Documentation of indigenous technical knowledge (ITK) prevailing among dairy farmers in Kathua district of Jammu and Kashmir

ADHITI BHANOTRA[1*] and JANCY GUPTA[2]

[1]Department of Veterinary and Animal Husbandry Extension Education
Mumbai Veterinary College, Maharashtra Animal and Fishery Sciences University
Mumbai 440012 Maharashtra, India
[2]Extension Division, ICAR – National Dairy Research Institute, Karnal 132001 Haryana, India
[*]Email for correspondence: adhitindri@gmail.com

 Received: 06.09.2023/Accepted: 08.10.2023

ABSTRACT

The indigenous practices are not only cost effective but are also socially compatible and generally comprise easily available local flora/ingredients. The article reports the preliminary findings of indigenous technical knowledge (ITK) that were carried out in the Kathua district of Jammu and Kashmir. The aim of this study was to document the traditional use of medicinal plants related to animal healthcare and management. Qualitative research methods viz transect walk, direct observation, focus group discussion and key informant interview were used for documentation of ITK and to gather information on most prevalent veterinary ailments for selection of ITK. The data were collected personally through a semi-structured interview schedule which was pre-tested among respondents from non-sample area for elimination, alteration and modification. A total of 55 medicinal plants were documented in the study area and are discussed briefly with considerable emphasis on their local name, scientific name and parts used. The different plant parts used were leaves, fruits, bulbs, bark, roots, seeds, tubers, flowers, whole plant, rhizomes and stem. There is need to promote the use of ITK within rural communities to preserve the traditional knowledge.

Keywords: Indigenous technical knowledge; dairy farmers; cattle; medicinal plants

INTRODUCTION

Biodiversity, indigenous knowledge and sustainable development are very closely linked. The basic component of any country's knowledge system is its indigenous knowledge or indigenous technical knowledge (ITK). It encompasses the skills, experiences and insights of people, applied to maintain or improve their livelihood. ITK is the local knowledge – knowledge that is unique to a given culture or society. ITK contrasts with the international knowledge system generated by universities, research institutions and private firms. It is the basis for local level decision making in agriculture, animal healthcare, food preparation, education, natural resource management and a host of other activities in rural communities (Warren 1991). Some call it local knowledge, others indigenous technical knowledge, while many prefer to call it traditional knowledge. ITK is specifically cocerned with actual application of the thinking of the people in various operations of agriculture and allied areas.

India has a very rich heritage of traditional health control and treatment systems (Ayurvedic, Unani and homeopathic) that have been used for animals since time immemorial. These practices have been percolating from one generation down to the next by oral transmission and considered to be the holistic approach for livestock management. ITK, regarding animal husbandry, is considered to be as old as domestication of various livestock species. Today, many indigenous knowledge systems are at risk of becoming extinct because of rapidly changing natural environments and fast pacing economic, political and cultural changes on a global scale. Practices vanish,

as they become inappropriate for new challenges or because they adapt too slowly. However, many practices disappear only because of the intrusion of foreign technologies or development concepts that promise short-term gains or solutions to problems without being capable of sustaining them. The tragedy of the impending disappearance of indigenous knowledge is most obvious to those who have developed it and make a living through it. But the implication for others can be detrimental as well, when skills, technologies, artifacts, problem solving strategies and expertise are lost. Unfortunately, these practices, which are in vogue throughout rural India, are little documented and there is danger of extinction of this knowledge. Thus it has become imperative to collect and document these practices and to assess their validity.

The indigenous practices in the Kathua district of Jammu and Kashmir are a part of rich traditions of animal care in India. The dwellers of this remote and hilly region of the Himalayas are dependent almost entirely on their traditional indigenous knowledge and traditional healers to cure their animals. So far, as the indigenous practices of Jammu and Kashmir are concerned, there are only few work reports. Only few surveys have been carried out in Kathua district of Jammu and Kashmir on documentation of medicinal plants prior to this study. Keeping this in view, this paper critically analyses the ITKs related to livestock healthcare and management practices in Kathua district of Jammu and Kashmir.

METHODOLOGY

The study was carried out in Kathua district of Jammu and Kashmir which is in the extreme south of the state. It is one of the most strategically placed districts as it provides only road and rail link to the rest of the country. Kathua district, the gateway of Jammu and Kashmir lies between 32° 17' to 32° 55' North latitude and 75° 70' to 76° 17' East longitude with an area of 2,651 sq km. A multi-stage random sampling was done to draw samples for the study. Three blocks in identified district and two villages in each block were selected to draw a sample of 150 farmers, who had at least one milch animal and those practising ITK at the time of investigations. Qualitative research methods viz transect walk, direct observation, focus group discussion and key informant interview were used for documentation of ITK and to gather information on most prevalent veterinary ailments for selection of ITK.

The data were collected personally through a semi-structured interview schedule which was pre-tested among respondents from non-sample area for elimination, alteration and modification. ITK in dairy enterprise was documented through interaction and focus group discussion with the farmers of the study area. Focus groups selected were homogenous groups of farmers considered optimal for attaining in-depth information about ITK. It gave better information than that could be obtained in a much more time-consuming exercise of individual interviews with the same people. The intent of focus group discussion is to promote self-disclosure among participants (Krueger and Casey 2000). However, the discussions were focused on the older members (men and women) of the community, who were presumed to have a wealth of traditional knowledge. Participants were allowed to deliberate on the various issues and experiences and document their agreements.

RESULTS and DISCUSSION

Indigenous technical knowledge involves innovative practices evolved by the farmers with their own experiences which are passed from generation to generation. They may prove a low-cost ideal tool for sustainable development. The people of the study area were rich in traditional knowledge regarding various veterinary ailments. The detailed inventory including botanical name, parts used, method of preparation and diseases treated is provided in Table 1. Some of the important medicinal plants of the area are shown in Plate 1.

A total of 55 medicinal plants were documented in the study area. The indigenous practices documented are unique and indicated the rich knowledge possessed by the farmers of the study area. The dairy farmers perceived ITK as more favourably accepted among the rural communities owing to its cost effectiveness, local availability of flora and fauna in the villages and lesser side effects. Another important reason for favouring ITK was that all the ingredients used were available at their doorsteps or in the villages themselves and such preparations were prepared by groups of villagers in a large amount so that they could provide them to a huge number of animals at the same time. All veterinary dispensaries were 4-5 km away from the villages which left the farmers with the option of practicing indigenous practices for the treatment of their animals. In addition to it, in a country like India, where most of the dairy farmers are resource poor,

Table 1. Medicinal plants used by the farmers in the study area for the control of animal diseases under ITK

Plant	Family	Local name	Part used	Traditional method of treatment
Acorus calamus	Araceae	Baryaan	Rhizomes	Rhizome as such given to animals in order to remove internal parasites; rhizome paste applied on open wounds to prevent infection
Adhatoda vasica	Acanthaceae	Vasak	Roots	Roots grinded and boiled and extract given during constipation
Aegle marmelos	Rutaceae	Bill	Fruits	Fruits cure diarrhoea and increase milk yield in animals and vigour of male buffaloes
Aesculus indica	Sapindaceae	Goon	Fruits	Fruits fed during extreme winters to provide warmth to the body of the animals and to those suffering from stomach ache and indigestion
Albizia lebbeck	Mimosaceae	Sareen	Seeds	Paste prepared after grinding the seeds applied on red or infected eye of the animal
Allium cepa	Liliaceae	Pyaaz	Bulbs	Bulbs fed to animals in case of snake bite
Aloe barbadensis	Liliaceae	Kuargandal	leaves, whole plant	Whole plant fed to animal if it stops taking food; fleshy leaves given during stomach ache or indigestion
Artemisia nilagirica	Asteraceae	Shambar	Leaves	Leaves fed to animals to remove internal parasites; in grinded form, applied on the animal body for removing lice and other external parasites
Azadirachta indica	Meliaceae	Neem	Leaves	Grinded leaves alone or in combination with other ingredients used to remove internal and external parasites of the animal; applied after castration on the affected area on wounds and during foot and mouth disease; leaves, one of the ingredients of the mixture, given to the animal suffering from haemorrhagic septicaemia
Bambusa arundinacea	Poaceae	Baans	Leaves, stem	Leaves fed to the animal to treat helminthic infestation and retention of placenta; very fine sticks used to prick blisters in mouth; used in case of fracture along with application of *Sesamum indicum* oil
Boerhavia diffusa	Myctaginaceae	Itt-Sitt	Leaves, whole plant	Leaves boiled and decoction applied on open wounds to cure skin disease; whole plant fed to the animal if it has consumed some poisonous weed
Bombax ceiba	Bombacaceae	Simbal	Bark	Bark boiled in water and suspension drenched to animals suffering from dysentery
Brassica campestris	Brassicaceae	Sarson	Seeds	Seeds mixed with Haldi (*Curcuma longa*) powder and kerosene oil applied externally on feet in case of foot and mouth disease; left over part of the seed, after extraction of oil, cake, mixed with water and fed to animal to open its mouth during foot and mouth disease; also given to remove general weakness and increase milk yield
Bulbostylis barbata	Cyperaceae	Massa	Rhizomes	Root portion of Massa, after grinding, mixed with wheat flour and fed for milk production in dairy animals
Calotropis procera	Asclepiadaceae	Nikka Ak	Leaves, flowers and stem	Leaves and flowers fed to animals in case of pneumonia; latex from the stem applied on tail gangrene
Cassia fistula	Caesalpiniaceae	Karangal	Leaves, fruits	Leaves crushed, mixed with honey and used to cure conjunctivitis; pods given as such or boiled and fed to animal to cure constipation

Plant	Family	Local name	Part used	Traditional method of treatment
Capsicum annuum	Solanaceae	Mirch	Fruits	Fruits along with other ingredients given to animal to cure helminthic infestation; in powdered form applied externally on the bruised sites of animal after dog bite; given to the animal suffering from cough
Carissa opaca	Apocynaceae	Garna	Leaves, shoots	Leaves and shoots fed to increase milk yield in goats
Cassia occidentalis	Caesalpiniaceae	Haedma	Leaves	Grinded leaves boiled and the decoction given to the animal suffering from indigestion
Cayratia trifolia	Vitaceae	Gidardar	Roots	Roots fed orally especially to the ox, during dislocation of bones
Cedrus deodara	Pinaceae	Deodar	Stem	Extract from the stem (Keelwan tail) applied externally to cure foot and mouth disease, mange and broken horn
Curcuma longa	Zingiberaceae	Haldi	Rhizome	Grinded rhizome with butter given orally to ox to cure blood in excreta; in powdered form, mixed with milk and fed to the animal suffering from fever during summers; powder, along with other ingredients, applied externally to the animal suffering from foot and mouth disease and bone fracture and to prevent infection in broken horn; 10 g turmeric, 10 g alum or Phitkari and 10 g black pepper crushed, mixed properly and massaged on teats once a day for treating mastitis
Citrus medica	Rutaceae	Garghal	Fruits	Its old pickle given to animal suffering from bloat and which has consumed some poisonous weed such as *Lantana camara*
Cymbopogon martini	Poaceae	Makora grass	Leaves	Grinded leaves applied on burn portion twice a day
Dodonea viscosa	Sapindaceae	Santha	Leaves	Leaves mixed with maize flour and cow urine used for fomentation in case of fracture; used in case of sprain along with mustard oil
Emblica officinalis	Euphorabiaceae	Amla	Fruits	1 kg amla and piece of iron boiled in water, cold suspension applied on the feet in case of foot and mouth disease; fruit paste applied on wounds to stop infection and remove external parasites; fruit extract given against some poisonous weeds; with extract of banana treats diarrhoea; with extract of neem removes intenstinal parasites
Eruca sativa	Brassicaceae	Tara-Mira	Seeds	Oil applied on the affected portion during mange and small pox
Euphorbia hirta	Euphorbiaceae	Doodli	Milky juice of plant	150 g given for treatment of dysentery
Foeniculum vulgare	Apiaceae	Saunf	Fruits	The fruits with other ingredients given to the animal if it stops taking food and during diarrhoea
Linum usitatissimum	Linaceae	Alsi	Seeds	0.25 kg crushed seeds mixed with wheat flour given to animal suffering from pneumonia for continuously 8 days
Mangifera indica	Anacardiaceae	Amb	Leaves, bark, fruits	Leaves and bark boiled and the decoction fed to the animal in case of indigestion; Ambchoor (dried mango fruits) given with water to animal orally during weed intoxication
Momordica charantia	Cucurbitacae	Jungli Karela	Fruits	Paste given in case of poisoning

Plant	Family	Local name	Part used	Traditional method of treatment
Musa paradisiaca	Musaceae	Kela	Leaves, fruits, rhizomes	Mixture of grinded leaves and fruits fed to animal suffering from foot and mouth disease; rhizome and pulp (from the fruits) given during weed intoxication; former also increases milk yielding capacity of the animal and latter cures diarrhoea; outer portion of the pseudo-stem treats haematuria
Nicotiana plumbaginifolia	Solanaceae	Desi Tambaku	Whole plant, leaves	Whole plant fed to cure bloat in animals; leaf powder treats external parasites
Nicotiana tabacum	Solanaceae	Tambaku	Flowers	Flowers mixed with wheat flour fed to animal suffering from diarrhoea
Ocimum sanctum	Lamiaceae	Tulsi	Leaves	Leaves along with other ingredients given orally to cattle during bloat; decoction of whole plant mixed with honey applied on the eyes to remove redness or extreme infection
Oroxylum indicum	Bignoniaceae	Tantara	Seeds, bark	Boiled seeds recommended against constipation; seeds or bark alone or in combination fed to the animal in case of snake bite
Oryza sativa	Poaceae	Chawal	Seeds	Seeds boiled in water and extract applied on animal body in case of mange ie hair fall especially in cattle; seeds form important constituent of mixture given to increase milk yield; infected seeds (Kala Dhaan) fed to animals for retention of placenta after abortion
Prunus persica	Rosaceae	Aaru	Leaves	Leaves grinded to form paste and applied on the animal body to remove external parasites
Psidium guajava	Myrtaceae	Amrood	Leaves	Ground leaves fed to animal suffering from ephemeral fever
Punica granatum	Punicaceae	Anar	Fruits	Fruits administered orally to cure Garmi (state of health in which animal doesn't eat anything)
Pyrus pashia	Rosaceae	Kainth	Fruits	Fruit extract poured to the eyes of animal suffering from eye infection
Rosa indica	Rosaceae	Gulab	Flowers	Flowers fed to animal to cure constipation
Saccharum officinarum	Poaceae	Gurh	Stem, leaves	With other ingredients cures diarrhoea; leaves fed during helminthic infestation; juice from stem given to cure constipation
Sapindus mukorossi	Sapindaceae	Reetha	Fruits	Fruit paste applied in the nostrils of cattle to remove leeches
Tinospora cordifolia	Menispermaceae	Garoh	Whole plant	500 g of powder fed to animal affected with foot and mouth disease; whole plant used extensively for increasing the milk yielding capacity of the animal especially of cows and buffaloes; removes the general weakness in animals and makes them healthy; along with other ingredients, whole plant fed to animal during Garmi (heat), cough and if blood comes in excreta
Trachyspermum ammi	Apiaceae	Ajwain	Seeds	Along with Gurh, seeds fed to animal for treating diarrhoea, indigestion and fever during winters; important ingredient for treatment of pyrexia and given orally and along with salt or ash applied on body of the affected animal; seeds mixed with other ingredients given to animal orally if the animal stops taking food, also to remove general weakness and increasing milk yielding capacity; along with salt, seeds given to remove constipation

Plant	Family	Local name	Part used	Traditional method of treatment
Trigonella foenum-graecum	Fabaceae	Methi	Seeds	Seeds fed to camels for keeping them healthy; fed to cows and buffaloes after abortion
Vitex negundo	Verbenaceae	Bana	Leaves	Leaves with other ingredients given during stomach ache; paste mixed with honey cures eye infection or reddening of eyes in diseased animals
Woodfordia fruticosa	Lythraceae	Taaye	Leaves	Leaves grinded in the form of small tablets given for treating stomach ache in animals
Xeromphis spinosa	Rubiaceae	Rada	Bark, root decoction	Small pieces mixed in wheat flour given to animal suffering from diarrhoea
Xylosona longifolium	Flacourtiaceae	Katori	Leaves	10-12 leaves fed to animal suffering from diarrhoea
Zanthoxylum armatum	Rutaceae	Timru	Bark, seeds	Whole plant along with other ingredients, acts as appetizer; bark and seeds cure blisters in mouth
Zea mays	Poaceae	Makki	Seeds	Seeds when mixed with other constituents increase milk yielding potential of the animal
Zingiber officinale	Zingiberaceae	Adrak	Rhizome	Dried rhizome (Sund) given during excessive fall of temperature

respondents felt that high cost of veterinary drugs hindered them from using drugs for treatment of animals. The farmers preferred to use ITK because they believed that it could lead them to increase in immunity of the animals without any loss in the production capacity of the animals.

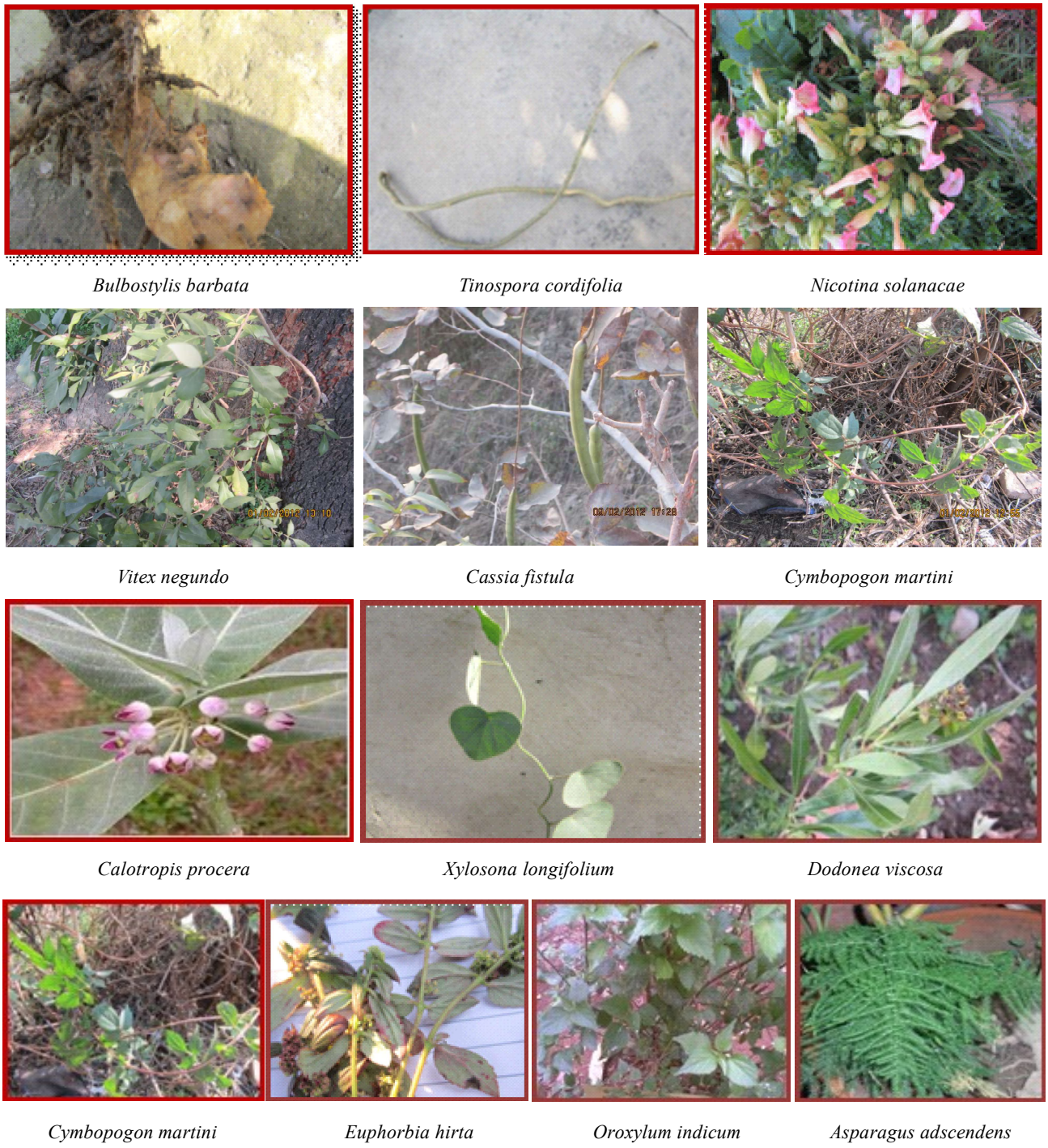
Beigh et al (2003) collected the information from the Bakerwals and other migratory herders and shepherds of Jammu and Kashmir who utilized herbal therapies for treatment of their livestock. A total of 25 plants within 19 families were identified for treatment of a variety of animal afflictions. The treatments, which covered a variety of livestock and fowl ailments, were generally easy to prepare, frequently involving only the feeding of a specific part of the selected plant to the animal being treated. A few plants had more than one application, but most were restricted to use on a particular affliction.

Khuroo et al (2007) reported the ethno-veterinary medicinal uses of 24 angiosperm plant species belonging to 23 genera and 15 families, used by the Gujars of Kashmir Himalaya. Different plant parts such as leaves, inflorescences, seeds, rhizomes, roots etc were used. In general, these plant species, through different modes of preparation to form crude drugs, were fed as food supplements to promote faster gain, to soothe burns, abrasions and wounds; used as laxative, diuretic and antipyretics and for the treatment of digestive, respiratory, locomotory and reproductive disorders.

Sharma et al (2012) conducted a study in Kathua district of Jammu and Kashmir between 2007 and 2009 and provided a list of important plants of the region. A total of 72 plants were used to cure 33 common ailments of milk yielding animals of Kathua district. Fabaceae (7 species) was the most represented family, along with Poaceae (6 species). Leaves (27.2%) were the most frequently used plant parts, herbs (48.6%) the most frequently used life-form and wild flora (58.3%) the most used source for the ethnoveterinary practices. The important ethnoveterinary plant species on the basis of use values were *Brassica campestris*, *Saccharun officinarum*, *Emblica officinalis*, *Trachyspermum ammi*, *Asparagus adscendens*, *Musa paradisica*, *Oryza sativa*, *Curcuma longa*, *Azadirachta indica*, *Tinospora cordifolia* and *Tamarindus indica*.

Earlier, Bhanotra and Gupta (2016) outlined the ITK possessed by farmers of Kathua district of Jammu and Kashmir. Altogether, 25 plants were used by the local people in formulation of different traditional medicines for curing 20 types of livestock diseases and ailments.

Khateeb et al (2017) conducted a study in the hilly regions of Jammu and Kashmir for documentation of unique ITK practices used for the treatment of various animal diseases. The information was collected from the ITK practitioners of district Doda. Thirty six ITK practices were identified and documented. They reported 22 species of plants used for the treatment of 14 different ailments. The documented practices were



Bulbostylis barbata *Tinospora cordifolia* *Nicotina solanacae*

Vitex negundo *Cassia fistula* *Cymbopogon martini*

Calotropis procera *Xylosona longifolium* *Dodonea viscosa*

Cymbopogon martini *Euphorbia hirta* *Oroxylum indicum* *Asparagus adscendens*

Plate 1. Some important medicinal flora of Kathua district, Jammu and Kashmir

for the treatment of maggot infestation, ectoparasites and endoparasites, retention of placenta, anestrus, mastitis, milk fever foot and mouth disease, black quarter, poisoning, snake bite and for increasing milk production.

Sharma (2017) compiled the ITK of the farmers of Kathua district of Jammu and Kashmir and reported that to improve lactation, grounded seeds of tamarind were given to animals after roasting and soaking. Indigestion of animals was cured by giving pepper, molasses and betel leaf powder. To control ecto-parasites (lice and fleas) in animals, powdered naphthalene balls were applied all over the body and then washed with clean water. To cure constipation in animals, 200 g of molasses dissolved in water were given.

Shubeena et al (2018a) conducted a study in central Kashmir region of the Kashmir division and reported that ITKs were part and parcel of day to day living and livestock rearing in the study area. ITKs were followed for increasing milk production, increasing fertility, retention of placenta, repeat breeding, prolapse, care of new born and for preparation of indigenous livestock products. The presence of the vast number of ITKs in the study area indicated the richness of the age-old wisdom of the people. Inspite of the presence of the formal veterinary facilities people were still relying upon ITKs and treated their animals themselves.

Shubeena et al (2018b) conducted a study in the Budgam and Ganderbal districts of central Kashmir and reported that farmers were found to adopt variety of the local plants, species and age-old techniques for managing various surgical conditions in animals. The presence of huge variety of the ITKs used in the study area indicated the richness of the age-old precious knowledge with its applicability. It formed an important part of the lives of farmers as majority of them resorted to traditional medication on appearance of symptoms of a disease and the formal veterinary services were availed in case of absolute emergencies.

CONCLUSION

The findings of the present study indicate that the study area had a lot of potential in its rich flora and fauna containing herbal plants used for preparation of traditional medicines which calls for conservation of these rich resources and care of intellectual property rights (IPRs). High diversity of ethnoveterinary plants was found to cure the animals of Kathua district, Jammu and Kashmir. Thus documentation of ITK will contribute towards preservation of important herbs, plants and trees used for treatment of animals. The present research study provides empirical evidence that the Kathua region was very rich in ITK which is used by the farmers for treatment of their animals. This requires means for the capture and validation as well as for the eventual exchange, transfer and dissemination of indigenous knowledge. Further phytochemical and pharmacological studies are also required to ascertain their chemical nature for commercial utilization of this knowledge.

REFERENCES

Beigh SY, Nawchoo IA and Iqbal M 2003. Traditional veterinary medicine among the tribes of Kashmir Himalaya. Journal of Herbs, Spices and Medicinal Plants **10(4):** 121-127.

Bhanotra A and Gupta J 2016. Mapping of indigenous technical knowledge (ITK) on animal healthcare and validation of ITKs used for treatment of pneumonia in dairy animals. Indian Journal of Traditional Knowledge **5(2):** 297-303.

Khateeb AM, Khandi SA, Bhadwal MS, Dar MA, Wani SA and Bafanda RA 2017. Indigenous technical knowledge practices followed by pastoralists for the treatment of livestock diseases in hills of Jammu and Kashmir state in India. Current Journal of Applied Science and Technology **24(2):** 1-9.

Khuroo AA, Malik AH, Dar AR, Dar GH and Khan ZS 2007. Ethno-veterinary medicinal use of some plant species by the Gujar tribe of the Kashmir Himalaya. Asian Journal of Plant Sciences **6(1):** 148-152

Krueger RA and Casey MA 2000. Focus group: a practical guide for applied research. 3rd Edn, Sage Publications, London; Thousand Oaks, California, USA, 206p.

Sharma N 2017. Indigenous technical knowledge regarding agriculture and livestock practiced by the farmers in Jammu region of Jammu and Kashmir. International Journal of Farm Sciences **7(2):** 113-114.

Sharma R, Manhas RK and Magotra R 2012. Ethnoveterinary remedies of diseases among milk yielding animals in Kathua, Jammu and Kashmir, India. Journal of Ethnopharmacology **141(1):** 265-272.

Shubeena S, Hai A, Hamdani SA and Akand AH 2018a. Indigenous technical knowledge (ITKs) used by farmers of central Kashmir to increase production and reproduction in livestock. International Journal of Livestock Research **8(8):** 294-302.

Shubeena S, Hai A, Hamdani SA, Akand AH, Shafiq S, Bulbul KH, Nisa SS, Mahboob S and Qureshi AI 2018b. Awareness and adoption of indigenous technical knowledge in management of surgical conditions in livestock. Journal of Entomology and Zoology Studies **6(4):** 1205-1208.

Warren DM 1991. Using indigenous knowledge in agricultural development. World Bank Discussion Paper 127, The World Bank, Washington, DC.