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Original Article

UTILIZATION OF ETHNO-VETERINARY MEDICINAL PLANTS IN HASSAN DISTRICT OF KARNATAKA, INDIA

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ABSTRACT

Objective: Present work deals with the studies on ethnoveterinary medicinal plants used by local people in Hassan district, Karnataka, India

Methods: The survey was undertaken during 2015-2016 to collect the information on the ethnoveterinary medicinal plants used for treating various diseases in livestock in rural areas.

Results: A total of 36 ethnoveterinary medicinal plants species belonging to 23 families were recorded along with their botanical names, local names, family name, parts used and their ethnomedicinal usage.

Conclusion: Survey was vital importance in finding some miraculous medicines for curing various veterinary diseases.

Keywords: Ethnoveterinary, Medicine, Hassan, Karnataka

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INTRODUCTION

Indian agriculture, livestock plays a key role in the farmer's life, they provide farm power, rural transport, manure, fuel, milk, and meat, but also a major role in the rural economy by providing income and employment to the farmers and weaker sections of the society [1]. Ethno veterinary medicine, deal with traditional animal health care which encompasses the knowledge, skills, methods, practices concerning animal health care. The local plants used for the treatment of conventional diseases of livestock and domestic birds are generally called ethno veterinary medicinal plants. Ethno-veterinary medicine is developed by farmers in fields, rather than by scientists in laboratories. The indigenous knowledge of the veterinary health care system acquired by traditional healers is orally transformed from one generation to next generation.

Over centuries, people have developed their own system of keeping animal's healthy and productive using age-old home remedies, surgical and manipulative techniques and religious practice [2]. The use of ethnoveterinary medicine is a cheaper and sustainable alternative to synthetic medicines [3]. Ethnoveterinary medicine usage differs not only from region to region but also among and within communities [4]. Ethnoveterinary medicinal practice and skills have developed through time mainly by trial and error and sometimes through experimentation and innovation [5].

Particularly old practice in large part of the world, in developing countries where animal health service facilities are still very poor or/and, are found scarcely located in urban areas [6]. In rural regions, livestock are regularly affected by different types of diseases due to unavailability of veterinary services; rural poor people exclusively depend on ethnoveterinary practices. In Hassan district, documentation of 194 plant species belonging to 172 genera and 73 families of wild medicinal plants has been recorded (7). The study of ethnobotanical knowledge of ethnoveterinary medicinal plants used by local people of Hassan district not documented yet. This paper is based on data to show the local knowledge of medicine still exists in the Hassan district of Karnataka, which contributes to animal health. The information about local knowledge that was collected remains relevant because farmers' experiences over generations are still valuable, and will possibly be of even greater value in future.

MATERIALS AND METHODS

Study area

In Karnataka, Hassan district is located in the south-western part. It lies between 12 ° 13′ and 13 ° 33′ North latitudes and 75 ° 33′ and 76 ° 38′ East longitudes with a total area of 6814 sq. Km. It has Tumkur district on its east, Chikkamagalore district towards its north. A South Canara district on the west and on the south is the Mysore district. The Hassan district is divided into 8 taluks viz. Alur, Arakalgud, Arasikere, Belur, Channarayapatna, Hassan, Holenarasipura, and Sakaleshpura with 2,574 inhabited villages (fig. 1). The geography is mixed with Malnad or mountainous region to the west and south-west called Bisle Ghat and the Maidan or plains region in the north, south, and east. There are some areas of degraded forest ranges in the central portion of the district. Hassan district is noted for its rich diversity of plant species, apart from wetlands and floodplains serving the habitat requirement of several inhabitant communities. Most of the families of rural areas are having the practice of maintaining their own small backyard home gardens; almost all families of rural areas have such practices.

Data collection

The study was conducted among local people including traditional healers and practitioners with knowledge of medicinal plants were selected for the collection of ethnomedicinal information. The information was documented through a survey, interview and field work. The information included details about the botanical and common name of the plant prescribed, part of the plant used, mode of preparation (decoction, paste, powder or juice) and medicinal uses. The information was confirmed through discussions with respondents who practiced the use of the documented plants for veterinary purposes. During the survey, all plants were enlisted, photographed and collected 10-14 inch plant specimen and pressed in the field with collection number. The collected plant specimens from the field along with digital photography and field notes for further processing for herbarium and taxonomical identification. Processed plant specimens to dry and poisoned with 5% HgCl2 to mount on herbarium sheets with detailed labelling by following the methods [8-10]. Botanical identification of the species was done with the help of floras [11-13] and also collected plant species were

cross-verified with the help of preserved authentic herbarium specimens of Regional Research Center Bangalore, India (RRCBI), Survey of Medicinal Plants Unit, Regional Ayurveda Research Institute for Metabolic Disorder (RARIMD), Jayanagar 1st Block, Bangalore.

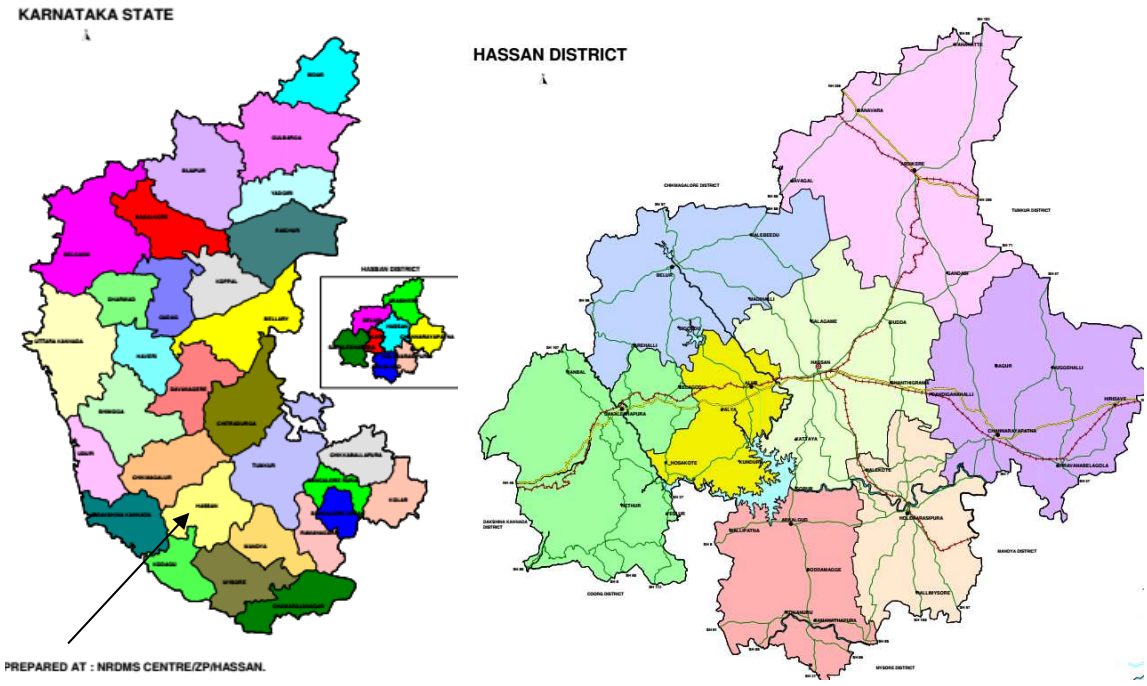


Fig. 1: A detailed study map of the Hassan district

RESULTS AND DISCUSSION

Ethnobotanical uses of 36 plants belonging to 23 families (table 1 and fig. 3) have been documented in the present study for their interesting therapeutic properties in treating various veterinary ailments such as fever, diarrhoea, cough, foot and mouth disease, to expel intestinal worms, stimulate, prevent premature delivery, retention of placenta, leg damage, eye problem, sore throat, paralysis and joint pain. In the present survey, 36% of the reported species are the herb. Other highly reported species are the tree (25%), shrub (22%) and the creeper (16%) (Fig. 2). The common use of herbaceous plants was also reported in other parts of the world [14] and local people used herbs and trees most commonly as medicine due to the availability in surrounding area [15]. The plant parts used by the local people to treat various ailments were mainly leaves, fruits, and seeds. The most frequently utilized medicinal plant's parts were leaves (55%), followed by root (10%), fruit (7%), whole plants, seeds, and stem (each 5%) bark and bulb (each 2%)(fig. 2). All over the world local communities, utilized for the preparation of herbal medicine using leaves [16-17]. The reason why leaves were used mostly is that they are collected very easily than fruits, flowers and underground parts [18] and in a scientific point of view leaves are active in photosynthesis and production of secondary metabolites [19].

The representation of the families (table 2), among the plants, studied, most of them belonged to the Apocynaceae, Poaceae (4 species each), Euphorbiaceae (3 species), Rubiaceae, Amaranthaceae, Asparagaceae, Asteraceae (2 species each). The rest species belonged to the Anacardiaceae, Liliaceae Mimosaceae, Verbenaceae, Myrtaceae, Menispermaceae, Moraceae, Lamiaceae, Nyctaginaceae, Apiaceae, Oxalidaceae, Araceae, Boraginaceae, Olacaceae and Rhamnaceae family (one species each). The information obtained is comparable favourably with results of similar studies conducted in some other districts of Karnataka [20-22]. Of the 36 recorded plant species frequently applied plant species against veterinary ailments included: *Justicia adhotoda, Calotropis procera, Asparagus racemosus, Rubia cordifolia, Boerhavia diffusa, Tylophora indica*. The same plant material for the same ailment could be prepared in different ways, depending on the preferences of different healers. Regarding *Justicia adhotoda,* the leaves are used to treat stomach pains, fever, dehydration, diarrhoea, dysentery and indigestion. The leaf paste of this plant has been reported for uses in the treatment of hoof rot in the literature [23]. The therapeutic value of *Achyranthes aspera* is known for skin diseases [24] and various gastrointestinal and respiratory problems [25]. According to the earlier reports, leaves of *Agave americana* are used to cure disease like warts, swelling of the throat, constipation, etc. Here, in present study leaf fibers used to tie the fractured bone. Leaves, stems, and twigs of *Calotropis procera* are applied to cure mouth and eye watering, colic, indigestion, pain and inflammation. Other reports regarding the use of this plant, include latex to increase lactation, crushed leaves for the relief of flatulence, and bark decoction for hoof rot [23]. The leaves and seeds are also reported to be useful for silent oestrus and delayed puberty [26].

The leaf paste of *Trichodesma indicum* is used to treat stomach disorders and intestinal worms in cattle in the Hassan district, whereas others have reported the use of this paste in the treatment of mastitis and for uterine prolapse [23]. The fruit pickle of *Mangifera indica* is used for mouth infections. Others have reported that the leaves of the same plant are fed to livestock to treat retained foetal membrane [26]. The seed oil of *Ricinus communis* is administered to treat constipation. Other studies have documented the use of *Ricinus communis* for intestinal obstruction, abscesses, hoof problems, wounds, digestive problems, to expel retained placenta and for delayed puberty in cattle [23, 26-27].

The old age residents were more knowledgeable regarding usage of the plants. Similarly, those plants are also used for curing some human ailments and use of plants for both human and animals are a common practice [28]. It was also observed that people living far away from urban area depend on ethnoveterinary medicines. The indigenous documentation knowledge will help the farmers, traditional healers, livestock agents, and village leaders to incorporate and encourage the use of ethnoveterinary medicinal plants in animal health care [29].

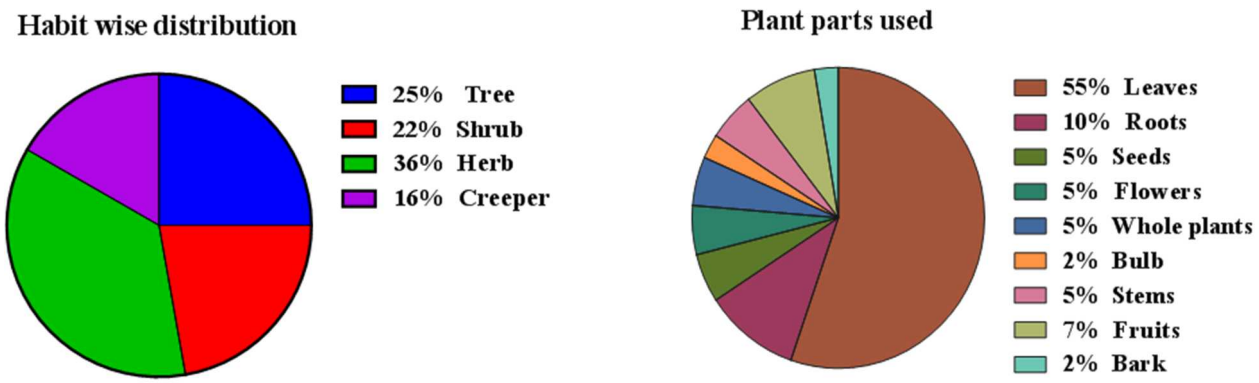


Fig. 2: Showing the habit wise distribution, percentage of plants used for ethnoveterinary medicines

Table 1: Ethnoveterinary medicinal plants used to treat livestock diseases in Hassan district of Karnataka, India

S. No.	Botanical name	Family	Local name	Habit	Parts used	Ethnoveterinary medicinal uses
1	*Acacia nilotica* (L.) Delile	Mimosaceae	Karijali	Small thorny tree	Flowers and Bark	Flowers grinded well and mixed with water, the solution so obtained is given orally twice daily for 15-20 d to cattle to cure jaundice. The extract of bark is given to cattle orally twice a day for 10-20 d to cure dysentery
2	*Achyranthes aspera* L.	Amaranthaceae	Uttarani	Undershrub	Roots	Fresh root is grounded and the paste applied to cure bone fracture
3	Aerva *javanica* (Burm. f.) Juss. ex Schult.	Amaranthaceae	Dodda indigida	Herb	Roots	Roots are boiled in water and decoction is given twice a day orally for 7–8 d for infection of mouth
4	*Agave americana* L.	Asparagaceae	Kattale	Bushy herb	Leaves	Swelling on the fracture part, Leaf fibers used to tie the fractured bone
5	*Allium cepa* L.	Liliaceae	Irulli	Bulbous herb	Bulb	Bulb is grind and mixed with black salt and used to drink with water to cure infection of mouth and hoops
6	*Asparagus racemosus* Willd.	Asparagaceae	Shatavari	Creeper	Roots	Root powder given with milk for one month for the treatment of arthritis in cattle. The juice, extracted from leaves and fruits is applied over suffering from diseases of foot
7	*Bambusa bambos* (L.) Voss	Poaceae	Bidiru	Shrub	Leaves	Leaves are given to cattle twice a day to facilitate easier removal of placenta after delivery
8	*Boerhavia diffusa* L.	Nyctaginaceae	Kommegida	Herb	Leaves	Juice of leaves for thrice a day to cure blood dysentery and dropsy
9	*Calotropis procera* (Aiton) Dryand.	Apocynaceae	Bili yekka	Errect shrub	Leaves	Fresh leaves and black salt are fed to animals for 1–2 d to cure mouth and eye watering
10	*Caralluma adscendens* var. *fimbriata* (Wall.) Gravely and Mayur.	Apocynaceae	Mangana kodu	Herb	Stem	Plant juice is mixed with coconut oil and heated for 5 min and applied on the affected parts of mouth
11	*Centella asiatica* (L.) Urb.	Apiaceae	Ondelaga	Creeper	Leaves	Apply paste of green leaves on forehead during fever
12	*Cryptolepis dubia* (Burm. f.) M. R. Almeida	Apocynaceae	Karibanti	Creeper	Leaves	Leaves crushed in buttermilk are given twice in the treatment of snakebite in cattle
13	*Cynodon dactylon* (L.) Pers.	Poaceae	Garikehullu	Herb	Whole plant	Fresh plant material is ground and the paste is topically applied for 2–3 d to cure wound healing
14	*Dendrocalamus strictus* (Roxb.) Nees	Poaceae	Hebbidiru	Tree	Leaves	Frequent coughing, the green leaves of hebbidiru grind with seeds of bajra and used to eat
15	*Euphorbia heterophylla* L.	Euphorbiaceae	Bhedisoppu	Herb	Leaves	Leaves and seeds are grounded together and mixed in water and given to livestock in case of food poisoning.
16	*Justicia adhatoda* L.	Acanthaceae	Adumuttada soppu	Shrub	Leaves	Leaves are mixed with grass or husk and fed to animal for 2–3 d to cure dysentery
17	*Lantana camara* L.	Verbenaceae	Seme seme huu	Shrub	Leaves	The tender leaves and twigs are grinded and then decoction are given to cattle for relieving joint pain
18	*Launaea procumbens* (Roxb.) Ramayya and Rajagopal	Asteraceae	Hattarike	Herb	Leaves	Paste of fresh leaves is topically applied for 3–4 d to cure skin infection
19	*Mallotus philippensis* (Lam.) Müll. Arg.	Euphorbiaceae	Kumkumada mara	Small tree	Fruits	Dried fruits are ground and powder is fed to animals along with wheat flour for 2–3 d to cure intestinal worms
20	*Mangifera indica* L.	Anacardiaceae	Mavina mara	Large tree	Fruits	Pickled fruit is fed to animal for 4–5 d to cure mouth infection
21	*Mentha arvensis* L.	Lamiaceae	Kadupudina	Herb	Leaves	Milled fresh leaves and mixed with black salt and used to eat with water to cure frequent loose motion
22	*Mussaenda frondosa* L.	Rubiaceae	Beltligida	Shrub	Roots	Root paste is given orally in the treatment of

						poisonous bites in cattle
23	*Oxalis corniculata* L.	Oxalidaceae	Hulisoppu	Creeper	Leaves	Leaves juice is used to cure white rashes on the surface of eyeball
24	*Pothos scandens* L.	Araceae	Agesoppu	Creeper	Whole plant	The whole plant is crushed and given to cattle's to increase lactation
25	*Psidium guajava* L.	Myrtaceae	Seebe	Small tree	Leaves	Fresh leaves are boiled in water for half an hour the extract is then used as drench to cure cuts and wounds
26	*Ricinus communis* L.	Euphorbiaceae	Haralu	Shrub	Seeds	Cup of seed oil is orally administered for up to a week to constipation
27	*Rubia cordifolia* L.	Rubiaceae	Kaikuykana soppu	Herb	Leaves	Leaf juice applied externally over affected parts of foot
28	*Streblus asper* Lour.	Moraceae	Miltimara	Tree	Seeds	Seed are sundried and grinded and given for 10-15 d to treat mouth disease
29	*Syzygium cumini* (L.) Skeels	Myrtaceae	Nerale	Large tree	Leaves	Fresh leaves are fed to animals to cure diarrhoea
30	*Tagetes erecta* L.	Asteraceae	Chandu huu	Herb	Leaves	Milled the fresh leaves and juice is applied externally to cure shelling off outer layer of horn concomitant bleeding,
31	*Tinospora sinensis* (Lour.) Merr.	Menispermaceae	Amurthaballi	Creeper	Stem	Stems are grinded and prepared into a thick paste is applied to skin of livestock to cure skin disease
32	*Trichodesma indicum* (L.) Lehm.	Boraginaceae	Katte tumbesoppu	Herb	Leaves	Paste of fresh plant is administered orally for a week for stomach disorder and intestinal worm
33	*Tylophora indica* (Burm. f.) Merr.	Apocynaceae	Adumuttada balli	Undershrub	Leaves	Leaves are crushed and paste is given twice a day orally along with ragi balls for 4 d to cure dysentery
34	*Ximenia americana* L.	Olacaceae	Nagari gida	Tree	Leaves	The leaf extracts are applied to treat eye infections in cattle, goats and sheep
35	*Zea mays* L	Poaceae	Mekkejola	Herb	Flowers	Decoction of the female inflorescence is orally administered for 4–5 d to cure urinary inflammation
36	*Ziziphus jujuba* Mill.	Rhamnaceae	Yelechi	Small tree	Leaves and Fruits	The decoction of leaves stops dysentery, the fruit is laxative

Table 2: Family-wise distribution of ethnoveterinary medicinal plants in the study area

S. No.	Name of family	Name of plants
1	Acanthaceae	*Justicia adhatoda* L.
2	Amaranthaceae	*Achyranthes aspera* L.
		Aerva *javanica* (Burm. f.) Juss. ex Schult.
3	Anacardiaceae	*Mangifera indica* L.
4	Apiaceae	*Centella asiatica* (L.) Urb.
5	Apocynaceae	*Calotropis procera* (Aiton) Dryand.
		Caralluma adscendens var. *fimbriata* (Wall.) Gravely and Mayur.
		Cryptolepis dubia (Burm. f.) M. R. Almeida
		Tylophora indica (Burm. f.) Merr.
6	Araceae	*Pothos scandens L.*
7	Asparagaceae	*Agave americana* L.
		Asparagus racemosus Willd.
8	Asteraceae	*Launaea procumbens* (Roxb.) Ramayya and Rajagopal
		Tagetes erecta L.
9	Boraginaceae	*Trichodesma indicum* (L.) Lehm.
10	Euphorbiaceae	*Euphorbia heterophylla* L.
		Mallotus philippensis (Lam.) Müll. Arg
		Ricinus communis L.
11	Lamiaceae	*Mentha arvensis* L.
12	Liliaceae	*Allium cepa* L.
13	Menispermaceae	*Tinospora sinensis* (Lour.) Merr.
14	Mimosaceae	*Acacia nilotica* (L.) Delile
15	Moraceae	*Streblus asper* Lour.
16	Myrtaceae	*Psidium guajava* L.
		Syzygium cumini (L.) Skeels
17	Nyctaginaceae	*Boerhavia diffusa* L.
18	Olacaceae	*Ximenia americana* L.
19	Oxalidaceae	*Oxalis corniculata* L.
20	Poaceae	*Bambusa bambos* (L.) Voss
		Cynodon dactylon (L.) Pers.
		Dendrocalamus strictus (Roxb.) Nees
		Zea mays L
21	Rhamnaceae	*Ziziphus jujuba* Mill
22	Rubiaceae	*Mussaenda frondosa* L.
		Rubia cordifolia L.
23	Verbenaceae	*Lantana camara* L.

***Acacia nilotica* (L.) Delile**

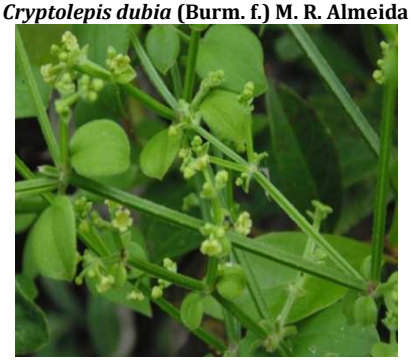
Aerv*a javanica* (Burm. f.) Juss. ex Schult.

***Asparagus racemosus* Willd.**

***Cryptolepis dubia* (Burm. f.) M. R. Almeida**

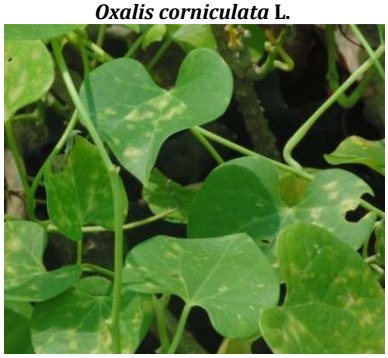
***Mallotus philippensis* (Lam.) Müll. Arg.**

***Oxalis corniculata* L.**



***Rubia cordifolia* L.**

***Streblus asper* Lour.**



***Tinospora sinensis* (Lour.) Merr.**

***Trichodesma indicum* (L.) Lehm.**

***Tylophora indica* (Burm. f.) Merr.**

***Ziziphus jujuba* Mill.**

Fig. 3: Showing some of ethno veterinary medicinal plants of Hassan district, Karnataka

CONCLUSION

The ethnoveterinary medicinal plant species are collected by local people from the surrounding areas, forests and are being used as remedies for various animal ailments. Documentation of ethnoveterinary medicinal plants survey is of vital importance in finding some miraculous medicines for curing various veterinary diseases. Further research focusing on these plants might give information regarding the bioactive compounds to fight diseases in an effective manner.

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CONFLICT OF INTERESTS

Declare none

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