESULTS

The present study documented 70 plant species belonging to 43 families that have been used for medicinal purposes by the Gujjars in Trikuta hills. These have been arranged alphabetically and the information has been provided about their botanical name, family, local and English name, plant part used, and the method of administration (Table 1). These plants grow in a variety of habitats such as forest areas, open grasslands, fields, and rocky areas on the hills, etc. Of the documented plants, 11% (8 species) belonged to family Asteraceae, 9% (6 species) to Lamiaceae, and 9% (6 species) to Fabaceae with. In addition, three species each belonged to family Liliaceae, Polygonaceae and Solanaceae. Families Rubiaceae, Menispermaceae, Fagaceae, Malvaceae and Verbenaceae were represented with two species each (Figure 1). Among the identified medicinal plants, 33 were herbs (~47%), 13 each were shrubs and trees (~19%), 9 (~13%) were climbers and 2 were epiphytes (~3%) (Table 1, Figure 2).

Plants of Trikuta used by the Gujjars cure a number of diseases including rheumatism, skin problems, and respiratory and reproductive disorders. Species of *Celastrus*, *Urtica*, *Hedera*, *Verbena*, *Dioscorea*, and *Saussurea* are used for the treatment of rheumatism, whereas those of *Bombax*, *Asparagus*, *Rubia*, *Dioscorea* and *Verbena* are used against sexual and reproductive disorders.

Different parts of the plants were used for the treatment of various ailments /disorders fever, common cold and cough, asthma, abdominal pains, rheumatism, blood pressure, and liver related problems (Table 1). The most commonly used plant part was leaves (28 species), followed by roots (of 25 species), whole plants (17 species), floral parts and fruits (9 species), seeds (7

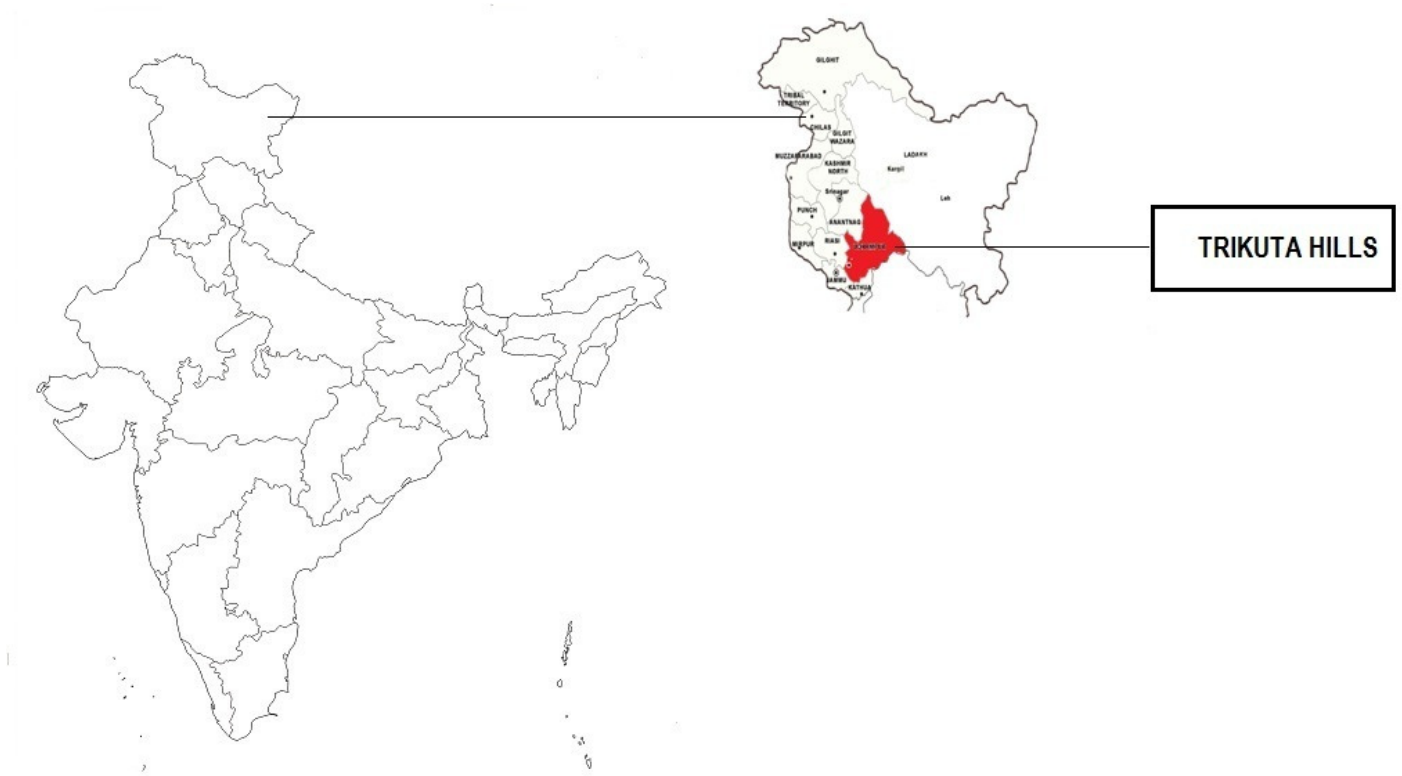


Figure 1. Geographical location of the study site, Trikuta hills (Jammu and Kashmir, India).

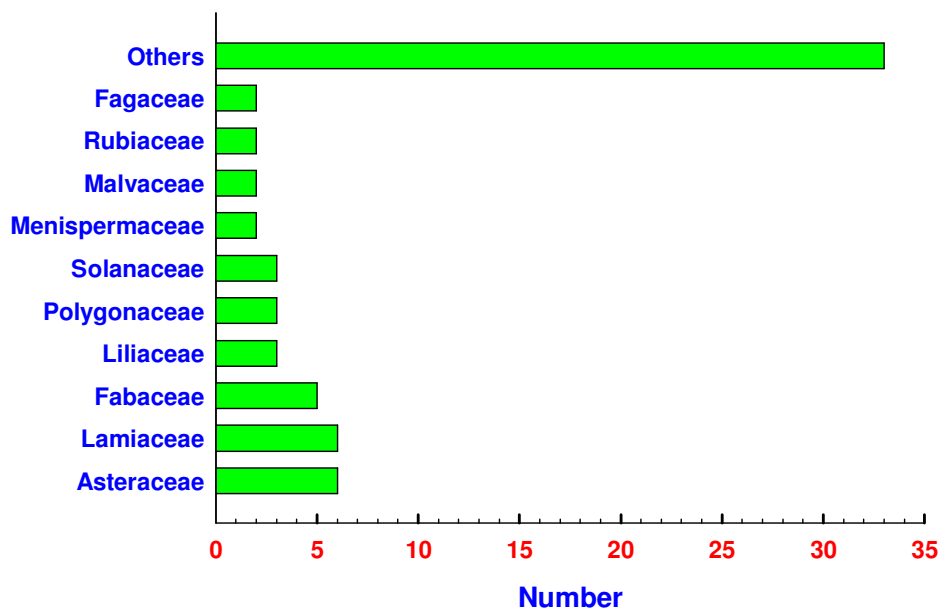


Figure 2. Distribution of ethnomedicinal plants, used by Gujjar community of Trikuta hills (Jammu and Kashmir, India), into different angiosperm families.

species), bark (3 species), and resins (2 species) (Figure 3). In most of the plants more than one part was used as medicine. For example, in *Saxifraga ligulata* both

underground and aboveground parts were used for curing different ailments. Most of the species were used for curing more than one disease. These were

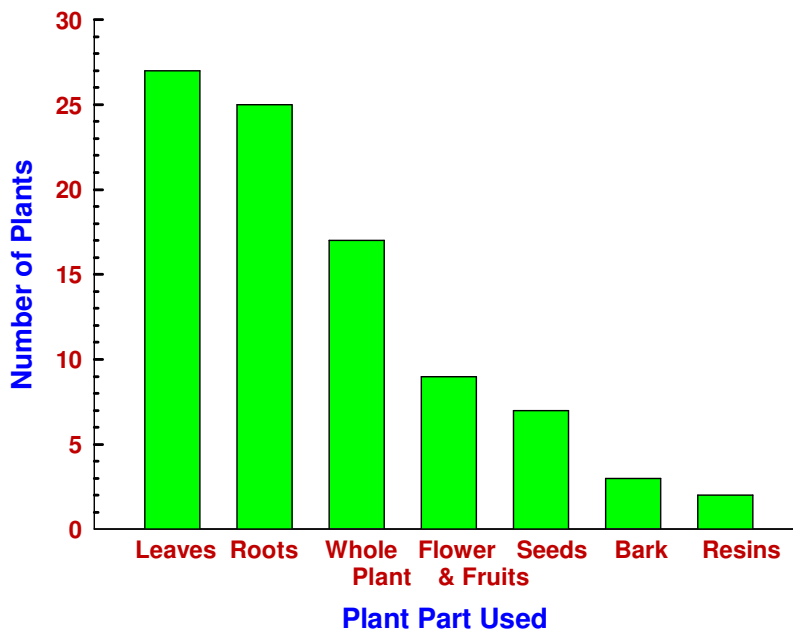


Figure 3. Frequency of use of different parts of ethnomedicinal plants by Gujjar community of Trikuta hills (Jammu and Kashmir, India).

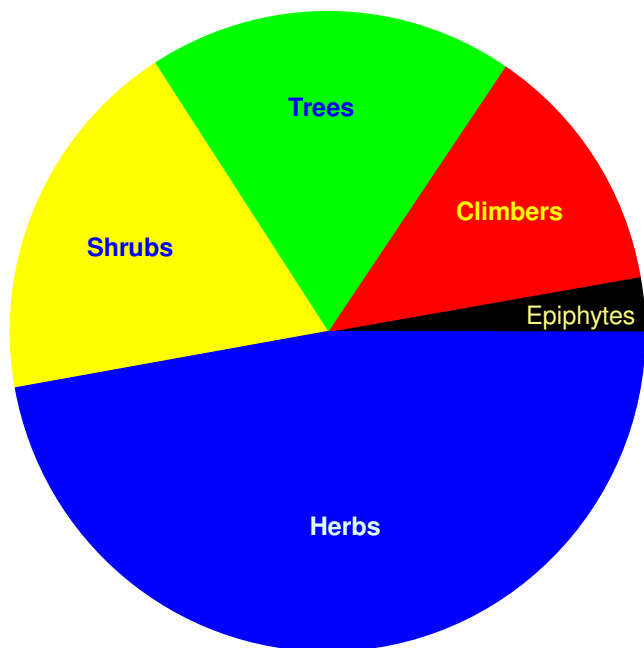


Figure 4. Distribution of medicinal plants used by Gujjar community at Trikuta hills (Jammu and Kashmir, India) into various life-forms.

Most of these preparations were made from the freshly collected plants just before the use; however, some are also used in dry form (Table 1).

DISCUSSION

The present study reports the ethnomedicinal use of 70 plant species belonging to 43 families by the Gujjar community of Trikuta hills. Such a high diversity of plant use is indicative of significant role of phytotherapy in curing health problems. Most plant species used by the Gujjars in Trikuta hills belonged to family Asteraceae. This is not surprising since Asteraceae is one of the largest families of flowering plants and is the most abundant in this region (Dar et al., 2002). Besides, other predominant families in the study area were Lamiaceae, Fabaceae, Liliaceae, Polygonaceae and Rubiaceae etc., suggesting their species richness in the local flora and confirmed by earlier reports (Dar et al., 2002). The present study documented that herbs were the primary source of medicine. This may be attributed to humid climate of the area that facilitates the growth of herbs. These observations are in conformity with other studies conducted elsewhere reporting herbs as the most dominant and ethnomedicinally important plants (Tangjang et al., 2011; Yineger et al., 2008). The most frequently used plant part was the leaves followed by roots, whole plant, flowers, fruits, seeds and bark. The greater use of leaves for the purpose of medicine is not surprising since these are the most accessible parts and

administrated mostly orally and a range of preparations such as decoction, paste, as powder, as juice or as vegetables eaten raw, herbal tea, and oil were adopted.

Table 1. List of medicinal plants used traditionally by Gujjar community in Trikuta hills, Jammu and Kashmir (India) for the cure of diseases.

Botanical name and family	Voucher Code	Habit and habitat	Local and English name	Part used	Mode of application	Ethnomedicinal use
<i>Abies pindrow</i> Pinaceae	PAN-18080	Tree Forest area	Fir, Himalayan silver fir	Leaf, resin	Dried, oil	Ulcer, Rheumatism
<i>Abrus precatorius</i> Fabaceae	PAN-18065	Climber Forest area	Rakantha Rosary beads	bail, Leaf, seeds	Decoction	Menstrual cramps, Nerve tonic.
<i>Achillea millefolium</i> Asteraceae	PAN-18079	Herb Forest meadows	Pahale kutch Millfoil	Leaves and floral heads	Paste	Crushed leaves and flower heads are used against inflamed gums and tooth ache
<i>Achyranthes bidentata</i> Amaranthaceae	PAN-18076	Herb Open grasslands and forest floors	Purkandi, Prickly flower chaff	Leaves and roots.	Paste	Against insect bite, snake bite, scorpion bite, worn on arm in fever, abdominal pains
<i>Adiantum capillus-veneris</i> Pteridaceae	PAN-18068	Epiphyte Forest areas	Parshoshan, Maiden hair fern	Whole plant	Paste	Piles and fissure, leaves are tied around fractured bone for quick healing, diuretic and febrifuge
<i>Aesculus indica</i> Sapindaceae	PAN-18064	Tree Forest areas	Van khodi, Indian chestnut	horse Seeds and fruits.	Oil	Oil for rheumatism, flowers have astringent properties
<i>Ajuga bracteosa</i> Lamiaceae	PAN-18094	Herb Forest area	Neel kanthi, Blue bugle	Leaves	Juice, paste, and decoction	Applied locally on areas of bells palsey, blood purifier and decoction of leaves used against stomachache. Leukorrhoea
<i>Asplenium dalhousiae</i> Aspleniaceae	PAN-18053	Herb Forest area	Gutti, Dalhousie spleenwort	Roots	Decoction	Infants as Ghutti
<i>Atropa belladonna</i> Solanaceae	PAN-18055	Shrub Open grass land	Saangangur, Deadly night's shade	Whole plant, Roots	Raw and powdered	Intestinal cramps, Arthritis, Excessive salvation.
<i>Allium rubellum</i> Liliaceae	PAN-18060	Herb open grass lands	Farnu Masala fern	Flower head, leaves	Powder	Leaves and flowers used as condiment, reduce blood cholesterol
<i>Asparagus adscendens</i> Liliaceae	PAN-19031	Shrub Forest areas	Sansspore White musli	Rhizome	Young shoots	Increases milk production in lactating mothers, aphrodisiac property.
<i>Berberis lycium</i> Berberidaceae	PAN-18072	Shrub Hilly areas	Rasaunt Berbery	Roots and fruits	Paste	Roots extract is applied to eyesores and piles, possess cooling effect, antiseptic

Table 1. Contd.

<i>Bistorta amplexicaulis</i> Polygonaceae	PAN-18095	Shrub Hilly terrains	Mundi chaye mountain flower	White fleece	Rhizome	Dried powder	Herbal tea beneficial in checking menorrhagia, asthma, joint inflammation.
<i>Boerhavia diffusa</i> Nyctaginaceae	PAN-19012	Herb Roadsides	Itshit, Hogweed		Roots	Powdered	Roots are laxative, powdered roots are applied on gangrenes
<i>Bombax ceiba</i> Bombacaceae	PAN-19030	Tree Forest areas	Safed muli Red silk cotton tree		Roots	Powdered	Roots are used against male reproductive problem.
<i>Butea monosperma</i> Fabaceae	PAN-19029	Tree Plain areas	Pala, Flame of forest		Whole plant	Paste	Cancer and skin ailments
<i>Castanea sativa</i> Fagaceae	PAN-18090	Tree Forest area	European chestnut -		Seeds	Raw	Constipation and piles, Dried flowers are taken with milk
<i>Celastrus paniculata</i> Celastraceae	PAN-18059	Climber Forest areas	Malkangani tree	Intellect	Seeds	Oil	Seeds yield oil which is used in rheumatism and gout.
<i>Cissampelos pareira</i> Menispermaceae	PAN-19003	Climber Forest area	Baatal bail, Ice vine		Leaves, Roots	Raw, Juice	Eye problems, Stomach ache, Boils and pimples
<i>Cichorium intybus</i> Asteraceae	PAN-19002	Herb Fields	Kashni, Cichory		Roots, Leaves	Powdered, Juice	Anti-inflammatory, rheumatism
<i>Convolvulus arvensis</i> Convolvulaceae	PAN-19004	Climber Plains	Rajbala, Field bindweed		Roots, Leaves	Powder and paste	Piles and dandruff
<i>Colebrookea oppositifolia</i> Lamiaceae	PAN-19013	Shrub Rocky places	Swali Indian Squirrel plant		Leaves	Paste	Leaves tied on infant stomach gives relief to stomach ache. Fastens healing
<i>Cordia myxa</i> Boraginaceae	PAN-19014	Tree Forest areas	Lasuda Assyrian plum		Fresh leaves.	Paste	Fresh leaves are cooked as vegetable used against Loose motions
<i>Corydalis govaniiana</i> Papaveraceae	PAN-18061	Shrub Hilly terrain	Bhoot Corydalis	nashni,	Roots	Powdered and decoction	Diuretic, eye infection
<i>Datura stramonium</i> Solanaceae	PAN-18078	Herb Open areas	Datur, Thorn apple		Whole plant	Powdered	Anti inflammatory, insanity
<i>Delphinium denudatum</i> Ranunculaceae	PAN-19015	Herb Moist and shady places	Mori Larkspur		Seeds and roots	Paste	Seeds used as insecticide and in treatment of skin eruption, Roots in high fever and tooth ache

Table 1. Contd.

<i>Desmodium microphyllum</i> Fabaceae	PAN-18074	Shrub Forest area	Mathuri	Roots	Decoction	female reproductive problems
<i>Digitalis purpurea</i> Plantaginaceae	PAN-18058	Herb Plain area	Tilmohri, foxglove	Leaves	Juice	Heart tonic and epilepsy
<i>Dioscorea deltoidea</i> Dioscoreaceae	PAN-18084	Climber Plain areas	Kreench Wild yam	Tubers	Powdered, paste	Used in rheumatism, ophthalmic ailments and in the synthesis of contraceptive pills
<i>Eclipta alba</i> Asteraceae	PAN-19016	Herb Moist places	Bhangara False daisy	Whole plant	Powdered	Powdered plant material along with sugar is made into drink-good for heat
<i>Erigeron bonariensis</i> Asteraceae	PAN-19017	Herb Waste places	Shesherda Asthma weed	Leaves	Powdered	Heart burn sensation
<i>Fumaria indica</i> Fumariaceae	PAN-19018	Herb Along fields	Pith patra Fumitory	Whole plant	Powdered	Diuretic, plant is dried then powdered, mixed with honey and applied on small pustules
<i>Galium aparine</i> Rubiaceae	PAN-18089	Climber Forest floors	Ranghe Scabrid bed straw	Whole plant.	Juice	Whole plant is used as diuretic and for detoxification
<i>Gerbera gossypina</i> Asteraceae	PAN-18096	Herb Hilly terrain	Bhurjali, Hairy gerbera daisy	Leaves, whole plants	Roots	Increase milk production in lactating mothers.
<i>Gloriosa superba</i> Liliaceae	PAN-18093	Herb Forest areas	Karianaga Flame lily	Roots	Fresh roots	Roots as source of colchicine and purgative, antidote to cobra bite
<i>Hedera nepalensis</i> Araliaceae	PAN-18082	Climber Forest areas	Ktambari Ivy	Leaves, Berries	Raw, Decoction.	Stimulant, diaphoretic, cathartic, rheumatism
<i>Holarrhena antidysenterica</i> Apocynaceae	PAN-19019	Tree Rocky hill sides	Inderjoe Easter tree	Seeds, bark and leaves	Dried, Decoction	Joint pains, Indigestion, Nausea, dysentery
<i>Hypericum oblongifolium</i> Hypericaceae	PAN-18081	Shrub Moist and shady places	Basantharad Saint John's wort	Roots, fresh leaves	Decoction	Antispasmodic, bronchodilator.
<i>Indigofera gerardiana</i> Fabaceae	PAN-18051	Shrub, Forest area	Kathi Gerards Indigo	Root	Dried	Abdominal pain
<i>Inula cappa</i> Asteraceae	PAN-18056	Herb Forest area	Khardmalli, Sheeps ear	Root	Raw, juice	Decoction of roots for mouth ulcers, oedema

Table 1. Contd.

<i>Justicia adhatoda</i> Acanthaceae	PAN-19028	Shrub Roadsides and wastelands	Barakanda Vasaka	Leaves and roots	Decoction	Decoction used in cough, asthma and chronic bronchitis
<i>Leucas aspera</i> Lamiaceae	PAN-18092	Herb Along fields	Bara halkasa Thumai	Whole plant	Dried	Stimulant
<i>Azadirachta indica</i> Meliaceae	PAN-19020	Tree Forest areas	Dhrek, Persian lilac	Leaves	Fresh leaves, Powdered form	Leaves tied around throat are good for mumps, tonsil, fruit cover dried powdered mixed with <i>Aloe vera</i> and honey good for cancer cure
<i>Ocimum americanum</i> Lamiaceae	PAN-18091	Shrub Forest area	Ghareda Lime basil	Leaves and seeds	Fresh and powdered, decoction	Stomach ache in infants and also for internal swelling
<i>Polygonum capitatum</i> Polygonaceae	PAN-18070	Herb Hilly terrain	Chodru , Pinkhead kotweed	Aerial part	Decoction and juice	Eye problems and urinary infection.
<i>Punica granatum</i> Punicaceae	PAN-18086	Tree Forest area	Dharudni Wild pomegranate	Fruit, bark	Raw, Decoction	Increases appetite, against tapeworm
<i>Quercus leucotrichophora</i> Fagaceae	PAN-18073	Tree ,Forest area	Banjh, White oak	Resin	Dried resin	Stomach ache
<i>Rabdosia rugosa</i> Lamiaceae	PAN-18062	Herb Plain areas	Maldah, Wrinkled leaf Isodon	Leaves	Decoction	Best honey is obtained from its flower; leaves also used for stomach ache and gastric
<i>Rhododendron arboreum</i> Ericaceae	PAN-18071	Tree Forest area	Matahal, Rose tree	Flower	Raw, cooked	Blood enhancer
<i>Ricinus communis</i> Euphorbiaceae	PAN-19027	Shrub Open areas	Arand, Castor	Leaves and seeds	Oil and fresh leaves	Leaves tied on joint good for joint pains, oil from seeds as expectorant
<i>Rubia cordifolia</i> Rubiaceae	PAN-18063	Climber Dry slopes	Manjit Madderwort	Leaves and fruits	Juice	Acts as an astringent, discoloration of skin and freckles menorrhagia, menstrual disorder
<i>Rubus niveus</i> Rosaceae	PAN-18075	Shrub Forest area	Kale akkha, Hill raspberry	Fruits	Raw	Blood enhancer
<i>Rumex hastatus</i> Polygonaceae	PAN-18097	Herb Sloppy areas	Khatti ambi, Arrowleaf dock	Whole plant	Juice	Juice from plant removes leech from ear

Table 1. Contd.

<i>Salvia plebeia</i> Lamiaceae	PAN-19026	Herb Open spaces	Kakrondha, Sage weed	Leaves	Juice	Given to patients with frequent reoccurrence of diarrhoea
<i>Saussurea costus</i> Asteraceae	PAN-18085	Herb Rocky slopes	Kuth, Costus	Roots	Oil, decoction	Roots are used in cough, bronchitis, oil from roots are used in rheumatism
<i>Saxifraga ligulata</i> Saxifragaceae	PAN-18083	Herb Moist rocks	Pathar phorh, Saxifrage	Leaves and Roots	Powdered, paste	Kidney stone, leukorrhea, leaves are used in wound healing, tubers are used as tea
<i>Sida rhombifolia</i> Malvaceae	PAN-19011	Herb In wild areas	Chikana, Country mallow	Whole plant	Paste	Relief from micturation and leukorrhea
<i>Sisymbrium irio</i> Brassicaceae	PAN-19021	Herb Marshy and moist places	Khubkali, London rocket	Whole plant	Juice seeds	Whole plant Astringent and expectorant
<i>Solanum nigrum</i> Solanaceae	PAN-19010	HerbRoadsides	Kaya koti, Black night shade	Leaves	Paste	Used for tingling sensation in organs and in oedema, Kidney inflammation
<i>Taraxacum officinale</i> Asteraceae	PAN-18054	Herb Plain areas	Bathur Dandelion	Roots leaves and	Powdered	Roots-diuretic for chronic disorder of kidney, leaves used for fomentation, blood purifier, dislocation of joints, diarrhoea, dysentery, foment, gastric ulcers
<i>Taxus baccata</i> Taxaceae	PAN-18077	Tree Forest	Brahmi Common yew	Bark	Powdered	Used as tea
<i>Tinospora cordifolia</i> Menispermaceae	PAN-19022	Climber Forests and along fields	Giloe, Heart-leaved tinospora	Stem	Decoction	Decoction of stem for dengue fever
<i>Trifolium pratense</i> Fabaceae	PAN-19007	Herb, Plain area	Red clover, Triptr	Leaves, Flower head	Decoction	Tea
<i>Tribulus terrestris</i> Zygophyllaceae	PAN-19008	Herb Open areas (preferably sandy)	Gokshru Land caltrops	Whole plant	Decoction	Decoction prepared from fruit and thorn is good for kidney ailments like stone, urinary tract infection and inflammation.
<i>Urtica dioica</i> Urticaceae	PAN-19025	Herb Plain areas	Soi Stinging nettle	Whole plant	Decoction	Water extract of leaves have antiseptic properties, also used against gout, sprain, swell
<i>Valeriana jatamansi</i> Valerianaceae	PAN-18098	Herb Exposed rocks and shady places	Mushkhibala Indian valerian	Roots	Decoction	aromatic, bitter roots antiseptic, used for treatment of epilepsy, it is also used as sedative
<i>Verbena officinalis</i> Verbenaceae	PAN-19009	Herb Open areas	Common verbena Verbain	Roots leaves and	Oil, paste	Roots-remedy for snakebite, leaves used as tonic in rheumatism and diseases of joints, ointment from leaves is given for swelling of womb, in nervous complications

Table 1. Contd.

<i>Viola serpens</i> Violaceae	PAN 18088	- Herb Moist and shady places	Banafsha Sweet violet	Whole plant	Dried powder	Rhizome –herbal tea for relieving cough and bronchitis, used in gargles, Flowers - used in lung troubles. Made into syrup for throat, the fresh herb is used in homeopathy for diseases of skin, eye and ear.
<i>Vitex negundo</i> Verbenaceae	PAN- 19024	Shrub Road sides	Bana Chinese chaste tree	Leaves	Oil	Anti-rheumatic, anti-arthritis
<i>Zanthoxylum armatum</i> Rutaceae	PAN- 19023	Shrub Plain areas	Timbru Wing leafy prickly ash	Whole plant	Oil and fresh shoots	Antihelminthic, toothache, itching, stomachache

hence used to the maximum extent for medicinal use (Gurib-Fakim, 2006). Roots were the second most commonly used plant part. However, their excessive use is detrimental for their survival since whole plant has to be uprooted. Not only roots, even the use of more than one plant part for medicinal purpose has put these plants to extinction risk owing to damage inflicted on the plants (Gurib-Fakim, 2006).

The study reported various preparation methods adopted by the Gujjars. These included preparation of decoction in water, crushing/extracting plant material in cold or boiled water. Medicinal plants like *Bistoria amplexicaulis*, *Saxifraga ligulata* and *Taxus baccata* were taken as herbal tea (Facciola, 1990; Hamayun et al., 2006; Pant et al., 2009). Another interesting mode of administration was tying the plant part against body part to get relief from some diseases. For example, *Colebrookia oppositifolia* leaves against stomach of infants to get relief from stomach ache; *Azadirachta indica* leaves around throat to get relief from mumps and tonsils; and leaves of *Ricinus communis* around joints to provide relief against joint pains. Though these findings have not

been validated scientifically, yet may serve as the basis for future investigations. Some of the information gathered during the present study was novel. For example, *Allium rubellum* is a plant of rare occurrence and there is little information about its medicinal uses in the literature. Some of the plants like *Gloriosa superba* and *Saussurea costus*, utilized by the Gujjars of Trikuta hills, belong to rare and endangered plants category; therefore, must be used cautiously and require priority conservation (Chaudhuri, 2007)

Conclusions

The study concludes that Gujjar community of Trikuta hills (Jammu and Kashmir, India) utilize 70 plant species as medicines for curing different ailments. These medicinal plants are the source of common primary health care practices by Gujjars. Efforts are, therefore, required to conserve and protect this traditional knowledge of Gujjars vis-à-vis the ethical, cultural and religious aspects in addition to the conservation of these medicinal plant species. Further, the frequent use of these

plants, especially roots, is a point of concern since this practice may put them to extinction risk category leading to the loss of the species from the area.

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