

Original Research Article

Ethno-veterinary practices in the southern districts in Tamil Nadu, India

Abstract

The present work deals with the survey of ethno-veterinary medicinal plants used by folk communities of southern districts (Tirunelveli, Tenkasi and Tuticorin districts), Tamil Nadu, India. An ethno-veterinary data was collected through semi-structured interviews and questionnaires from traditional practitioners, farmers, herders, village elders and women's, from seventeen villages of three districts. These people have their own an ethno-medicine, ethno-veterinary treatment systems of diseases both for human as well as for their livestock. In this study, the common cattle diseases of the area are foot & mouth disease (FMT), anthrax, pneumonia, ectoparasites, diarrhea, etc. The different cattle diseases are listed along with their treatment system. Here as many as twenty-eight (28) medicinal plants belonging to from twenty (20) different families 27 genera were documented which were used by the indigenous communities with their vernacular names, family, plant parts used and animal disease curing property.

Keywords

Indigenous knowledge, Ethno-veterinary treatment, medicinal plants, animal healthcare

1. INTRODUCTION

With a history extending more than 5000 years, India has one of the most advanced medical cultures. Younger generations found it challenging to understand and apply the beliefs and customs of their ancestors as a result of the entrance of new practices. Despite recent initiatives to encourage its use globally, much information is only recorded in field reports and academic journals. Ethnoveterinary medicine is the scientific term for traditional animal health care encompassing the knowledge, skills, methods, practices, and beliefs about animal health found among community members. It includes community-based local or indigenous knowledge on preparation and administration of medicinal plants for caring, healing, and managing livestock. It also covers social practices and ways livestock are incorporated into farming systems (Kamal *et al.*, 2004).

Ethnoveterinary practices related to animal healthcare are as old as the domestication of several livestock species. They contain beliefs, knowledge, practices, and skills relating to livestock health and management. The Indian subcontinent has rich ethnoveterinary traditions that have developed over many decades of experience (Sri Balaji and Vikrama Chakravarthi, 2010).

Ethnoveterinary practices are often inexpensive, safe, time-tested, and based on local resources and strengths (McCorkle 1995; Kumar 2002). Knowledge of medicinal plant properties and uses was passed down orally from generation to generation. However, this knowledge transfer in India is declining as

modern culture is increasingly adopted, often viewing traditional culture as inferior. Along with rural depopulation, the ability to pass down customs is now facing the imminent danger of disappearance (Anyinam, 1995). These traditional practices can provide useful alternatives to modern animal healthcare systems (Farooque *et al.*, 1996; Kumar 2002; Purohit *et al.*, 2002).

Medicinal plants are tied to local heritage worldwide (Tamal and Sayani 2012). Various plants are used extensively in herbal preparations given to animals. Medicinal plants and animals have been utilized to treat diseases in virtually all cultures (Yineger *et al.*, 2007). However, using biological resources medicinally is not restricted to human treatment, also being widely used to treat animal diseases (Lans *et al.*, 2006; Kunwar and Bussmann 2008).

Tamal and Sayani (2012) reported that ethno-medicinal practice is very common among Bankura District tribes in West Bengal. In field surveys, they found 14 plants from 11 families whose herbal preparations are potent medicines to treat various diseases and disorders in domestic animals. There are no authentic records of veterinary plant use in ancient literature. As a result, tracing animal ailments has become difficult. However, the Rigveda, the oldest Hindu text, describes the close human association with plants to treat people (Ayurveda) and animals (Mrigayurveda) is now called ethnoveterinary treatment (EVT). It was observed that various plant parts like bark, roots, leaves and seeds were widely used as remedies for diverse conditions in traditional small ruminant health. Nevertheless, these indigenous ethnoveterinary practices continue to play a vital role in caring for livestock in traditional communities. However, due to changing socioeconomic and cultural community values, regional indigenous livestock rearing practices are gradually declining.

Animal husbandry is the backbone of rural Tirunelveli, Tenkasi and Tuticorin districts in Tamil Nadu, India. However, due to lack of documentation, traditional animal treatment (Ethnoveterinary treatment or EVT) is restricted to a few herbal healers in society. These practices still continue among local and tribal people who have greater accountability for livestock management in India. About 85 percent of Indians live rurally. The present study aimed to document remedies used to treat known livestock diseases and indications, highlighting their preparation, processing, and administration. Additionally, the results obtained can inform new scientific studies.

2. Materials and Methods

2.1. Study area

Survey was undertaken from January 2023 to March 2023 to collect data and information on the use of different medicinal plant species which are used for curing animal ailments from the farmers, herders, village elders, women's, and traditional herbal healers (Vaidyas) in various remote villages (Tuticorin: Sathankulam, Valliammalpuram, Pannamparai, Puthukinaru, Karungulam, Thathankulam, Korampallam); (Tirunelveli: Tharuvai, Ilanthaikulam, PalayamChettikulam, Palaymarket, Burkitmanagaram, Palayamkottai, Thachanallur); (Tenkasi: Sankarankovil, Sivagiri, Duraisamipuram)(Figure-1). In addition, we collected data through direct observation of passersby in villages.

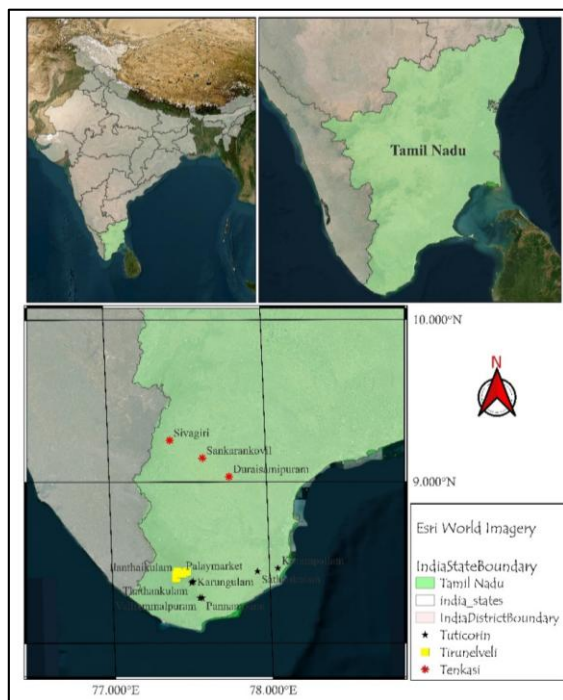


Fig.1 Map of the study area

2.2. Data collection

Ethno-veterinary information was collected using semi-structured interviews and questionnaires. Field surveys were conducted to collect information through interviews. Extensive field visits were made to local herbal healers to gather information from them. The field visits also helped identify the places, localities and habitats where medicinal plants occurred in the study area, and how these plants were used to cure particular animal ailments. Ethno-veterinary medicinal plants/parts were collected from the villages and identified using textbooks, field manuals and monographs.

Randomly selected households, headmen, elders, traditional healers, local people and veterinary doctors from the study areas were consulted and interviewed. The goal was to understand the reliance on traditional herbal and modern allopathic systems for treating animal ailments among various animal categories.

The perceptions of local people during field trips were recorded across different socio-demographic categories such as gender, education, age groups and healing experience. This allowed assessment of their responses and preferences to determine the status of the traditional animal healthcare system.

3. Results and Discussion

A total of 28 medicinal plants belonging to 27 genera from 20 different families were documented according to interactions with traditional healers, which were used by the indigenous communities of Tirunelveli, Tuticorin and Tenkasi districts, Tamil Nadu.(Table-1).



Fig.2. Enhancing Infrastructure in Livestock Farming Cultivation Area

During field studies, a total 17 villages were surveyed from different parts of among the three districts. Figure 23 showing the infrastructure of the livestock farming culturing area. Thirty-four 34 percentages of farmers are maintained in the cattles and goats on vacant in the empty land, with 32 % of farmers having soil floor. The shelters are constructed with And followed by roof using palm tree leaves, and o-Only 14% of farmers use maintain the habitats of concrete or asbestos sheets for housing. This in the 14% consists of farmers. They are from urban areas (Figures-3 and 4).

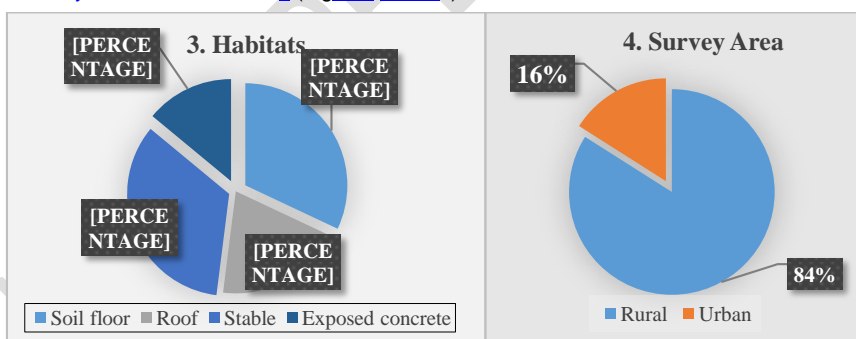


Fig 3. Percentage of different habitats used among the three districts.

Fig 4. Percentage of veterinary animal's culture in the study area.

Medicinal plants are used to treat a wide range of ailments in animals, including mastitis, enteritis, arthritis, stomatitis, and salivation from the mouth, wounding, and conjunctivitis. It has been noted that only a small number of practitioners and the last elderly people who practice ethno veterinary medicine still retain its traditional expertise today. Herbaceous plants were commonly used in other parts of the world as well, with local people utilizing herbs and trees primarily for medicinal purposes due to their

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availability in surrounding areas. The plant parts most often used by locals to treat various ailments were mainly leaves, fruits, and seeds.

Table. 1. List of Ethnoveterinary medicinal plants practiced by the farmers in Tuticorin, Tirunelveli & Tenkasi Districts.

S. No	Botanical name	Family	Local name	Habit	Parts used
1.	<i>Sesamum indicum</i>	Pedaliaceae	Sesame	Shrub	Seed
2.	<i>Cissus quadrangularis</i>	Vitaceae	Veld grape	Creeper	Stem, root
3.	<i>Piper betel</i>	Piperaceae	Betel	Vine	Leaf
4.	<i>Piper nigrum</i>	Piperaceae	Black pepper	Vine	Fruit
5.	<i>Borassus flabellifer</i>	Arecaceae	Palm	Tree	Trunk
6.	<i>Cocos nucifera</i>	Arecaceae	Coconut	Tree	Fruit
7.	<i>Sida cordifolia</i>	Malvaceae	Siddha mooti	Sub shrub	Leaf
8.	<i>Gossypium</i>	Malvaceae	Cotton	Shrub	Seed
9.	<i>Oryza sativa</i>	Poaceae	Rice	Grass	Seed
10.	<i>Allium cepa</i>	Amaryllidaceae	Onion	Herb	Altered stem
11.	<i>Achyranthes aspera</i>	Amaranthaceae	Nayuruvi	Herb	Leaves
12.	<i>Andrographis paniculata</i>	Acanthaceae	Siriyangai	Herb	Leaf
13.	<i>Zingiberofficinale</i>	Zingiberaceae	Ginger	Herb	Rhizome
14.	<i>Curcuma longa</i>	Zingiberaceae	Turmeric	Flowering plant	Rhizome
15.	<i>Pergulariadaemia</i>	Apocynaceae	Veliparuthi	Vine	Leaf
16.	<i>Vitex negundo</i>	Lamiaceae	Nochi	Tree	Leaf
17.	<i>Moringa oleifera</i>	Moringaceae	Murungai	Tree	Leaf
18.	<i>Vigna mungo</i>	Fabaceae	Ulunthu	Herb	Seed
19.	<i>Senna auriculata</i>	Fabaceae	Aavaram	Leguminous tree	Leaf
20.	<i>Tamarindus indica</i>	Fabaceae	Tamarind	Tree	Fruit
21.	<i>Trigonella foenumgraceum</i>	Fabaceae	Fenugreek	Herb	Seed
22.	<i>Trachyspermum ammi</i>	Apiaceae	Omam	Herb	Seed
23.	<i>Morinda citrifolia</i>	Rubiaceae	Manjanathy	Shrub	Leaf
24.	<i>Azadirachta indica</i>	Meliaceae	Neem	Tree	Leaf, bark, neem, seed
25.	<i>Capsicum frutescens</i>	Solanaceae	Chilli pepper	Herb	Fruit
26.	<i>Datura metel</i>	Solanaceae	Oomathai	Shrub	Leaf, fruit
27.	<i>Acalypha indica</i>	Euphorbiaceae	Kuppaimeni	Herb	Leaf
28.	<i>Musa sp</i>	Musaceae	Banana	Herbaceous plant	fruit

Out of the 28 medicinal plants documented from interactions with traditional healers across 3 districts in Tamil Nadu, further analysis revealed the predominant use and proportional representation of various plant parts for ethno medicinal purposes. The results showed that leaves constituted the maximum proportion (40%) of total plant parts utilized, followed by seeds (20%), fruits (20%), rhizomes (6.67%), roots (3.33%), stems (6.67%), and other plant parts like bark and trunk (3.33%) (Figure- 5).

Therapeutic plants, since times centuries old, have been used in practically all cultures as a source of medicine. The extensive use of herbal medicines and healthcare preparations, as those described in

ancient texts such as the Vedas and the bible and obtained from universally used traditional herbs and medicinal plants, has been outlined to the occurrence of natural products with medicinal belongings. The preparation of herbal medicine using leaves. The reason why leaves were used mostly is that they are collected very easily than fruits, flowers and underground parts and in a scientific point of view leaves are active in photosynthesis and production of secondary metabolites. Prepared in different way, depending on the preferences of different healers. Regarding *Azadirachta indica*, the leaves are used to treat stomach pain, fever, dehydration and indigestion. The leaf paste of this plant has been reported for use in the treatment. *Curcuma longa* is known as for skin diseases. According to the earlier reports, *Trachyspermum ammi* which is used for stomach pain & digestive problem.

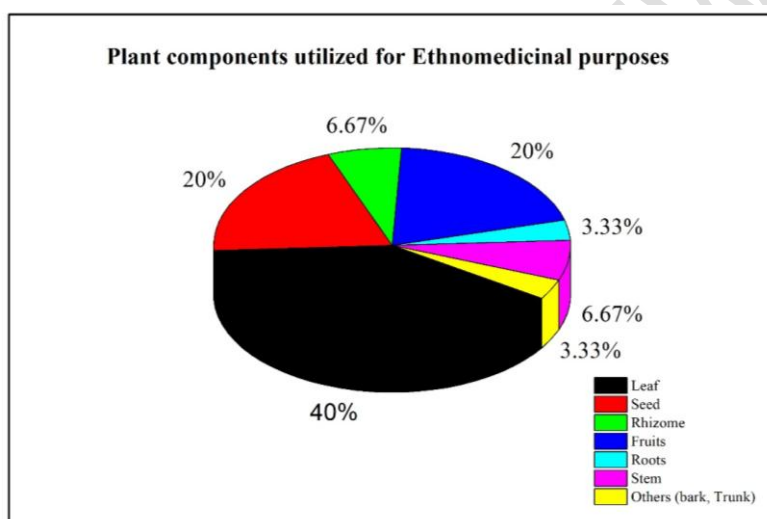


Fig.5. Plant components utilized for ethnomedicinal purposes

Vigna mungo used to treat joint pain & bone breaking. Other reports regarding *Cocos nucifera* and *Curcuma longa* which help for mouth diseases and skin diseases.

The leaf and seed part of *Trachyspermum ammi* and *Piper betel* which are used for digestive and motion problems in cattle in the Tirunelveli, Tenkasi and Thoothukudi district.

Curcuma longa and *Cocos nucifera* are used for the treatment of cow, goat horn damage. It was more knowledgeable regarding the usage of the plants and herbals. Similarly, these plants are also used for curing some human ailments and the use of plants for both human & animals is a common practice. It was also observed that people living far away from urban areas depend on ethno-veterinary herbal medicines.

The indigenous documentation knowledge will help the farmers, traditional healers, livestock agents, and village people to incorporate and encourage the use of ethno-veterinary herbal medicinal plants in animal health care (Table.2).

1. Anthrax (Adaippan)

Paste of a palm size leaf of Inji (kandakathari), five fruits of (milagai) and teaspoonfull of (milagu) is given to cattle orally for three days or a week to cure anthrax.

Table. 2. List of Diseases, causing agents and treatments using herbals.

Sl. No	Diseases	Causing agents	Treatment	
			Allopathic	Herbal
1	Cattle sore Anthrax	<i>Bacillus anthracis</i>	Ciprofloxacin, Doxycycline.	Turmeric, Neem
	Food and mouth disease	Infected water, spread by rats and birds.	Mixture of coal –tar and copper sulfate.	Banana
2	Throat obstruction	<i>Pseudomonas aeruginosa</i>	Sedation with acepromazine or xylazine	Black pepper, Betel, Turmeric
3	Bovine rhinotracheitis	Bovine herpes virus	Procaine penicillin	Lime, Turmeric, Onion, Salt
4	Parasitic diseases	<i>Parafilariaabovicola</i>	Ivermectin or nitroxylnil	Neem, Turmeric, Banana, Benzoin
5	Diarrhea	Worms, bovine viral diarrhea virus, <i>Salmonella</i> or <i>Yersinia</i>	Rehydration fluids, anthelmintic, Mineral inflammatory.	Cotton seeds, Ajwain seed Asafoetida Betel
6	Pink eye	<i>Mycoplasma conjunctivae</i> , <i>Moraxella bovis</i> , <i>Mycoplasma</i> , <i>Neisseria</i>	Ox tetracycline or trimethoprim or sulfamethoxazole	Palm jaggery, Datura metel, Fenugreek, Sesame oil
7	Skin lesions	Mange mite, lice	Macro cyclic lactones	Turmeric, Chilli powder
8	Decubitus Ulcers	<i>Proteus mirabilis</i>	Erythromycin, flunixin meglumine, tolfenamic acid	Siriyangai, Aloe Vera, Turmeric, Neem oil
9	Abscess	<i>Corynebacterium pseudo tuberculosis</i>	Flunixin meglumine, tolfenamic acid, erythromycin	Ajwain seed, Banana, Betel
10	Lameness	Nervous system weakness or muscular weakness	Meloxicam	Egg, Sesame oil, Noni, Thennaimarakudi oil, Tamarind seed
11	Arthritis	<i>Encephalitis virus</i>	Oxtetracycline antibiotics	Greens, Pergulariadaemia, Veld grape
12	Pox	Cowpox virus	Cow pox vaccine	Banana, Neem oil, Ragi flour
13	Venom bite	Snakes, Scorpion	Polyvalent snake venom antiserum, saline, dextrose, dexamethasone phosphate,	Lime, Pepper, Betel
14	Burn wound	Heat	Providone iodine or chlorhexidine	Turmeric, Avuri
15	Psoriasis	<i>Staphylococcus aureus</i> , <i>Endogenous retrovirus</i> , <i>Malassezia</i>	Tetracycline, pencillins	<i>Acalypha indica</i> , Pork lard, Chilli

2. Bone fracture (Ezhu(lu)umbumurivu)

Paste of *Dodonaeaangustifolia* L.F. (Viral) is applied on bone fracture wounds of the cattle for three days. Paste of *Vigna mungo* (L.) Hepper (Uzhunthu) seed powder (50) mixed with egg embryo is applied on bone fracture part.

3. Bloat (Vayitruporumal)

A teaspoon of *Piper nigrum* L. (Milagu) folded with five leaves betel L. (Vettilai) is orally given to the cattle thrice daily to cure bloat.

4. Bronchitis (Elappu)

Paste of *Musa paradisiaca* L. (Vazhai) fruits (5nos) and *Sesamum indicum* L. (Ellu) oil (25ml) is given orally for a week.

5. Black quarter (kulaimutti)

Milk of *Euphorbia antiquorum* L. (Pothakalli) is applied on the neck and joints of the cattle to cure black quarter.

6. Constipation (Malachikkal)

Paste of equal amount of *Albizia lebbbeck* (L.) Benth. (Vakai) root, sliced fruit of *Citrullus colocynthis* (L.) Schrader (Kumatti), leaves of Piper Betel L. (vettilai) and spoonful of *Piper nigrum* L. (milagu) fruits is given once daily orally to cattle.

7. Conjunctivitis (kanpurai)

Leaf of piper betel L. and small amount *Nicotiana tabacum* L. (pugaielai) is chewed and spit forcefully into the eyes of the cattle to cure conjunctivitis.

8. Corneal opacity (kannilpooviluthal)

Extract of five leaves of *Coccinia indica* Wight & Arn. (kovaielai), 5gm of *Cuminum cyminum* L. (Seeragam), five bulbs of *Allium cepa* L. is filtered through a pure white cloth and applied on the eyes of the cattle to cure corneal opacity.

9. Contusion (Rathakattu)

Paste of *Cadapa indica* Lam. (Veeli) leaf ground with cows' milk is applied on the affected part of cattle to cure contusion.

10. Chronic wound (natapatta pun)

Palm size leaves of *Wrightia tinctoria* (Roxb) R.Br. (Veppilai) is soaked in *Cocos nucifera* L. (Thennai) oil (250ml) for 10 days in the sunlight and the infusion is applied on the wound.

11. Diuretics (Adikadineerpothal)

Equal amount of (Palm size) of leaf extracts of *Gossypium hirsutum* L. (Paruthi) and *Gymnema sylvestre* (Retz.) R.Br. ex Roemer & Schultes (Sirugurunjan) mixed with the urine of the healthier cattle is given orally to the affected cattle as diuretic.

12. Dog bite (Naikadi)

Paste of handful leaves of *Achyranthes aspera* L., (Nayurvi) and *Allium cepa* L., (Chinnavengayam) is given orally to the cattle to cure dog bite for a week.

13. Dyspepsia (Thannirkudikkamai)

A succulent leaf of *Aloe vera* (L.) Burm f., (Sothukathalai) is given orally to cattle to cure dyspepsia.

14. Enteritis (kalichal)

Phyla nodiflora (L.) E.Green, (Poduthalai) plant mixed with grass is fed to sheep and goats for three days.

15. Facial palsy ((Mugavaichanny)

The cattle are allowed to immersed in a pond and few drops of *Calotropis proceral*. (Vellaerukku) milk is applied on nose of cattle once a day.

16. Foot and mouth disease (Komari)

Paste of palm size leaves of *Andrographis pnniculate* (Burm.f.) wallich ex.Nees, (Chiryangai), *Peristrophe paniculata* (Forsskal) Brummitt, (Periyangai), fruits of *Cuminum cymimitt*. (Seeragam) and bulb of *Allium cepa* L., is given orally to cattle for three days.

17. Heamaturia (Ratthakalichal)

Paste of equal amount of *Aloe vera* (L.) Burn f.succulent leaf, bark of *Syzygiumcumini* (L)skeels. (Naval), bulb of *Allium cepa* L. and Fruits of *Cuminum cymium* L. (seeragam) is given orally cattle for three days.

18. Heat disease (Vekkai)

Whole plant of *Phyllanthus amarus*(L.) Sehum&Thonn.(Keelanelli) mixed with grass is fed to cattle. Flower of *Cassia auriculata* L. (Aavarai),whole plant of *Enicostemaaxillare* (Lam.) A.Raynal-(Vellarugu) and fruit of *Cuminim cyminum* L.(seeragam) mixed with grass is fed tocattle for three days. Paste of *Thmarindus indica* L.(Puli) leaves and *Allium cepa* L.bulb is given orally to cattle for the three days.

19. Inflammation (Veekam)

Paste prepared from equal amount of extracts of *Daemia extensa* L.Veliparuthiand *Zingiber officinale*Rosc. (Inji) mixed with *Ferula asafetida* L. (Perungayam) is applied externally in warm condition to cattle.

20. Inferility (Malatuthanmai)

Seeds of *Cicer arietinum* L. (Kondakadalai), leaves of *Ocimum sanctum* L. (Thulasi) mixed with embryo of the egg are given orally to cow for three days.

21. Indigestion problem (Semiymai)

Paste of *Aerva lanata* (L.) Juss (Kannupelai) Whole plant and *Bambusaarundinacae* (Retz.) Willd. (Moongil) leaves mixed with grass is fed to cattle once a day.

22. Lactation problem (Palsurappunoi)

Paste of *Vigna unguiculata* (L.) Walp. (Kanaipayar), *Vigna mungo* (L.) Hepper- (Uzhunthu), *Gossypium hirsutum*L. (Paruthi), fruits of *Musa paradisiacal* L. and kernel of *Cocopc nucifera* L. is fed to cow for a week.

23. Retention of Placenta (Elangodithankiruthal)

Paste prepared from whole plant of *Sesamum indicum* L. (Ellu) and *Borassus flabellifer* L.(Panai) and sugar is given orally to cattle once a day.

24. Snake bite (Pambu kadi)

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Leaves of *Daemia extensa* L.(Velliparuthi), *Azima tetrachantha*Lam. (Mulsanguelai) and *Crotonnbonplandianus*Baill- (Vellapoondur) mixed with grass is fed to cattle for three days.

25. Sprain & Swelling (Sulukku)

Cooled infusion of *Cissus quadrangularis* L. (Pirandai) extracts, *Tamarindus indica* L. (Puli) fruit juice with a spoon of salt is applied on the affected area of the cattle.

Table. 3. Scientific relevance scores of indigenous animal healthcare practices of 50 cattle farmers in Tuticorin, Tirunelveli and Tenkasi Districts

Disease	Indigenous practices	% of responds practicing
Cattle sore	Applying a mixture of turmeric powder and neem oil	74
	Feeding banana, sodom apple	30
Throat obstruction	Feeding piper betel and pepper	42
	Applying a mixture of turmeric powder and neem oil	30
	Feeding sida cordifolia	16
Bovine rhinotracheitis	Feeding tamarind and onion	32
	Applying a mixture of turmeric powder and castor oil	90
Parasitic diseases	Feeding banana	20
	Applying a mixture of neem leaf powder, turmeric, Acalypha indica, Colocynthis, camphor	92
Diarrhea	Feeding a cotton seed, ajwain seed, asafoetida, fenugreek	94
Pink eye	Feeding a mixture of palm jaggery, fenugreek	36
	Feeding Datura metel with white goat milk	24
Skin lesions	Dusting a chili powder or turmeric powder	97
Decubitus Ulcers	Applying a green chiretta, turmeric and neem oil	74
	Giving a mixture of aloes, salt and butter milk	86
Abscess	Applying a turmeric powder with castor oil	98
Lameness	Putting a paste of egg, castor oil in the affected area	62
Arthritis	Tie with Indian mulberry leaves, Chinese chastetree leaves, areca nut and Vigna mungo	60
Venom bite	Feeding a mixture of pepper, betel	45
	Applying a neem leaf extract and turmeric powder or basil leaf in the bite mark	82
Pox	Giving a mixture of banana and castor oil	24
	Applying a neem leaf powder with turmeric powder and coconut oil on the red spots	88
	Feeding a ragi flour, rice porridge	18
Burn wound	Applying a turmeric with castor oil or coconut oil or neem oil	99
	Applying anaavaram leaf or veld grape	14
Psoriasis	Applying <i>anacalypha indica</i> or neem with turmeric	70
	Applying a camphor with castor oil	62
Stomach pain	Feeding a mixture of ajwain, betel, pepper	91
	Feeding a drumstick tree leaves or <i>Pergulariadaemia</i> powder or veld grape	73

26. Smallpox (Ammal)

Paste prepared from equal amount of *Curcuma longa*Auct. Non L. (Manjal) rhizome and of *Azadirachta indica* A.Juss (Vembu) leaves is given orally to goat's sheep for three days

27. Stillbirth (Vayitrileranthukanru)

Equal quantity (50 gm) of *Ferula asafetida* L.(Perungayam) powder and salt (Induppu) mixed with hot water is given orally to cow for three days.

28. Tongue disease (Nakku pun)

Hot water extract of five seeds of *Pongamia glabra* Vent. (Pungaimaram) is given orally to cattle.

29. Poisonous bites (Visakadi)

Paste prepared from equal amount of *Azima tetracantha* Lam. (Mulsanguelai) leaves, *Piper nigrum* L. fruits, *Allium cepa* L.bulb is given orally to cattle for three days or a week (For any poisonous bites).

Besides indigenous medicine, ethnic communities use forest products not only for household consumption but also for commercial purposes to generate community income; the conservation of biological resources is integrated with regional and national economies. Numerous plant species are found to have an important role in the everyday life of ethnic and local people-(Maikhuri *et al.*, 1998; Raghupathy 2001). Rafique Khan *et al.*, (2021) documented 39 plant species, belonging to 31 genera and 21 families were documented which were used by the indigenous communities of Kashmir Himalaya for curing 21 different diseases of 7 different types of livestock.

Ganesan *et al.*, (2008) enumerated 113 plant species belonging to 100 genera and 46 families are used by rural peoples in the treatment of anthrax, bone fracture, bloat, bronchitis, black quarter, corneal opacity, dog bite, enteritis, foot and mouth diseases, etc. The medicinal plants are listed with their scientific name, family, local name (Tamil) and mode of utilization. Medicinal plants have been used across the globe since ages due to their efficacy, availability as well as cultural beliefs. The herbal remedies are an essential part of the traditional medicinal practices in the indigenous Himalayan mountain communities. Plant based ethno veterinary medicine are widely practiced in the Himalayan region since the livestock rearing is an integral part of the livelihoods.

4. Conclusion

This study, which is the first of its kind and aims to record and share the hidden knowledge of the villagers, farmers, cattle owners, and traditional healers regarding ethno-veterinary medicines and their methods of treatment towards cattle diseases in the Tirunelveli, Tenkasi and Tuticorin district of Tamil Nadu, is very important for biochemists and pharmacologists for future research in order to develop new pharmaceutical products. In addition to this, precarious toxicological investigations are mandatory for safe and secure use of documented ethno-medicines. In our study, we concluded that twenty-eight ethno-medicinal plants belongs to twenty families used by farmers, cattle owners and healers to control the livestock animal eighteen diseases in southern districts of Tamilnadu, India.

References

1. Anyinam C. Ecology and ethnomedicine: exploring links between current environmental crisis and indigenous medical practices. *Social science & medicine*. 1995 Feb 1;40(3):321-9.
2. [https://doi.org/10.1016/0277-9536\(94\)E0098-D](https://doi.org/10.1016/0277-9536(94)E0098-D)
3. Farooquee NA, Saxena KG. Conservation and utilization of medicinal plants in high hills of the central Himalayas. *Environmental Conservation*. 1996 Mar;23(1):75-80. <https://doi.org/10.1017/S0376892900038273>
4. Ganesan S, Chandhirasekaran M, Selvaraj A. Ethnoveterinary healthcare practices in southern districts of Tamil Nadu. 2008
5. Misra KK, Kumar KA. Ethno-veterinary practices among the Konda Reddi of East Godavari district of Andhra Pradesh. *Studies of Tribes and Tribals*. 2004 Jul 1;2(1):37-44.
6. <https://doi.org/10.1080/0972639X.2004.11886502>
7. Kumar D. The use and relevance of ethnoveterinary practices in sheep. *The Indian Journal of Small Ruminants*. 2002;8(2):124-8.
8. Maikhuri RK, Nautiyal S, Rao KS, Saxena KG. Role of medicinal plants in the traditional health care system: a case study from Nanda Devi Biosphere Reserve. *Current Science*. 1998 Jul 25:152-7.
9. McCorkle CM. Back to the future: Lessons from ethnoveterinary RD&E for studying and applying local knowledge. *Agriculture and Human values*. 1995 Mar;12:52-80.
10. <https://doi.org/10.1007/BF02217297>
11. Purohit A, Maikhuri RK, Rao KS, Nautiyal S. Revitalizing drink: An assessment of traditional knowledge system in Bhotiya community of Central Himalayas, India.
12. Rafique Khan SM, Akhter T, Hussain M. Ethno-veterinary practice for the treatment of animal diseases in Neelum Valley, Kashmir Himalaya, Pakistan. *PLoS one*. 2021 Apr 30;16(4):e0250114.
13. <https://doi.org/10.1371/journal.pone.0250114>
14. Raj AJ, Biswakarma S, Pala NA, Shukla G, Vineeta, Kumar M, Chakravarty S, Bussmann RW. Indigenous uses of ethnomedicinal plants among forest-dependent communities of Northern Bengal, India. *Journal of ethnobiology and ethnomedicine*. 2018 Dec;14:1-28.
15. <https://doi.org/10.1186/s13002-018-0208-9>
16. Raghupathy L. Conservation and sustainable use of medicinal plants: current issues. *Himalayan Medicinal Plants: Potential and Prospects*. Nainital: GyanodayaPrakashan. 2001;415:e426.
17. SriBalaji N, Chakravarthi VP. Ethnoveterinary practices in India-A review. *Veterinary world*. 2010 Dec 1;3(12):549.
18. <https://doi.org/10.5455/vetworld.2010.549-551>
19. Tamal Mondal and Sayani Biswas. Ethnoveterinary Uses of Some Medicinal Plants of Bankura District, West Bengal. *Life Sciences Leaflets*, 2012; 5:47-49.