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Ethno-veterinary study of medicinal plants in Charkhi Dadri district of Haryana, India

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ABSTRACT

Ethno-veterinary medicinal plants are important as they are used extensively in many rural areas of the world where people heavily rely on traditional herbal treatments to treat their domestic animals. Indigenous herbal remedies utilized for centuries to keep animals healthy and verbally passed down through the generations. Charkhi Dadri is a district of Haryana situated in the Trans-Gangetic Plains area of India. A total of 45 distinct medicinal plants were studied from 31 families to explore their ethno-veterinary uses of which herbs comprised the majority of the plants followed by trees, shrubs, and climbers. The seeds, leaves and whole plants are the most popular plant parts used. The people can use the documentation of this native knowledge to promote the adoption of traditional methods for treating livestock problems since time immemorial. The findings of this study demonstrate the viability of traditional medicine, which primarily relies on the usage of medicinal herbs to provide for the healthcare needs of cattle in the Charkhi Dadri District of Haryana. The information gathered from the region's livestock farmers may also utilize to manage the nation's system for caring for livestock and enhance the quality of life in humans.

KEYWORDS: Ethno-veterinary, Livestock, Charkhi Dadri, Medicinal plants, Traditional medicine

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INTRODUCTION

In many rural areas of the world, where residents heavily rely on traditional herbal remedies to heal their domestic animals, ethno-veterinary medicinal plants are crucial. Because it provides them access to food, clothing, employment, manure, money, and a wealth reservoir, livestock is a means of livelihood for millions of people around the globe (Sheikh *et al.*, 2013). Many societies view animals as having the same status as people because they play an important role in the culture (Nigam & Sharma, 2010; Raikwar & Maurya, 2015). According to a 2018 WHO research, 66% of Indians live in rural regions and are substantially dependent on agriculture and livestock. In Haryana, the system of livestock farming and growing crops are tightly linked in mixed crop-livestock farming systems. Raising animals and growing crops together is a sustainable way to enhance the income of the family and is a key factor in the rural economy of the district.

Indigenous herbal methods have been used to keep animals healthy for ages and have been passed down through generations

orally. Cattle managers and owners before the development of western medicine used traditional methods (Shang *et al.*, 2012; Dutta *et al.*, 2020). The history of Indian veterinary science is around 5000 years old and classified into formalized and traditional medicine. There has been recorded knowledge in the form of publications on many aspects of veterinary medicine (Upadhyay *et al.*, 2011; Pullaiah *et al.*, 2016). Traditional herbalists transmit local veterinary medicine knowledge orally from generation to generation (Nair, 2006; Pushpangadan *et al.*, 2016). Very little information is documented in literature and other religious texts (Raut & Shrestha, 2012; Rastogi *et al.*, 2015). If willing, they share their information with a small group of individuals in their surroundings (Takhar & Chaudhary, 2004; Acharya & Acharya, 2010). Such knowledge of rural people's traditional healthcare methods utilizing plant resources is now slowly vanishing due to the willingness of the younger population to give up conventional ways of life, a lack of knowledge about traditional practitioners, and the availability of modern healthcare facilities (Galav *et al.*, 2013). As a result, we are at risk of losing traditional knowledge (Manandhar, 2002). It is obvious that the state's infrastructure and surgical capabilities for treating

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animals are far inadequate compared to the health service for humans. Unfortunately, the majority of such facilities are in large cities, while most domestic animals are reared in rural parts of the country, where they receive insufficient veterinary care. Traditional healthcare practices are an effective way to treat domestic cattle in the majority of remote rural communities where veterinary assistance is inaccessible (Pradhan & Mishra, 2018; Wani *et al.*, 2022). The usage of botanicals and indigenous knowledge from local healers plays a crucial role in primary healthcare. Many communities continuously use this folklore information time since immemorial. Thus, documenting ethno-veterinary medical knowledge can provide information for further pharmacological research.

MATERIAL AND METHODS

Study Area

The northern Indian state Haryana has 22 districts total, including the Charkhi Dadri District. On December 1, 2016, the Haryana state government formally announced Charkhi Dadri as the 22nd district of Haryana. There are two subdivisions (Charkhi Dadri and Badhra), two tehsils (Charkhi Dadri and Badhra), and one sub-tehsil (Bond Kalan) in the Charkhi Dadri district. The approximate location of District Charkhi Dadri is between 28°35'31.42" North Latitude and 76°15'55.05" East Longitude. Charkhi Dadri is situated 120 km from New Delhi, the Indian capital, and 295 km from Chandigarh, the capital of Haryana. According to the 2011 Census, the Charkhi Dadri district had 502,276 population. The population of rural areas is 88.78%. In this region, people primarily work in agriculture. Although the livestock sector is an element of farming, it has struggled to keep up with developments and research in the area of current agricultural systems. Cattle, buffaloes, goats, sheep and swine make up the most prevalent livestock in these areas, aside from poultry birds. The Charkhi Dadri district's geography comprises sand dunes of various shapes and sizes and peaks of the Aravalli range. It is located in the Trans-Gangetic Plains Region. The Charkhi Dadri district's climate ranges from arid to semi-arid. Monsoonal cycles set underlying climatic patterns that are subtropical, continental, and rainy. In addition to the monsoon, this region experiences a dry climate with scorching summers and freezing winters. The typical temperature is between 3 °C and 45 °C. The temperature varies widely both daily and seasonally. In June and July, this region experiences hot, sweltering winds that are also heavily laden with dust. The district expects to receive 400 mm of precipitation annually. Succulent flora and tropical thorn scrubs are common in the area. Several ephemeral plants mature during the monsoon season. The locals for ethno-veterinary purposes utilize a number of these plants. Some of them are utilized generally as vegetables. The main crops cultivated here are wheat, guar, bajra, mustard, cotton, grams, and barley. There are also a number of grazing animals including sheep, goats, buffalo, cattle and camels. The majority of the residents of this region are farmers and have domestic animals such as dogs, cows, goats, sheep, buffalo, and camels. The data collection and questionnaire were conducted from 7 villages of the Charkhi

Dadri district which are Charkhi, Ghsola, Paintawas Kalan, Kitlana, Chapar, Birhi Kalan and Jhoju Kalan. Some of these are circled on the map also (Figure 1).

Data Collection

The livestock population in the zone was estimated to 38,753 cattle, 153,675 buffaloes, 12,946 sheep, 17,225 goats, 1,562 pigs and 2,832 dogs (<http://pashudhanharyana.gov.in>). By conducting interviews with 64 key informants and local healers, as well as by conducting direct field observations, information regarding plants used to treat various livestock ailments was gathered. Following a preliminary interaction with locals, key informants were identified. Using an open-ended questionnaire in the local language, key informants from the community, including cattle herders, farmers, the village head, women including in housework's, aged people, local officials, and travelers on the way, were questioned about the ethnobotanical uses of the plants. The information gathered included the names of the plants used locally, their applications locally, the plant parts used locally, the way of preparations and the method of administration of the plants and herbs, as well as the age and gender of the people interviewed. Without receiving any payment, each respondent gave their verbal consent to participate in the study and share their experience with us. Since the researchers are familiar with the area and its inhabitants, arranging the interviews was not challenging. The results were only considered significant when at least five distinct informers supplied comparable data on the same plant. Also, information about particular ailments was cross-examined using a variety of techniques, including multiple discussions with the community healers of different wards within area of study. To learn about the medicinal benefits of plants, the local healers consulted and specimens of plants harvested locally were displayed to them. Some plants identified in the field, whereas others

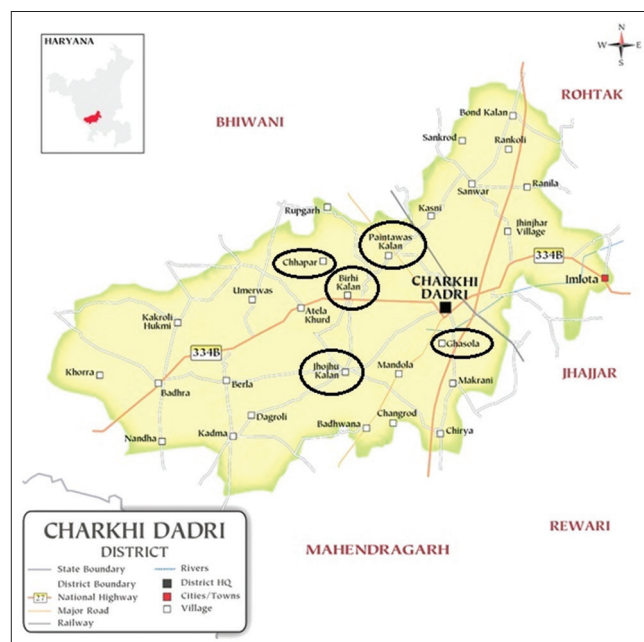


Figure 1: Circled villages are the sites for data collection

identified through standard literature (Kirtikar & Basu, 1918; Chopra & Chopra, 1994; Seth & Sharma, 2004; Khare, 2008), crosschecking specimens deposited at the herbarium, and in some cases, with the assistance of taxonomy specialists.

RESULT AND DISCUSSION

A collection of 45 distinct types of medicinal plants from 31 families and 45 genera was investigated. Table 1 lists the medicinal plants along with their botanical name, local name, family, habits, plant parts used, and their uses. The 45 medicinal plants collected from the study area belong to 31 different families. The study area features the highest reported number of medicinal plants from the Fabaceae family (4 species), Apiaceae, and Poaceae (3 species each). According to the Figure 2, 23 families only reported one species, while the following families had two species each: Brassicaceae, Combretaceae, Cucurbitaceae, Liliaceae, and Mimosaceae. Trees, shrubs, and climbers comprised the next most common types of plants utilized for ethno-veterinary purposes after herbs (Figure 3a). The highest utilization of herbaceous plants could be a result of their greater quantity and ease of collection, storage, and transportation. Similar result was reported by Wani *et al.* (2022) on 59 medicinal angiospermic plants studied from Poonch District of Jammu and Kashmir, and Rao studied ethno-medicinal survey of traditionally used medicinal plants from Charkhi Dadri district. The bulk of the species in each of these studies were herbs, with trees, shrubs, and climbers accounting up the least number of species. Several plant parts, including leaves, seeds, stems, roots, flowers, and fruits, are utilized in traditional healthcare systems in a variety of ways, depending on the local population's availability to and hereditary knowledge of such medicinal plants and their parts. The most often used plant parts in the current study were seeds (25%), second leaves and entire plant (19% each), followed by fruit (16%), roots (11%), bark (5%), rhizome and latex (2% each) (Figure 3b). The most often utilized plant parts in different researches are seeds and leaves that are frequently used in herbal remedies (Pala *et al.*, 2019; Raj *et al.*, 2018).

These medicinal plants are used for twelve livestock ailments including stomach problems, placental problems, cold and fever, mastitis and pregnancy and delivery related issues, urinary problems and inducing heat period. Maximum number of plants species (17 plant species) used for stomach related issues followed by placental problems and cold and fever (7 plant species), pregnancy/delivery related issues (5 plant species), mastitis (4 plant species) and 1-2 plants species for other health problems of livestock (Figure 4). In addition, the inhabitants of these areas to increase milk production use numerous plants.

Several plant species have been utilized for several ailments, such as the treatment of foot and mouth ailments, urinary disorders, and gastrointestinal disorders. Many plants identified in the current research were also the focus of research investigations in the nearby area (Takhar & Chaudhary, 2004; Pradhan & Mishra, 2018). Some diseases are treated with a single plant, while others are treated with a mix of two or more plants.

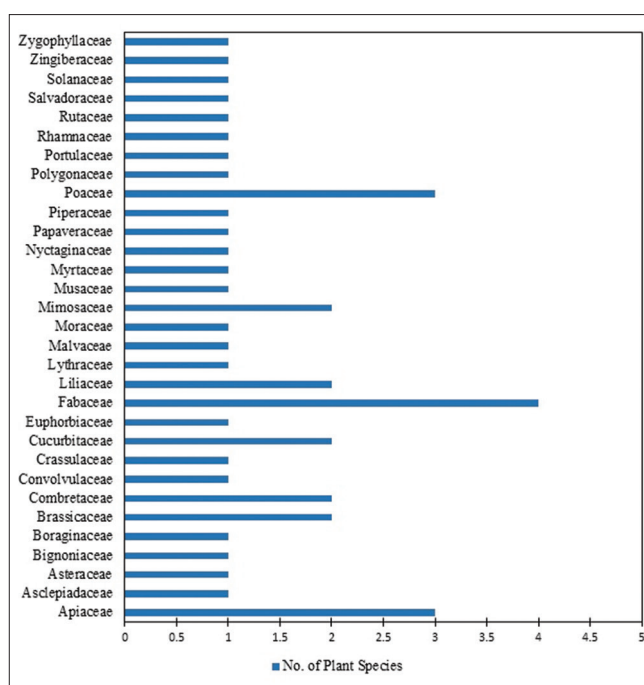


Figure 2: Number of plant species belonging to each family

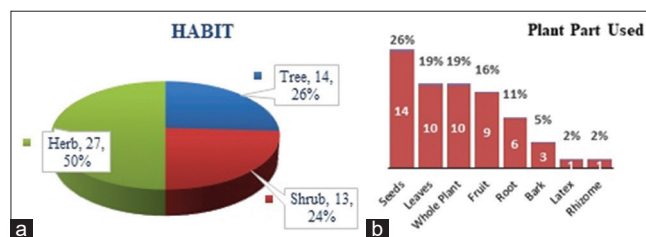


Figure 3: a) Distribution of plant habits in study area; b) Percentage of plant part used in the formulation used for treatment of animals

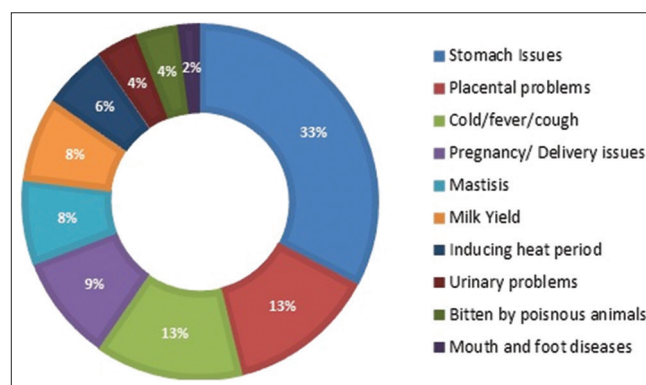


Figure 4: Number of plant species used for each animal ailments

Animal illness symptoms are often recognized by local healers by animal behavior, excrement, body temperature, color of the eyes, decreased appetite, and peculiar noises they make (Raut & Shrestha, 2012; Pradhan & Mishra, 2018). In addressing animal issues, a variety of liquid preparations are prepared from various plant components. Paste, fresh plants, powder, and decoction are other forms used, as well (Table 1). According to the findings of this research, parts of the plant can treat a wide range of illnesses

Table 1: List of medicinal plants study during research

S. No.	Binomial Name	Vernacular Name	Family	Habit	Ethno-veterinary uses	Part Used	Preparation	Method of Use
1	<i>Ferula asafoetida</i> H.Karst.	Heeng	Apiaceae	Herb	To treat problems like gas and flatulence	Root resin	Mixed with oil	25-50 g resin mixed with 200-300 g aisi oil (<i>Linum usitatissimum</i>) given twice daily for three to four days.
2	<i>Foeniculum vulgare</i> Mill.	Saunf			To treat diarrhea	Seeds	Powder	250 g powder of normal and fried seeds (in equal amount) is administered twice day for two to three days.
3	<i>Trachyspermum ammi</i> (L.) Sprague	Ajwain			For Canker sore treatment	Seed	Fumes	After the seeds, an old jute bag, and hair are burned, camel is allowed to breathe in fumes.
					For expelling cow's or buffalo's retained placenta	Seed	Powder and paste	Two to three times a day, a paste made of 500 g of jaggery and 200 g of seeds is consumed orally.
					To treat cold	Seed	Mixture	A piece of jute, some porcupine spines, and 100 g of sugar are added to 30-40 g ajwain, and the mouth of the cattle is exposed to the fume.
4	<i>Calotropis procera</i> (Aiton)	Aak	Asclepiadaceae	Herb	For removing a postpartum placenta that has been retained in cows and buffaloes	Latex	Latex	Buffalo tails are soaked in latex for five to ten minutes.
					To eradicate the sheep's gut worms	Green leaves	Raw	Every day, 200 g of green leaves are provided as feed.
					To enhance milk production, particularly for goats	Dried Leaves	Powder	As a dietary ingredient, dried leaves are used.
5	<i>Helianthus annuus f. annuus</i> Surajmukhi		Asteraceae	Shrub	To ensure a smooth delivery in livestock during pregnancy	Seed	Seed Oil	Each day, 50-60 ml of seed oil is administered.
6	<i>Tecoma undulata</i> (Sm.) G. Don	Roheda	Bignoniaceae	Tree	In camels and buffalo, for complete body replenishment	Root	Mixture of root decoction	<i>Zizyphus nummularia</i> 's 100-150 g root extract is combined with its same amount root extract and administered with jaggery.
7	<i>Cordia myxa</i> G.Forst.	Lasura, Leshwa	Boraginaceae	Tree	In order to treat cracked nipples in breastfeeding animals, particularly buffaloes	Leaves	Warmed leaves	Nipples with cracks are covered with warmed leaves.
8	<i>Eruca sativa</i> Mill.	Taramira	Brassicaceae	Herb	In order to cure mastitis in cows and buffalo	Whole plant	Raw	4-5 kg whole plant is given mixed with feedstuff till problem is cured.
9	<i>Raphanus sativus</i> L.	Muli	Herb	Herb	Maintaining a buffalo's pregnancy viable for a week just after fertilization	Whole plant	Raw	Over the course of a week, about 1 kg of plant is provided as food.
10	<i>Terminalia arjuna</i> (Roxb.) Wight & Arn.	Arjan	Combretaceae	Tree	For removing a postpartum placenta that has been retained in cows and buffaloes	Bark	Paste	Orally administered fresh bark paste.
11	<i>Terminalia chebula</i> Retz.	Harad			For better digestion	Fruit	Decoction mixture	Five litres of water are used to boil 50 g of fruits with 500 g of <i>Trigonella foenum-graecum</i> , then the mixture is allowed to cool. For two to three days, 50 ml of the cooled decoction is administered orally.
12	<i>Cuscuta reflexa</i> Roxb.	Amerbel	Convolvulaceae	Herb/ Climber	Applied to the affected area where the poisonous worm bit an animal to relieve the discomfort	Whole plant	Decoction of plant	The affected area is addressed with <i>Cuscuta</i> (dodder) decoction.
13	<i>Kalanchoe daigremontiana</i> Raym.-Hamet & H.Perrier	Patherchat	Crassulaceae	Herb	To cure cattle with urinary issues.	Leaves	Raw	Twice a day administration of 150 g of leaves.
14	<i>Citrullus colocynthis</i> (L.) Schrad.	Gadumba	Cucurbitaceae	Herb	For curing dysentery	Fruit	Mixture	50g of <i>Solanum surratense</i> whole plant and 100g of its fruits of <i>Citrullus colocynthis</i> are mixed, the mixture is administered orally.
					For improving digestion	Fruit	Raw	Fruits are fed to cattle.
15	<i>Cucumis callosus</i> (Rottler) Cogn.	Kachri			To relieve stomach pain, particularly in cows and buffaloes	Fruit	Crushed fruit paste	50g of fruit is crushed in fresh buttermilk, and the resultant mixture is then given two times per day for up to three days.

(Contd...)

Table 1: (Continued)

S. No.	Binomial Name	Vernacular Name	Family	Habit	Ethno-veterinary uses	Part Used	Preparation	Method of Use
16	<i>Ricinus communis</i> L.	Arandi	Euphorbiaceae	Shrub	To address general gastrointestinal issues (to clean the stomach)	Seed	Seed oil	50 ml of diluted oil from seeds is administered twice daily for two to three days.
17	<i>Trigonella foenum-graecum</i> L.	Methi	Fabaceae	Herb	For better digestion	Seed	Mixture with salt	In two liters of water, 250g of seeds boiled with black salt and for 4-5 days, the 45-50g are administered orally once daily.
18	<i>Cicer arietinum</i> L.	Chana		Herb	To increase the milk quantity in case of milching cattle	Seed	Soaked seeds	The seeds are fed after being soaked.
19	<i>Cyamopsis tetragonoloba</i> (L.) Taub.	Guar		Shrub	In case of buffaloes to induce heat period	Seed	Seed	Provide 1 kg of fried guar once on daily basis.
20	<i>Prosopis cineraria</i> (L.) Druce	Jandi		Tree	Over pimples and wounds especially in case of goats, buffaloes and cows	Bark	Poultice of dried bark	Use a dried bark-based poultice on cuts and pimples.
21	<i>Allium sativum</i> L.	Lahsun	Liliaceae	Herb	To treat cold and fever.	Fruit	Paste	Cattle are fed the paste, which is made by combining 100g of garlic with 5-7 large elaichi, with 200-250g of jaggery.
22	<i>Asparagus recemosus</i> Willd.	Satavar			For heat production in buffaloes.	Whole plant	Raw	Over four to five days, around 600 to 700g of plants are provided as feed.
23	<i>Lawsonia inermis</i> L.	Henna	Lythraceae	Tree	Maintaining a pregnancy viable immediately after fertilization	Leaves	Powder	For one week, 50g of leaf powder is mixed with any feed and given to the buffalo.
24	<i>Gossypium hirsutum</i> L.	Binola	Malvaceae	Shrub	To improve the quality of milk for butter production, particularly in buffaloes	Seed	Raw/Boiled	Binola is provided as a food supplement.
25	<i>Ficus religiosa</i> L.	Peepal	Moraceae	Tree	For removing a postpartum placenta that has been retained in cows and buffaloes	Bark	Decoction in water	Using 4 liters and 1 kg of fresh bark is boiled for one hour, this solution is given orally.
26	<i>Acacia nilotica</i> (L.) Delile	Kikar	Mimosaceae	Tree	Curing diarrhea	Tender Twigs	Raw	For 2-3 days, 500g of soft branches are fed to buffaloes to treat their diarrhea.
					To destroy the stomach worms	Fruits	Powder	To get rid of the gastrointestinal worms, 500g of fruits are provided as feed every day for 5-6 days.
					Smooth delivery in cattle	Leaves	Powder	Weekly administration of khand, a mixture of 50g dried leaf powder, 200g cow butter, and 100g sugar, helps animals in smooth delivery.
27	<i>Albizia lebeck</i> (L.) Benth.	Siras			Goat, cow, and buffalo eye issues	Leaves	Juice	The eyes are splashed with crushed green leaf juice.
28	<i>Musa paradisiaca</i> L.	Kela	Musaceae	Herb	To treat mastitis	Fruit	Ripened fruit	Cows and buffaloes are fed camphor tablets that have been put inside ripe bananas as a form of food.
29	<i>Syzygium aromaticum</i> (L.) Merr. and L.M. Perry	Clove	Myrtaceae	Shrub	To treat mastitis	Seeds	Oil of seeds	Cattle nipples are smeared with clove oil.
30	<i>Boerhavia diffusa</i> L.	Punarnava			For removing a postpartum placenta that has been retained in cows and buffaloes	Whole plant	Raw	Two times a day, a 1 kg entire plant is given.
31	<i>Argemone mexicana</i> L.	Satyanashi	Nyctaginaceae	Herb	For the treatment of camel constipation	Whole plant	Hot Percolation	Boiling 200g of the entire plant in 2 litres of water until it is reduced to half, followed by cooling and given for two days.
32	<i>Piper nigrum</i> L.	Kali mirch	Piperaceae	Shrub	For removing a postpartum placenta that has been retained in cows and buffaloes To treat the cattle bitten by poisonous worms	Whole plant Seed	Raw Powder	Once every day, 150-200 g of the entire plant is given with feed. A paste made of fine piper powder and butter is applied to the area where venomous worms have bit.

(Contd...)

Table 1: (Continued)

S. No.	Binomial Name	Vernacular Name	Family	Habit	Ethno-veterinary uses	Part Used	Preparation	Method of Use
33	<i>Saccharum bengalense</i> Retz.	Sarkanda, Jhunda, Moonj Gehu	Poaceae	Herb	For removal of retained placenta especially in buffaloes	Leaves	Raw	Animals are fed 500g of young, green leaves as feed.
34	<i>Triticum aestivum</i> L.				To treat cold	Seed	Crushed seed	The mixture of 500g powdered seeds, 30g tea leaves, and 150g Ashwagandha is fed to the camel for two days.
35	<i>Pennisetum glaucum</i> (L.) R.Br.	Bajra		Shrub	For heat production in cattle	Seed	Raw	For three to four days, 1 kg of roasted millet is fed once daily.
36	<i>Calligonum comosum</i> L. Her.	Phoglia	Polygonaceae	Shrub	To treat cattle with urinary issues	Whole plant	Raw	For 4-5 days, 300 g of plants are fed as fodder twice per day.
37	<i>Portulaca oleracea</i> L.	Nunia	Portulacaceae	Herb	For the purpose of limiting heavy bleeding in buffaloes during and following delivery	Whole plant	Raw	Whole plant is given as feedstuff.
38	<i>Ziziphus nummularia</i> (Burm. f.) Wight & Walk.-Arn.	Jhar-beri	Rhamnaceae	Shrub	To remove intestinal worms	Twigs and leaves	Raw	Twice daily for a week, 500g of delicate branches and leaves are fed.
39	<i>Aegle marmelos</i> (L.) Correa	Bel patra	Rutaceae	Tree	For the treatment of diarrhea in cattle, buffalo and different animals young ones.	Fruit	Grinded fruits	During two days, 200 g of powdered fruits are given twice daily along with 20 g of tea.
40	<i>Salvadora persica</i> L.	Jaal	Salvadoraceae	Tree	Three to four days are needed to treat the cold and cough To cure the foot and mouth ailments in buffalo	Root	Decoction	500 g of jaggery are mixed with 250 g of root extract and given to camels once a day. Legs are treated with root decoction.
41	<i>Withania somnifera</i> (L.) Dunal	Ashwagan -dha	Solanaceae	Shrub	To treat dysentery and diarrhea	Fruit	Paste	500 g of fruit paste and 50 g of dried ginger are and given orally once daily for two to three days.
42	<i>Zingiber officinale</i> Roscoe	Adrak	Zingiberaceae	Herb	To increase the milk production in goat and cows To treat cold and cough	Leaves	Raw	Two times every day, leaves are fed as food.
43	<i>Curcuma longa</i> L.	Haldi		Shrub	As a remedy for cough or throat issue	Root	Decoction	Camels and buffaloes are given a daily dose of root decoction.
44	<i>Elettaria cardamomum</i> (L.) Maton	Elachi		Shrub	To treat general gastric problems	Rhizome	Rhizome mixture	150 g ginger are mixed with jaggery and given to the cattle. For two days, 100 g of mango pickle blended with 15-20 g of rhizome is administered twice daily.
45	<i>Tribulus terrestris</i> L.	Gokharu, Bhanhri	Zygophyllaceae	Herb	To treat cold For curing diarrhea	Fruit Whole plant	Mixture Water extract	Horses are fed 300 g of jaggery and 8-10 elaichi orally once a day. Goats are given an oral water extract of the entire plant twice daily for two to three days.

when used alone or in combination with other plant species. Even a single ailment can be treated by different species of medicinal plants. Existing reports that certain plants, including *Trachyspermum ammi*, *Calotropis procera*, *Citrullus colocynthis*, *Acacia nilotica*, *Argemone Mexicana*, *Zizyphus nummularia*, etc., are used to treat multiple illnesses. The use of plant parts from a single species of plant to treat a single condition was shown to be more frequent than the use of plant parts from multiple plant species to treat one or more disorders. Cattle can be poisoned to varying degrees by some plants, including their young shoots and some parts (Balaji & Chakravarthi, 2010). Before using plants or plant parts for medical purposes, care should be taken to ensure that the appropriate dosage is used because in some situations, using them in excess amounts could be dangerous. In many Indian states, cattle are also prone to the prevalent veterinary diseases that were identified in this study.

Most plants in various illness groups are associated with digestive diseases, cold and fever, mastitis, stomach disorder, wound healing, facilitating smooth delivery and removal of retained placenta, while the number of plants used to treat eye illnesses, snakebites, and urinary disorders is quite small in contrast to all other applications (Table 1). According to villagers, mastitis, placenta retention, and gastrointestinal disorders are all prevalent problems in the area under research, and aside from extreme cases, they have traditionally cured these conditions with various plant components. For enhancing their cattle's milk production, the inhabitants of this area use a variety of plants. Their strong desire to boost livestock production and income had been evident. This research implies that locals have a strong understanding of the curative properties of plants. Farmers, cattle herders, village headmen, other community leaders, older citizens, and local healers were reported to have more knowledge of traditional remedies than younger people did during the study period (Acharya & Acharya, 2010; Manoj et al., 2012; Nair et al., 2021). About 80% of those surveyed confirmed that their parents, grandparents, and co-producers had supported them in acquiring more knowledge about conventional treatments. As a result, traditional healers' wisdom is in danger of disappearing. Therefore, efforts should be made to encourage the documentation of data about indigenous uses, traditional knowledge, and information that is hidden among the tribes. Additionally, there are still a lot of challenges to overcome before our nation can fully achieve its potential for livestock production, including inadequate breed improvement, inadequate contemporary veterinary care, and a lack of adequate nutrition.

CONCLUSION

The current study reported the usage of 45 medicinal plants from 31 families against various animal diseases. The dominant form of plant used for ethno-veterinary purposes is herbs. In the study area, it was discovered that plants from the families Fabaceae, Apiaceae, and Poaceae were largely utilized for ethno-veterinary purposes. Also, research has shown that seeds and leaves have greater medical applications than that other plant parts like roots and fruits. Ethnobotanical knowledge is essential

for treating many diseases and conserving plant diversity in rural regions. It was found that the residents of the research area still treat their domestic cattle with traditional medical procedures. With the exception of severe cases, ethnic communities have created their own medical formulations utilizing traditional knowledge to treat their domestic cattle. But, as a result of industrialization, urbanization, and, most importantly, a lack of interest by younger generations, this invaluable information base has become obsolete. For the benefit of people, it is, therefore, necessary that the valuable indigenous medicine knowledge be studied, documented and verified. The communities in concern will benefit from the documentation of such indigenous knowledge both now and in the future, along with the scientific investigation of the wider application of traditional knowledge to the treatment of animals. The residents of this area adopt plant-based medicines due to their minimal cost, availability, lack of negative side effects, and knowledge that has been practiced generation after generation. Based on the wealth of this traditional herbal knowledge, there is a vast scope for further study and the development of new drugs for treating animal ailments. Also, this is the ecofriendly and sustainable approach. As a result, this knowledge can be a significant asset for the next generation and the community's economic growth by raising the household's income and standard of living.

REFERENCES

- Acharya, K. P., & Acharya, M. (2010). Traditional knowledge on medicinal plants used for the treatment of livestock diseases in Sardikhola VDC, Kaski, Nepal. *Journal of Medicinal Plants Research*, 4(2), 235-239.
- Balaji, N. S., & Chakravarthi, P. V. (2010). Ethnoveterinary practices in India-A review. *Veterinary World*, 3(12), 549-551.
- Chopra, R. N., & Chopra, I. C. (1994). *Indigenous drugs of India*. Kolkata, West Bengal: Academic publishers.
- Dutta, P., Hari Kumar, A. V., Rana, S. K., Patel, S. B., Patel, D. D., Patel, K. R., Punniamurthy, N., Nair, M. N. B., & Sharma, G. K. (2020). Management of common ailments of dairy animals with ethno-veterinary herbal preparations in Gujarat. *The Pharma Innovation Journal*, 9(8S), 67-70.
- Galav, P., Jain, A., & Katewa, S. S. (2013). Ethnoveterinary medicines used by tribals of Tadgarh-Raoli wildlife sanctuary, Rajasthan, India. *Indian Journal of Traditional Knowledge*, 12(1), 56-61.
- Khare, C. P. (2008). *Indian medicinal plants: an illustrated dictionary*. New York, US: Springer Science & Business Media. <https://doi.org/10.1007/978-0-387-70638-2>
- Kirtikar, K. R., & Basu, B. D. (1918). *Indian Medicinal Plants*. Allahabad, India: Lalit Mohan Basu.
- Manandhar, N. P. (2002). *Plants and People of Nepal*. Portland, Oregon: Timber press.
- Manoj, Y., Anupama, Y., & Ekta, G. (2012). Ethno-veterinary practices in Rajasthan, India-A Review. *International Research Journal of Biological Sciences*, 1(6), 80-82.
- Nair, M. N. B. (2006). Documentation and assessment of ethnoveterinary practices from an Ayurvedic viewpoint. In A. V. Balasubramanian & T. D. Nirmala Devi (Eds.), *Traditional Knowledge Systems of India and Sri Lanka*, Chennai, India: Centre for Indian Knowledge Systems.
- Nair, M. N. B., Punniamurthy, N., Kumar, S. K., & Shankar, D. (2021). Ethno-veterinary herbal formulations: An indigenous strategy to reduce use of antibiotics in the management of livestock health. *Indian Journal of Comparative Microbiology, Immunology and Infectious Diseases*, 42(spl), 76-82. <https://doi.org/10.5958/0974-0147.2021.00021.0>
- Nigam, G., & Sharma, N. K. (2010). Ethnoveterinary plants of Jhansi district, Uttar Pradesh. *Indian Journal of Traditional Knowledge*, 9(4), 664-667.
- Pala, N. A., Sarkar, B. C., Shukla, G., Chettri, N., Deb, S., Bhat, J. A., & Chakravarty, S. (2019). Floristic composition and utilization of ethnomedicinal plant species in home gardens of the Eastern Himalaya. *Journal of Ethnobiology and Ethnomedicine*, 15, 14. <https://doi.org/10.1007/s11548-019-00000-0>

- doi.org/10.1186/s13002-019-0293-4
- Pradhan, S., & Mishra, S. (2018). Ethnoveterinary practice: An alternative treatment approach in contemporary India. *The Pharma Innovation Journal*, 7(9), 362-365.
- Pullaiah, T., Krishnamurthy, K. V., & Bahadur, B. (2016). *Ethnobotany of India: Western Ghats and West Coast of Peninsular India*. New York, US: Apple Academic Press. <https://doi.org/10.1201/9781315366142>
- Pushpangadan, P., Lijinu, T. P., Bincy, A. J., Anzar, S., Aswany, T., Chitra, M. A., Harsha, K., Sreedevi, P., & George, V. (2016). Traditional Medicine in livestock management. *Journal of Traditional and Folk Practices*, 4(1), 43-49.
- Raikwar, A., & Maurya, P. (2015). Ethnoveterinary medicine: in present perspective. *International Journal of Agricultural Sciences and Veterinary Medicine*, 3(1), 44-49.
- Raj, A. J., Biswakarma, S., Pala, N. A., Shukla, G., Vineeta, Kumar, M., Chakravarty, S., & Bussmann, R. W. (2018). Indigenous uses of ethnomedicinal plants among forest-dependent communities of Northern Bengal, India. *Journal of Ethnobiology and Ethnomedicine*, 14, 8. <https://doi.org/10.1186/s13002-018-0208-9>
- Rastogi, S., Pandey, M. K., Prakash, J., Sharma, A., & Singh, G. N. (2015). Veterinary herbal medicines in India. *Pharmacognosy Reviews*, 9(18), 155-163. <https://doi.org/10.4103/0973-7847.162140>
- Raut, B., & Shrestha, A. P. (2012). Ethnoveterinary Practices in Western Morang, Nepal. *International Journal of Pharmaceutical Sciences and Research*, 3(1), 182-188. [https://doi.org/10.13040/IJPSR.0975-8232.3\(1\).182-88](https://doi.org/10.13040/IJPSR.0975-8232.3(1).182-88)
- Seth, S. D., & Sharma, B. (2004). Medicinal plants in India. *The Indian Journal of Medical Research*, 120(1), 9-11.
- Shang, X., Tao, C., Miao, X., Wang, D., Wang, Y., Yang, Y., & Pan, H. (2012). Ethno-veterinary survey of medicinal plants in Ruoergai region, Sichuan province, China. *Journal of Ethnopharmacology*, 142(2), 390-400. <https://doi.org/10.1016/j.jep.2012.05.006>
- Sheikh, M., Ahmad, H., Enyat-ul-Haq, Ahmed, B., Khan, Z., & Rizvi, R. (2013). Survey of ethnoveterinary medicine amongst ethnopractitioners of western Uttar-Pradesh province of India. *Journal of Medicinal Plants Research*, 7(9), 509-516. <https://doi.org/10.5897/JMPR12.1121>
- Takhar, H. K., & Chaudhary, B. L. (2004). Folk herbal veterinary medicines of southern Rajasthan. *Indian Journal of Traditional Knowledge*, 3(4), 407-418.
- Upadhyay, B., Singh, K. P., & Kumar, A. (2011). Ethno-veterinary uses and informants consensus factor of medicinal plants of Sariska region, Rajasthan, India. *Journal of Ethnopharmacology*, 133(1), 14-25. <https://doi.org/10.1016/j.jep.2010.08.054>
- Wani, Z. A., Farooq, A., Sarwar, S., Negi, V. S., Shah, A. A., Singh, B., Siddiqui, S., Pant, S., Alghamdi, H., & Mustafa, M. (2022). Scientific Appraisal and Therapeutic Properties of Plants Utilized for Veterinary Care in Poonch District of Jammu and Kashmir, India. *Biology*, 11(10), 1415. <https://doi.org/10.3390/biology11101415>