ASIAN JOURNAL OF PHARMACEUTICAL AND CLINICAL RESEARCH

INNOVARE ACADEMIC SCIENCES
Knowledge to Innovation

Vol 9, Suppl. 1, 2016

Online - 2455-3891
Print - 0974-2441

Research Article

ETHNOBOTANICAL NOTE ON THE VETERINARY HEALTH-CARE MANAGEMENT BY MALAYALI TRIBES OF KALRAYAN HILLS

KANNAN M[1], SENTHIL KUMAR T[2]*, RAO MV[3]

[1]Department of Botany, Directorate of Distance Education, Vinayaka Missions University, Salem, Tamil Nadu, India. [2]Department of Industry University Collaboration, Bharathidasan University, Tiruchirappalli, Tamil Nadu, India. [3]Department of Plant Science, Bharathidasan University, Tiruchirappalli, Tamil Nadu, India. Email: senthil2551964@yahoo.co.in

Received: 23 March 2016, Revised and Accepted: 31 May 2016

ABSTRACT

Objective: Livestock is considered as the wealth of the tribal people, and the tribes are having rich knowledge on ethno-veterinary (EV) health-care management. Keeping this in view, the study was carried out to document ethno-veterinary medicinal (EVM) knowledge of *Malayali* tribes, the native people of Kalrayan Hills, Salem, Tamil Nadu, to improve their socio-economic status.

Methods: Ethnobotanical survey was carried out in Kalrayan hills for EVM practices through regular field visits to the various hamlets of the study area from December 2009 to December 2014. EVM information was collected through personal interviews, field observations, and discussions among the traditional healers having familiarity and knowledge on Ethnoveterinary Medicine [EVM].

Results: Utilization of 137 plant species as EVM, belonging to 120 genera under 54 families, has been recorded against 40 livestock ailments with 126 types of preparations. Plant parts, such as leaf, root, flower, bark, resin, and rhizome, are used in the preparation. Among the plant parts, bark is predominately used. Most of the preparations include parts of more than one plant as the ingredients, and many of such combined preparations are used for treating more than one ailment.

Conclusion: In the present study, we observed the prevalence of different types of livestock ailments in the study area, and the tribal community is having much knowledge on EV health-care management which is an integral part of their day-to-day life.

Keywords: Ethnobotany, Ethno-veterinary medicine, Livestock, *Malayali* tribes, Eastern Ghats, Kalrayan hills, Salem.

INTRODUCTION

India is having major cattle genetic resources not only in the form of the population but also genetic diversity represented by 30 recognized cattle breeds [1]. Cattle are considered as the wealth of the tribal people, and their well-being is considered to be very important [2]. As the tribal people are enriched with traditional ethno-veterinary (EV) knowledge, the forest resources in their surroundings play a very significant role in their routine life [3], and medicinal plants are the chief source for the primary health-care services of such rural population [4].

Ethno-veterinary medicine (EVM) is defined as the traditional animal healthcare which comprises the folk knowledge, believes, practices, skills, methods, and practices pertaining to health care of animals [5,6]. As the villagers around the globe are having limited access to modern medicine, they strictly depend on the traditional medicine for the health care of livestock. Regrettably, these practices are not properly documented and largely lost because they are passed on generation through verbal communication and dilution due to lack of observation and technical skills.

EVM contributes in the management of animal diseases in a cost-effective manner but unfortunately research works, which prove the pharmaceutical efficiency of plants, have not been done so far, or a very little research work has been done [7]. It is an established fact that plants serve as potent medicines for curing various diseases of the tribal community as well as their livestock [8]. As 80% of populations from the developed countries are depend on traditional medicine prepared from the medicinal plants, it is necessary to investigate them for understanding their properties, safety, and their efficacy [9]. However, documentation on the utilization of plant resources as veterinary medicine is very less.

The prevalence of several diseases in cattle was reported by various authors across India [1-3,5-8,10-17]. There are so many documentations on the ethnobotanical, ethnomedicinal, and ethnofloristic aspects of plants in Salem District of Tamil Nadu, India [18-33], whereas the reports on EVM is very scanty [34,35] in the study area. Keeping this in view, the present study was initiated to explore plants utilized for EV health care and document the traditional veterinary medicinal knowledge of *Malayali* tribes.

METHODS

Study area

The study area, Kalrayan (Kalvarayan) hills, is situated in the Eastern Ghats of the Southern Indian state of Tamil Nadu, India, lies between 11°36' and 12°01' N and 78°29' and 78°54' E. It runs over three districts, *viz*., Salem, Viluppuram, and a small region of Thiruvannamalai districts and it spreads over an area of 1158.4 km^2 [31]. It measures about 25.76 km in North-South and 37 km in East-West [36]. The average annual rainfall ranges from 782.98 to 1787.20 mm, and the temperature varies from 25°C to 40°C.

Kalrayan hills are divided into five regions or "*Nadu*"s (Cluster of tribal villages), namely, *Chinnakalrayan Nadu*, *Periyakalrayan Nadu*, *Jadaya Gaundan* Nadu, *Kurumba Gaundan Nadu,* and *Ariya Gaundan Nadu* [30]. Among them, *Chinnakalrayan Nadu* and *Periyakalrayan Nadu* belong to Salem district, Tamil Nadu, and they comprise 58 and 44 tribal hamlets, respectively. The remaining three regions belong to Viluppuram district, Tamil Nadu. Vegetation of Kalrayan is semi-deciduous to scrub forests where sandal wood grows naturally along with other dominant species like teak and bamboo [26].

Tribal community

The native people of the Kalrayan are called as *Vedar*. The warriors belonging to *Karalar* community had invaded from Kanchipuram and settled with *Vedar* community by marriage. The mixed populations of

Karalar and *Vedar* communities who inhabited in Kalrayan are called "*Malayali*" tribes. Some of them are farmers and remaining people depend on works interrelated with agriculture and involved in livestock keeping, poultries, collection of honey, bee wax, and other minor forest products. The tribal of Kalrayan hills have much knowledge on various EVM practices, but it is comparatively less than the ethnomedicinal treatment for human ailments. At present, the practice of EVM is done by only countable number of healers [13]. This indigenous knowledge is evolved through observations, experiences gathered through experimentation, and the information passed through generations. Most of the traditional healers are not charging anything for the herbal treatment.

Data collection

Ethnobotanical information and EVM importance of plants were collected from traditional healers, aged persons, and farmers having familiarity and knowledge with plants by following standard methods such as personal interviews, discussions, and field observations through regular field visits to various hamlets of Kalrayan hills from December 2009 to December 2014 [37]. The information on EVM was cross verified by the communication with traditional healers and other knowledgeable persons, *viz*., elders, farmers, livestock owners, informants residing in nearby area.

The plants of EVM interest were identified and verified with standard flora available [38,39], and the voucher specimens were deposited in Department of Botany, Vinayaka Missions University, Salem. EVM plants enumerated according to the ailments cured in alphabetical sequence of the botanical name in each ailment with vernacular name followed by family, plant part used, mode of preparation, administration, and dosage required.

RESULTS

The present study highlights the EVM knowledge and practices found among the tribes of Kalrayan hills of the study area. By the discussion with the native people, we understand the population of cattle has been reduced in the study area. The major factor for this decrease is the profligate returns due to the low productivity and replacement of livestock in the agricultural practices by the machinery. Most of the tribes are aware of the traditional EVM system, but all of them are not practically using them.

During the study, we came across the traditional knowledge of *Malayali* tribes of Kalrayan hills on EVM. As they are dwelling in the remote hamlets, accession of veterinary doctors in the critical condition of animal health is not possible. In such situations, they depend on the plant resources for their treatment. There are 137 plant species belonging to 120 genera under 54 families were recorded for the treatment of various health-care problems in livestock. Observations in the study area are corroborating with the earlier reports [26,34,35].

EV diseases

Livestock raisers and healers every where having traditional ways of classifying and diagnosing the common diseases of livestock. Based on their experience and traditional knowledge, the local people and traditional healers of various tribal hamlets in Kalrayan hills classified the livestock ailments into various categories. Treatment for 40 types of veterinary health-care problems was noticed and all of them belong to nine categories (Table 1). Indigestion, bloat, enteritis, fever, block quarter, respiratory problems, chock-on, injuries, maggoty wounds, foot and mouth disease, infertility, *kunthu,* udder inflammations, swellings, yoke galls, contusion, parturition, retained placenta, poison bites, inflammation in tongue, bone fracture, endoparasites in intestine, ectoparasites, lactation problems, laziness in feeding (anorexia), poison bites, *Thiruttu noi*, *Kundi saala noi,* and sprain are some of the notable EV ill health problems prevailed in the study area.

Of all the above diseases, *kunthu,* the inactive status of the cattle due to various ill health problems with fever symptoms, is the most prevailed veterinary health problem. In *thiruttu noi*, the cattle will not take fodder properly (anorexia), unable to chew the cuds, unable to lay down, and always stands inactively. *Kundi saala noi* is a type fever, and it is also called as *Kuduvi nirkum kaichal.* In this disease conditions, the cattle are inactive, stands by keeping their legs in short distance than its normal position and keeps their head nearer to the body by shrinking its neck and entire body parts shorter than its normal length.

Medicinally important plants

Among the 137 EVM plant forms, trees dominate with 67 species followed by herbs, climbers, and shrubs (Fig. 1). Most of the plants are gathered from wild; few are obtained from cultivation and rarely some purchased materials also used as ingredients for preservation purposes.

Plants used for EVM come under 54 families. Among them Euphorbiaceae, Fabaceae, and Mimosaceae (9 species each), predominate all other families followed by Asclepiadaceae (8 species), Rubiaceae (7 species), Anacardiaceae and Rutaceae (6 species each), Poaceae (5 species), Apocynaceae, Caesalpiniaceae, Lamiaceae, Moraceae, and Solanaceae (4 species each). Remaining families are represented by single or two species (Table 2). Most of the plants are having multiple usages, i.e., used in treating more than one ailments. *Lannea coromandelica* and *Vanilla walkerae* are added in eight herbal preparations.

Plant parts used

The traditional healers of the Kalrayan hills use various plant parts such as stem, leaf, bark, thorn, flower, latex, oil, resin, fruit, seeds, root, rhizome, entire plant, and by-products of the plants for various medicaments. Utility value of the bark predominates (124) all other parts followed by leaves (112), seeds and grains (21), fruits (18), stem (17), root (9), entire plant and rhizome (8 in each), by-products of the plants (7), latex and tender parts (3 in each), flower and thorn (2 in each), and resin (1). In 12 preparations, more than one part of the same plant are used. Apart from the various plant parts, healers use certain animal products as the ingredients in the medicaments such as pig ghee, egg white yolk, cow dung, cow milk, goat milk, buttermilk, animal flesh, and children's urine.

Mode of preparation and administration

As most of the traditional healers are illiterate, the knowledge on the mode of preparation and dosage of the drugs are learnt only through the long experience of the healer. For the EV health-care treatments, the native people use different methods of herbal preparations and administrations. Paste, juice, fresh parts as such and decoction are the methods commonly practiced in the study area for the preparation of EVM. In addition, some preparations include smoke or vapor forms through fumigation, processing of materials by boiling, using plant oils or soaking in water (Fig. 2). In some cases, more than one mode of preparations is also carried out.

Mode of administration also varies depends on the disease and materials used. In general, the medicines are administrated by

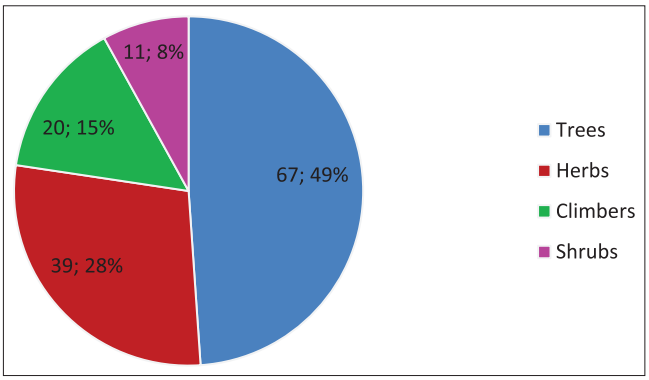

Fig. 1: Habit-wise distribution of ethno-veterinary medicinal plants of Kalrayan hills, Salem (n=137)

Table 1: List of health problems prevailed in livestock of Kalrayan hills, Salem

S. No	Category	S. No	Vernacular name of the disease	Description
1	Digestive problems	1	Jeerana kolaru	Indigestion
		2	Vayiru upputhal/muttu kaichal/uppulu kunthu	Bloat/tympany
		3	Kalichal/vayitru pokku/pacha kunthu	Enteritis
		4	Virana katti kunthu/vara kunthu	Dry dung with blood clotting
2	Fever	5	Kaaichal	Fever/Pyrexia
		6	Aanai kunthu	Fever
		7	Kunthu	Ephemeral fever/3 day sickness
		8	Nadukkal kunthu	Shivering fever
		9	Sengathri noi	Type of fever
		10	Sappa katti noi	Black quarter
		11	Kundi sala noi	Kuduvi nikkum fever
3	Respiratory problems	12	Elappu vanguthal	Respiratory distress
		13	Elappu kunthu (elappu noi)	Bronchitis
		14	Serukku paduthal	Chock on (aspiration of food material into respiratory tract)
4	Wounds and injuries	15	Pun	Wound
		16	Pulu piditha pun	Maggoty wound
		17	Komari	Foot and mouth disease
	Swellings	18	Thavalai noi/manna mari kattu	Swelling in cheeks and neck regions
		19	Kaluthu katti	Yoke gal
		20	Veekam/ratha kattu	Contusion
5	Parturition	21	Kandru poduthal prachinai	Parturition
		22	Sathai vilathu iruthal	Retained placental membrane
6	Poison bites	23	Paambu kadi	Snake bite
		24	Poochi kadi	Insect bite
7	Bone problems	25	Elumbu murivu	Bone fracture
		26	Iduppu naluvuthal	Hip dislocation
8	Tongue diseases	27	Sela paduthal	Inflammation in tongue
		28	Ul naakku surathal	Tongue secretion
9	General health	29	Madi vaatham (madi veekkam)	Mastitis
		30	Paal surppu	Lactation problem
		31	Meichal illamai	Anorexia
		32	Malattu thanmai	Infertility
		33	Uni	Ectoparasites
		34	Vayitru poochigal	Endoparasites
		35	Kirumi naasini	Antiseptics
		36	Thiruttu noi	Laziness in feeding (anorexia)
		37	Theratha maduhal	General weakness
		38	Padukkangolli eruthu	Unable to stand
		39	Kola mutti noi, sappani kunthu	Lameness
		40	Sulukku/thasai pidippu	Sprain/muscle contraction

Table 2: Family-wise distribution of ethno-veterinary medicinal plants (n=137)

S. No	Family	Number of plant species (in each family)
1	Euphorbiaceae, Fabaceae, Mimosaceae	9
2	Asclepiadaceae	8
3	Rubiaceae	7
4	Anacardiaceae, Rutaceae	6
5	Poaceae	5
6	Apocynaceae, Caesalpiniaceae, Lamiaceae, Moraceae, Solanaceae	4
7	Annonaceae, Arecaceae, Asteraceae, Boraginaceae, Capparidaceae, Combretaceae, Convolvulaceae, Cucurbitaceae, Malvaceae, Pedaliaceae, Rhamnaceae, Sapindaceae, Tiliaceae, Verbenaceae, Vitaceae, Zingiberaceae	2
8	Agavaceae, Alangiaceae, Amaranthaceae, Araceae, Bombacaceae, Burseraceae, Ebenaceae, Gentianaceae, Lecythidaceae, Liliaceae, Loganiaceae, Meliaceae, Moringaceae, Musaceae, Myrtaceae, Orchidaceae, Oxalidaceae, Pandanaceae, Piperaceae, Plumbaginaceae, Salvadoraceae, Sapotaceae, Simaroubaceae, Ulmaceae	1

following three types, *viz*., oral, external, and nasal. Oral administration is predominately used in 73 preparations followed by external applications (52 preparations), which include administration in eyes, ears, *othadam* (fomentation), and fumigation process. In certain treatments (3 preparations), administration in nostrils also done. For the control of ectoparasites, cattle sheds are fumigated regularly with dried and fresh foliages to reduce the insect pests such as ticks, mites, flies, and mosquitoes. In three preparations, both oral and external administrations are carried out and in two spiritual aspects herbal plants or preparations are not administered in any of the three modes.

In the case of treating "*Kunthu,*" materials are taken along with all ingredients in small quantities and pounded in *Kal Ural* (stone mortar). The paste material of an orange size is taken in a white cloth, and this preparation is dipped in urine of children below 10 years of age kept in a cup or tumbler. In the unavailability of urine, hot water is also

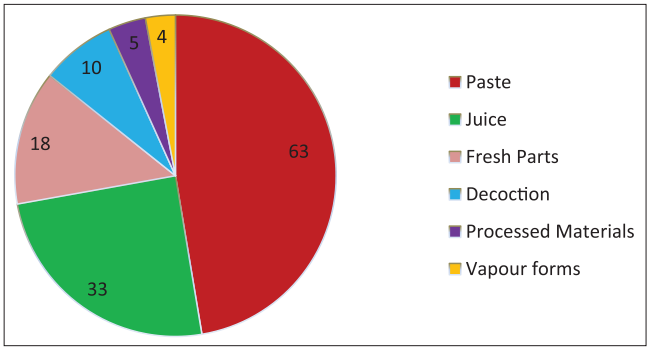

Fig. 2: Various modes of preparations of medicaments for ethno-veterinary health-care management in Kalrayan hills, Salem (n=133)

used. However, urine is preferred for the effective treatment. Then, the preparation is taken up from the cup and extract oozing from the preparation through the cloth is administered as drops in ears, eyes, and nostrils for three times in both sides. Finally, solid material remained in the cloth is administered orally. It is done in early hours or in the evening hours only. This entire process is called as "*Nasiam Kattuthal,*" and it is continued for 2-3 days or up to cure.

In some ill health problems, the herbal treatment is connected with spiritual aspects. For the processing of the herbal materials, they are using mud pots only and during the preparation, they never keep the utensils or medicinal plants directly in the ground. They hope that this practice may reduce the efficacy of the drug. Some of the preparations are carried out only in specific days such as Tuesdays, Sundays, or in *Amavasai* (no moon days) and can be used after 6 months only.

For the treatment of udder inflammations, bloating, poison bites, and throat swellings, certain plants are used for the purpose of chanting sacred words to recover from ill health by holding the plant parts by the healers and this process is known as "*Paadam Poduthal*" (Chanting *Manthra* to recover from ill health).

In the case of sprain and muscle contraction, they are preparing a gel using *Agave americana* and *Eleusine coracana*. For that, *A. americana* leaves are torn longitudinally and made into a ribbon-like structure, which is shown in the fire for 3-5 minutes directly by holding the two sides in hand, and hence, the leaf becomes fragile. By holding the two sides, the leaf pieces were twisted one by one to extract the juice in a separate vessel. In 1 L of boiled juice, about 500 g of *E. coracana* flour is added and mixed well while care must be taken to avoid the formation of any solid material. This preparation is boiled for 15 minutes until it becomes gel. This processed material is allowed to cool down and it is directly applied at bearable heat on the sprain area and left for 3 days without washing. It will be followed for 3 to 5 times at 3 days of interval. The same procedure can be followed to cure rheumatic swellings in human beings also. For the treatment of the same disease, *Tamarindus indica* seed powder is also used instead of *E. coracana* in another preparation.

Apart from the various ill health problems, they are protecting their mobile wealth through some general health management practices such as post-natal care of animals, protection from ecto- and endo-parasitic infections, laziness in feeding, low lactation problems, use of antiseptics, and care for insect bites. For the post-natal care, they treat animals consecutively from 2 to 21 days after delivery.

The details of plants used for the treatment of various EV ailments, their preparations, administration, and dosages are given in Table 3.

Preservatives

Due to the seasonal availability of certain plants, there are some limitations in the practice of EVM. For which, traditional healers are preserving the preparations using certain preservatives, or they follow some procedures to preserve them for off-season uses. For the preservation of their preparations, the healers are using six plant species as ingredients, namely, *Allium cepa, Allium sativum, Cuminum cyminum, Foeniculum vulgare, Papaver somniferum,* and *Piper nigrum*. These plants are used as ingredients, both for their medicinal values and also for their preservative properties. These plants can be gathered from wild or collected from cultivation. Preparation of herbal drugs in no moon days or in fresh mud pots are notable preservative procedures. Some of the preparations include "*Kolambu Sakkarai*" (cooking salt) as one of the ingredients for its preservative property, and the healer will not say the common word "*Uppu*" for cooking salt. It is concerned with the spiritual aspects.

DISCUSSION

Among the various types of EV disease problems prevailed among the livestock some common ill health problems such as skin diseases, fever, intestinal worms, and swelling are reported by previous documentation in the study area [34]. Some of the important diseases in documentation are reported in the foothills of Kalrayan hills [35] and nearby regions of Tamil Nadu [13,15-17].

Among the documented plant species, few resemblances were noticed with previous studies carried out in and around the study area [15,25,34,35], but the ailments cured are differed in the present documentation.

Local healers of the study area commonly practice use of two or more plants for single preparation. This phenomenon is reported by various authors [5,6,10,11,15,40]. The combination of various parts of more than 35 plants along with some preservatives is used for a single preparation in Kalrayan hills for the treatment of more than one ailment, especially for the treatment of health problems related with "*Kunthu.*" They hope that those combined preparations will improve the efficacy of the drug.

In most of the preparations, barks of various plants are used for the treatment in the study area, whereas in the previous reports predominant use of leaves is noticed [3,5-7,10-13,15]. Preparation of herbal drugs in no moon days and chanting *Manthra* for the treatment are spiritually connected with the treatment procedures, and the local healers hope that the capacity of the herbal preparations will improve and lasts for long time if prepared in no moon days. Use of cooking salt as one of the ingredients in the preparation is common in the study area for its preservative property. In addition to the salt, use of plant oils, children's urine, and materials from animal origins in the preparation were used in the study area, and various researchers were reported this phenomenon in different regions of India [5-8,35].

CONCLUSION

EV practices prevailed in Kalrayan hills found to be effective against a wide range of health management problems of livestock. There are no alternative medicinal facilities such as modern medicinal system, and hence, it plays an important role in their family, social, religious, and economic value of their day-to-day life.

Traditional healers are having rich knowledge on locally available plants as medicines and well experienced in the EV health care. This indigenous system of medicine is much effective when compared to modern medicine. It requires little or no cost to the tribes, but it is confined to the elderly people only.

Local cultivation of medicinal plants will contribute to the economic development of the tribes and conservation of forest wealth in the study area. More surveys are needed in future to know the plant resources, which possess immense values in their routine life and welfare of local tribal groups. Documentation of this indigenous knowledge will help the livestock agents, traditional healers, farmers, and village leaders to integrate and promote the use of EVM in animal health care. It will

Table 3: Ethno-veterinary medicinal plants, their preparations, and administrations

S. No	Name of the disease	Binomial Name	Vernacular names	Family	Parts used	Mode of preparation, administration, and dosage
1.	Kalichal (Dysentery)	*Acacia arabica* (Lam.) Muhl. ex Willd	Karuvela maram	Mimosaceae	Bark	The material is taken in equal amount and soaked in sufficient amount of hot water in a new pot. After 12 hrs, material is strained, and juice is administered orally
		Acacia leucophloea Willd	Vellai Vela maram	Mimosaceae	Bark	
		Pandanus odoratissimus L.f.	Thalam	Pandanaceae	Tender Stem	
		Syzygium cumini (L.) Skeels	Naval	Myrtaceae	Bark	
		Bauhinia racemosa Lam.	Aathi maram	Caesalpiniaceae	Leaf, bark	Along with leaf or bark or both, *Allium sativum*, *Piper nigrum* are added in small quantity and pounded. Juice orally administered for 3 days in the morning. For goats 50 ml and cattle 100-200 ml
		Capsicum annuum L.	Milahai	Solanaceae	Fruit	Two or three dry fruits are ground into juice using water and administered orally for two times for goats
		Cassia auriculata L.	Aavaarai	Caesalpiniaceae	Flower	Along with plant material, *Allium cepa* and *Cuminum cyminum* are added in an equal amount and crushed with hot water. The paste is given orally for 2 or 3 days or up to cure (once in a day)
		Dichrostachys cinerea (L.) Wight & Arn.	Vettu Thaari/ Vidatharai	Mimosaceae	Leaf	
		Cassia auriculata L.	Aavarai	Caesalpiniaceae	Leaf	Five tender fruits of *Musa paradisiaca* and handful tender leaves of *Cassia auriculata* are pounded together and made into paste. Mixed with rice gruel of required amount and administered orally up to cure
		Musa paradisiaca L.	Monthan Valai	Musaceae	Fruit	
		Curcuma longa L.	Manjal	Zingiberaceae	Rhizome	Paste of two gooseberry size is administered orally for goats once in a day for 2 days
		Canthium parviflorum Lam.	Kaarai	Rubiaceae	Leaf	Handful of *Canthium parviflorum* leaf, *Ziziphus jujuba* leaf, *Cuminum cyminum* seeds, four or five Allium cepa, 10 leaves of *Syzygium cumini* are ground with small amount of cow milk and made up to a tumbler using cow milk. Extract is orally administered 1 or 2 times or depends on the severity for one more day can be continued
		Syzygium cumini (L.) Skeels	Naval	Myrtaceae	Leaf	
		Ziziphus jujuba Lam.	Ilanthai	Rhamnaceae	Leaf	
		Gymnema sylvestre (Retz.) Schult.	Siru Kurinjan	Asclepiadaceae	Leaf	Leaves are taken in 2:1 ratio, respectively, and pounded. Juice is orally administered with sufficient amount of buttermilk
		Oxalis corniculata L.	Puliarai	Oxalidaceae	Leaf	
		Rubia cordifolia L.	Otti Thalai	Rubiaceae	Stem	Stem is ground with water and a lemon size paste is administered orally for 2 days in the morning. Once in a month is recommended for intestinal worms also
		Vanilla walkeriae Wight	Kundu kodi/Aanai Pirandai	Orchidaceae	Stem	Ground with hot water and extract is given orally 2 times (Morning and evening)
2.	Ratha Kalichal (Dysentery with blood)	*Cocos nucifera* L.	Thennai maram	Arecaceae	Flower	Tap root of *Ficus benghalensis* and female flower of *Cocos nucifera* are ground together preferably with cow milk or hot water. Juice is given orally ½ L for cow, 100 ml for goats twice a day for 3 days or up to cure
		Ficus benghalensis L.	Aalamaram	Moraceae	Root	
		Pedalium murex L.	Aanai Nerunji	Pedaliaceae	Leaf	Lemon size leaf paste is given orally twice a day for 3 days or up to cure
3.	Vekkai (heat disease)	Cassia auriculata L.	Aavaarai	Caesalipiniaceae	Leaf	Leaf materials along with small quantity of *Cuminum cyminum* and orally administered as such with fodder or separately as paste
		Enicostema littorale Blume	Vellarugu	Gentianaceae	Leaf	
		Oryza sativa L.	Nel	Poaceae	Seed	For hens and cocks boiled rice along with *Allium cepa* and curd is given as food 2 or 3 times daily for 3 days
4.	Jeerana Kolaaru (Indigestion)	*Ailanthus excelsa* Roxb.	Pee maram	Simaroubaceae	Bark	Bark is ground with few *Allium sativum* and paste is given orally in lemon size both in the morning and evening for 2 days
		Acacia pennata (L.) Willd.	Indu Mullu	Mimosaceae	Leaf	All ingredients are ground well with small quantity of *Allium sativum* and few *Piper nigrum*. Juice is administered orally 2 times in a day

(Contd...)

Table 3: ***(Continued)***

S. No	Name of the disease	Binomial Name	Vernacular names	Family	Parts used	Mode of preparation, administration, and dosage
		Plumbago zeylanica L.	Kodi Veli chedi	Plumbaginaceae	Leaf	
		Vanilla walkeriae Wight.	Kundu kodi	Orchidaceae	Stem	
		Azadirachta indica A.Juss.	Vembu	Meliaceae	Bark	All ingredients are ground and boiled in water. ½ L decoction is orally administered for a day. Cattles start to chew the cud and feeding
		Ficus racemosa L.	Athi maram	Moraceae	Bark	
		Pongamia pinnata (L.) Pierre	Punga maram	Fabaceae	Bark	
		Terminalia arjuna (Roxb. ex DC.) Wight & Arn.	Mathura maram	Combretaceae	Bark	
		Acacia pennata (L.) Willd.	Kokki Mullu	Mimosaceae	Leaf	All materials are ground together and orally administered as paste for 2 days in the morning
		Randia dumetorum (Retz.) Poir.	Kaarandai	Rubiaceae	Leaf	
		Plumbago zeylanica L.	Kodi Veli chedi	Plumbaginaceae	Leaf	
		Thespesia populnea (L.) Correa	Poovarasu	Malvaceae	Leaf	Leaf juice is given orally
5.	Muttu Kaichal, Vayiru Upputhal, Theevanam Utkollamai (Feeding problem)	*Acacia pennata* (L.) Willd.	Kokki Mullu	Mimosaceae	Leaf	All the materials along with *Allium sativum* and *Piper nigrum* are ground in stone mortar. Lemon size paste is given orally to cattle 2 times in morning and evening for *Vayiru Upputhal* and *Theevanam Kollamai*
		Plumbago zeylanica L.	Kodi veli chedi	Plumbaginaceae	Leaf	
		Randia dumetorum (Retz.) Poir.	Kaarandai	Rubiaceae	Leaf	
		Vanilla walkeriae Wight.	Kundu kodi	Orchidaceae	Stem	
		Bambusa arundinacea Retz.	Kattai maram/ Mungil	Poaceae	Leaf	Plant parts listed are ground well along with small quantity of *Allium cepa, Allium sativum, Cuminum cyminum,* and few Piper nigrum in hot water or urine of children and the paste is given orally for 2 or 3 times in a day for 2 days (both for cows and goats)
		Canthium dicoccum (Gaertn.) Merr.	Neguni maram	Rubiaceae	Leaf	
		Ipomoea asarifolia Roem. & Schult.	Sunda chedi	Convolvulaceae	Bark	
		Tamarindus indica L.	Puli	Caesalpiniaceae	Fruit	Fruit pulp is extracted with water and orally administered. For cattle orange size and for goats lemon size fruit material can be used
6.	Kaaichal (fever)	*Cassia fistula* L.	Konnai	Caesalpiniaceae	Bark	Along with bark, few *Allium sativum* and *Piper nigrum* in small quantity are added and ground into paste. Orally administered twice in a day up to cure
					Leaf	Leaf is ground well with *Allium sativum, Cuminum cyminum*, and *Piper nigrum* and made into paste. Administered orally 2 times a day for 2 to 3 days or up to cure
		Pedalium murex L.	Anai Nerunji	Pedaliaceae	Entire Plant	Juice in hot water administered orally
7.	Kundi Sala Noi (Kuduvi Nirkum fever)	*Aloe vera* (L.) Burm.f.	Sothu Kathalai	Liliaceae	Bark	All ingredients along with small quantity of *Allium cepa, Allium sativum, Cuminum cyminum, Foeniculum vulgare, Papaver somniferum*, and *Piper nigrum* are mixed, pounded, and boiled with pig ghee. For about ½ L, decoction is given orally for 2 days twice daily. This material should be prepared on Tuesday, Sunday or *Ammavasai* (No moon day) and should be kept for storage in fresh earthen pot for 6 months. It can be used only after 6 months and up to 1 year
		Artocarpus heterophyllus Lam.	Pala	Moraceae	Bark	
		Capsicum minimum Roxb.	Siru Milahai	Solanaceae	Fruit	
		Chloroxylon swietenia DC.	Porusa maram	Rutaceae	Bark	
		Ficus benghalensis L.	Aala maram	Moraceae	Bark	
		Ficus racemosa L.	Athi maram	Moraceae	Bark	
		Lannea coromandelica (Houtt.) Merr	Othiya maram	Anacardiaceae	Bark	

(Contd...)

Table 3: ***(Continued)***

S. No	Name of the disease	Binomial Name	Vernacular names	Family	Parts used	Mode of preparation, administration, and dosage
		Mangifera indica L.	Ma	Anacardiaceae	Bark	
		Pandanus odoratissimus L.f.	Vellai Thala	Pandanaceae	Bark	
		Polyalthia cerasoides (Roxb.) Bedd.	Senthalam	Annonaceae	Bark	
		Tamarindus indica L.	Puli	Caesalpiniaceae	Bark	
		Terminalia chebula Retz.	Kadukai	Combretaceae	Bark	
8.	Aanai kunthu	*Acalypha indica* L.	Kuppai Meni	Euphorbiaceae	Leaf	Handful of each leaf materials with two or three tender twigs of *Azima tetracantha* and five to six *Piper nigrum* are pound together, and juice is administered in the form of *Nasiam*. Drops administered externally on eyes, ears, and nose. Paste is administered orally
		Azima tetracantha Lam.	Sanga mul	Salvadoraceae	Leaf	
		Pedalium murex L.	Aanai Nerunji	Pedaliaceae	Leaf	
		Pergularia daemia (Forssk.) Chiov.	Veli Paruthi	Asclepiadaceae	Leaf	
9.	Sappani Kunthu	*Albizia lebbeck* (L.) Benth.	Sappananji	Mimosaceae	Leaf	Juice administered orally and paste is applied on the affected part
		Caralluma umbellata Haw.	Kallu Mulaiyan	Asclepiadaceae	Entire plant	Ground with water and paste is given orally up to cure
10.	Kunthu, Thiruttu Noi	*Cardiospermum halicacabum* L.	Kothan kodi	Sapindaceae	Leaf	Plant parts ground with hot water and one tumbler juice is administered orally for 1 or 2 times
		Pergularia daemia (Foressk.) Chiov.	Veli Paruthi	Asclepiadaceae	Leaf	
11.	Vara Kunthu, Sappani Kunthu, Pachai Kunthu, Thiruttu Noi	*Albizia procera* (Roxb.) Benth.	Kudu Mathurai	Mimosaceae	Bark	Along with the plant materials, *Allium sativum* and *Piper nigrum* are added in small quantities and made into paste without adding water. Given orally for 2 days in the morning in lemon size
		Plumbago zeylanica L.	Kodi veli chedi	Plumbaginaceae	Leaf	
		Thespesia populnea (L.) Correa	Poovarasu	Malvaceae	Seed, Bark	Materials are pounded, boiled and decoction is administered orally for ½ L per day for 2-5 days
12.	3 Kunthu (Vara Kunthu, Sappani Kunthu, PachaiKunthu)	*Albizia odoratissima* (L.f.) Benth.	Selavanji	Mimosaceae	Bark	With the plant materials, small quantity of *Allium sativum* and *Piper nigrum* are added and pounded together. Boiled and filtrate decoction is administered 500 ml orally for 2 days in morning and evening
		Ipomoea staphylina Roem. & Schult.	Unangodi	Convolvulaceae	Leaf	
		Mallotus philippensis (Lam.) Mull.Arg.	Thirucheelai maram	Euphorbiaceae	Bark	
13.	Kola Mutti Noi	*Citrus limon* (L.) Burm.f.	Elumichai	Rutaceae	Fruit	Along with latex, juice of Citrus limon, salt and pig ghee are mixed and applied externally in the form of "Othadam" (Fomentation)
		Euphorbia antiquorum L.	Sathura Kalli	Euphorbiaceae	Latex	
14.	Kola Mutti Noi Sappa Katti Noi Uppulu Kunthu Sappani Kunthu Virana Katti Kunthu	Albizia lebbeck (L.) Benth.	Patta Saalaa	Mimosaceae	Bark or Leaf	Listed plant parts are taken in equal quantities. Dried in shade and made into powder. Small quantity of *Allium sativum, Cuminum cyminum, Piper nigrum* and *Kolambu Sakkarai* (Cooking salt) are also added in the preparation. Orally given about 100 g in morning and evening for 3-4 days or up to cure
		Barringtonia acutangula (L.) Gaertn.	Kadappai	Lecythidaceae	Bark	
		Bauhinia racemosa Lam.	Aathi maram	Caesalpiniaceae	Bark	
		Caralluma umbellata Haw.	Kallu Mulaiyan	Asclepiadaceae	Bark	

(Contd...)

Table 3: ***(Continued)***

S. No	Name of the disease	Binomial Name	Vernacular names	Family	Parts used	Mode of preparation, administration, and dosage
		Cissus quadrangularis L.	Pirandai	Vitaceae	Entire Plant	
		Dalbergia latifolia Roxb.	Eeti	Fabaceae	Bark	
		Lannea coromandelica (Houtt.) Merr	Othiya maram	Anacardiaceae	Bark	
		Syzygium cumini (L.) Skeels	Naaval	Myrtaceae	Bark	
		Terminalia arjuna (Roxb. ex DC.) Wight & Arn.	Mathura maram	Combretaceae	Bark	
		Terminalia chebula Retz.	Kadupattai	Combretaceae	Bark	
		Vanilla walkeriae Wight.	Urundai Pirandai	Orchidaceae	Entire Plant	
15.	5 Types of Kunthu (Sappani Kunthu, Vara Kunthu, Aanai Kunthu, Modakku Kundhu, Pachai Kunthu), Sappa Katti,Kola Mutti, Sengathri Noi	*Albizia lebbeck* (L.) Benth.	Padai Salam	Mimosaceae	Bark	All ingredients are sun dried and powdered. Water decoction is prepared. Keeping of materials directly in the ground during preparation should be avoided. Decoction is given orally. First day ½ L. Then reduced based on the severity and should be administered up to cure
		Albizia procera (Roxb.) Benth.	Kudu Mathurai	Mimosaceae	Bark	
		Barringtonia acutangula (L.) Gaertn.	Kadappai	Lecythidaceae	Bark	
		Buchanania axillaris (Desr.) T.P.Ramamoorthy inC.J.Saldanha & Nicolson	Sulukki - Senjulukki Pen maram	Anacardiaceae	Bark	
		Caralluma umbellata Haw.	Kallu Mulaiyan	Asclepiadaceae	Leaf	
		Dalbergia latifolia Roxb.	Kundasi maram	Fabaceae	Bark	
		Diospyros montana Roxb.	Vaguna	Ebenaceae	Bark	
		Gymnema sylvestre (Retz.) Schult.	Sirukurincha	Asclepiadaceae	Leaf	
		Heliotropium indicum L.	Nandu Vakkili poondu	Boraginaceae	Leaf	
		Lannea coromandelica (Houtt.) Merr	Othiya maram	Anacardiaceae	Bark	
		Morinda tinctoria Roxb.	Manja Naaval	Rubiaceae	Bark	
		Pandanus odoratissimus L.f.	Vella Thalam	Pandanaceae	Bark	
		Polyalthia cerasoides (Roxb.) Bedd.	Senthalam	Annonaceae	Bark	
		Putranjiva roxburghii Wall.	Karuppalai/ Karumbalai Pen maram	Euphorbiaceae	Bark	
		Semecarpus anacardium L.f.	Saaraa maram	Anacardiaceae	Bark	
16.	Seven types of Kunthu (Sappani Kunthu, Uppulu Kunthu, Virana Katti Kunthu, Pachai Kunthu, Kola Mutti Kunthu, Nadukkal Kunthu, Elappu Kunthu)	*Ailanthus excelsa* Roxb.	Pee Maathi/ Pee maram	Simaroubaceae	Bark	All plant materials with *Allium cepa, Allium sativam, Cuminum cyminum,* and *Piper nigrum* are made into paste with hot water and mixed with salt. Lemon size is given orally twice a day for 3 or 4 days or up to cure
		Alangium salviifolium (L.f.) Wangerin	Alingi	Alangiaceae	Bark	
		Albizia amara (Roxb.) Boivin	Unja maram	Mimosaceae	Bark	
		Albizia lebbeck (L.) Benth.	Patta Saalaa	Mimosaceae	Bark	
		Anisomeles malabarica (L.) R.Br.	Pei Mirati	Lamiaceae	Leaf	
		Artocarpus hirsutus Lam.	Kaatu Pala	Moraceae	Bark	
		Canthium dicoccum (Gaertn.) Merr.	Neguni maram	Rubiaceae	Bark	

(Contd...)

Table 3: ***(Continued)***

S. No	Name of the disease	Binomial Name	Vernacular names	Family	Parts used	Mode of preparation, administration, and dosage
		Capparis zeylanica L.	Aathandai	Capparidaceae	Leaf	
		Capsicum annuum L.	Milahai	Solanaceae	Dry Fruit	
		Caralluma attenuata Wight	Siru Kallu Muliyan	Asclepiadaceae	Leaf	
		Caralluma umbellata Haw.	Periya Kallu Muliyan	Asclepiadaceae	Leaf	
		Chloroxylon swietenia DC.	Porusa maram	Rutaceae	Bark	
		Cissus quadrangularis L.	Sathura Pirandai	Vitaceae	Stem	
		Clausena anisata (Willd.) Hook.f.	Thappattai chedi	Rutaceae	Leaf	
		Commiphora caudata Engl.	Pachai Kili maram	Burseraceae	Bark	
		Dalbergia latifolia Roxb.	Eetti maram	Fabaceae	Bark	
		Diospyros montana Roxb.	Kari Paalai	Ebenaceae	Bark or Leaf	
		Euphorbia tirucalli L.	Kodi Kalli/ Tirukalli	Euphorbiaceae	Stem	
		Ficus racemosa L.	Athi maram	Moraceae	Bark	
		Gardenia resinifera Roth.	Kumbuli maram	Rubiaceae	Bark	
		Lannea coromandelica (Houtt.) Merr	Kuli Maathi/ Othiyan	Anacardiaceae	Bark	
		Mimusops elengi L.	Muluvu maram	Sapotaceae	Bark	
		Nothopegia colebrookiana Blume	Kattunaathi	Anacardiaceae	Bark	
		Pandanus odoratissimus L.f.	Vella Thalam	Pandanaceae	Bark	
		Polyalthia cerasoides (Roxb.) Bedd.	Senthalam	Annonaceae	Bark	
		Pongamia pinnata (L.) Pierre	Punga maram	Fabaceae	Bark	
		Pterocarpus marsupium Roxb.	Vengu maram	Fabaceae	Bark	
		Randia dumetorum (Retz.) Poir.	Kaarandai	Rubiaceae	Leaf	
		Secamone emetica (Retz.) Schult.	Puluvu kodi	Apocynaceae	Leaf	
		Spondias pinnata (L.f.) Kurz	Kaatu Ma	Anacardiaceae	Bark	
		Syzygium cumini (L.) Skeels	Naaval	Myrtaceae	Bark	
		Terminalia arjuna (Roxb. ex DC.) Wight & Arn.	Mathura maram	Combretaceae	Bark	
		Toddalia asiatica Lam.	Mullanganda / Molavarani	Rutaceae	Bark	
		Tragia involucrata L.	Poonai Kaichi/ Kaaran Sorandi	Euphorbiaceae	Leaf	
		Vanilla walkeriae Wight.	Aanai Pirandai	Orchidaceae	Stem	
		Wrightia tinctoria R.Br.	Paalai/Vellai Paalai	Asclepiadaceae	Bark or Leaf	
17.	All Kunthu and Sappa Katti Noi	*Albizia lebbeck* (L.) Benth.	Vahai	Mimosaceae	Bark	Parts of the listed plants are ground along with small quantities of *Allium cepa*, *Allium sativum*, *Cuminum cyminum*, and *Piper nigrum*. Paste is mixed with urine of children below 10 years of age and the extract is administered as drops in nostrils through white cloth in the form of "Nasium"
		Albizia procera (Roxb.) Benth.	Kudu Mathurai	Mimosaceae	Bark	
		Cissus quadrangularis L.	Sathura Pirandai	Vitaceae	Stem	
		Cordia myxa L.	Neruvili	Boraginaceae	Bark	
		Dalbergia latifolia Roxb.	Eeti	Fabaceae	Bark	

(Contd...)

Table 3: ***(Continued)***

S. No	Name of the disease	Binomial Name	Vernacular names	Family	Parts used	Mode of preparation, administration, and dosage
		Euphorbia tirucalli L.	Kodi Kalli	Euphorbiaceae	Stem	
		Lannea coromandelica (Houtt.) Merr	Kuli Maathi	Anacardiaceae	Bark	
		Mangifera indica L.	Ma	Anacardiaceae	Bark	
		Nicotiana tabacum L.	Puhai Ilai	Solanaceae	Leaf	
		Syzygium cumini (L.) Skeels	Naaval	Myrtaceae	Bark	
		Vanilla walkeriae Wight.	Urundai Pirandai	Orchidaceae	Stem	
		Wrightia tinctoria R.Br.	Paala maram	Apocynaceae	Bark	
18.	Kunthu, Sappa Katti, Thiruttu Noi	*Albizia amara* (Roxb.) Boivin	Karum Selavanji	Mimosaceae	Bark	All barks are taken fresh in equal quantities (1 kg) and pounded without water. Then, soaked as such for some time. *Allium cepa* ¼ kg, *Allium sativum* and *Piper nigrum* are also added in small quantity. Six dry chilies are taken separately and ground well and mixed with the bark juice. 50 ml of pig ghee is added and ½ L juice is administered orally. It is followed for 3 days and the cattle are not allowed to drink water up to the treatment
		Albizia lebbeck (L.) Benth.	Vahai/Pattai Selavanji	Mimosaceae	Bark	
		Azadirachta indica A.Juss.	Vembu	Meliaceae	Bark	
		Capsicum annuum L.	Peru Milahai	Solanaceae	Fruit	
		Chloroxylon swietenia DC.	Porusa maram	Rutaceae	Bark	
		Diospyros montana Roxb.	Vakkana maram	Ebenaceae	Bark	
		Holoptelea integrifolia (Roxb.) Planch.	Aaavalli/Aaya maram	Ulmaceae	Bark	
		Pandanus odoratissimus L.f.	Vellai Thala	Pandanaceae	Bark	
		Plumeria rubra L.	Naakku Alari	Apocynaceae	Bark	
		Polyalthia cerasoides (Roxb.) Bedd.	Senthalam	Annonaceae	Bark	
		Semecarpus anacardium L.f.	Saaraa maram	Anacardiaceae	Bark	
		Wrightia tinctoria R.Br.	Paala maram	Apocynaceae	Bark	
19.	Thiruttu Noi, Thodai Veengi, Sappai Veengi	*Ailanthus excelsa* Roxb.	Kudappi maram/Pee maram	Simaroubaceae	Bark	All barks, few dry chilies, *Allium sativum,* and *Piper nigrum* are pounded and boiled. At bearable heat decoction is administered orally two or three tumbler for 1 or 2 days in the morning
		Capsicum annuum L.	Milahai	Solanaceae	Fruit	
		Dalbergia latifolia Roxb.	Kundasa maram	Fabaceae	Bark	
		Holoptelea integrifolia (Roxb.) Planch.	Aalimaram	Ulmaceae	Bark	
20.	Elapu Noi (breathing trouble)	*Cadapa indica* Lam.	Viluthi	Capparidaceae	Leaf	Paste is given orally for 3 days
		Citrullus colocynthis (L.) Schrad.	Kumati	Cucurbitaceae	Roots	
		Dodonaea viscosa Jacq.	Virali maram	Fabaceae	Leaf	
		Syzygium cumini (L.) Skeels	Navai maraam	Myrtaceae	Bark	The bark is soaked in water with salt for 12 hrs. Then pounded and boiled. Decoction orally administered at bearable heat for about 1 L. It reduces breathing trouble. Solid paste particles available in the bottom are also be orally administered
21.	Serukku (Chock on)	*Albizia odoratissima* (L.f.) Benth.	Selavanji	Mimosaceae	Leaf	All plant parts along with *Allium sativum*, *Cinnamomum cassia* and *Piper nigrum* are ground well and decoction prepared. 100 ml per day is administered for 2 days
		Lannea coromandelica (Houtt.) Merr	Othiya maram	Anacardiaceae	Leaf, bark	
		Pandanus odoratissimus L.f.	Vellai Thalam	Pandanaceae	Leaf	
		Thespesia populnea (L.) Correa	Poovarasu	Malvaceae	Leaf	
		Calotropis gigantea (L.) W.T.Aiton	Erukku	Asclepiadaceae	Leaf	Leaves are used as fodder to reduce the ill health

(Contd...)

Table 3: ***(Continued)***

S. No	Name of the disease	Binomial Name	Vernacular names	Family	Parts used	Mode of preparation, administration, and dosage
22.	All ill health Problems	*Capsicum annuum* L.	Milahai	Solanaceae	Fruit	All bark materials are pound well. Leaf materials are ground well with *Allium cepa, Piper nigrum* and dry chilies separately and mixed with the bark materials. Juice is administered orally about 250 ml/day for 3-5 days daily in the morning
		Cassia fistula L.	Konnai	Caesalpiniaceae	Bark	
		Clausena anisata (Willd.) Hook.f.	Thappattai chedi	Rutaceae	Leaf	
		Dalbergia latifolia Roxb.	Kundasa maram	Fabaceae	Bark	
		Diospyros montana Roxb.	Vekkana	Ebenaceae	Bark	
		Ruellia tuberosa L.	Vedipoondu	Acanthaceae	Leaf	
		Tridax procumbens L.	Kinathu poondu	Asteraceae	Leaf	
23.	Ul naakku surathal (Tongue secretion)	*Artocarpus hirsutus* Lam.	Kaatu Pala	Moraceae	Bark	Bark is ground with small quantity of *Allium sativum* and few *Piper nigrum* and made into paste. Preparation is to be rubbed externally on the surface of cattle tongue. It gives relief to the cattle and starts to take fodder
24.	Sela paduthal (Accumilation of impure blood in the nerves of tongue)	*Acalypha indica* L.	Kuppai Meni	Euphorbiaceae	Leaf	Leaves of the plant and salt are taken in 2:1 ratio and ground well with water. Juice is applied on the backbone of the cattle up to the end of tail and the paste is given orally for 2 days. End of the tail is scratched to ooze out impure blood
		Caralluma umbellata Haw.	Kallu Mulaiyan	Asclepiadaceae	Bark	Plant materials are taken in equal quantities and ground with hot water. Small quantity of *Kolambu Sakkarai* (salt) is added and rubbed on the surface of the cattle tongue to remove the infection. This process should be done in the morning for 2 or 3 days consecutively
		Cissus quadrangularis L.	Pirandai	Vitaceae	Entire plant	
		Vanilla walkeriae Wight.	Urundai Pirandai	Orchidaceae	Entire plant	
		Caralluma umbellata Haw.	Kallu Muliyan	Asclepiadaceae	Bark/leaf	All the plant materials are ground into paste with small quantity of salt and the material is rubbed externally on the infected region of the cattle's tongue. The waste blood present in the nerves is withdrawn by puncturing the nerves using thorn of either *Scutia myrtina* or *Toddalia asiatica*
		Cissus quadrangularis L.	Sathura Pirandai	Vitaceae	Stem	
		Cosmostigma racemosum Wight	Pada Mirati	Asclepiadaceae	Leaf	
		Pergularia daemia (Forssk.) Chiov.	Uthamanai	Asclepiadaceae	Leaf	
		Scutia myrtina Merr.	Thoradi mullu	Rhamnaceae	Thorn	
		Toddalia asiatica Lam.	Mullanganda	Rutaceae	Thorn	
		Vanilla walkeriae Wight.	Urundai Pirandai	Orchidaceae	Stem	
25.	Elumbu Murivu (bone fracture)	*Artocarpus hirsutus* Lam.	Kaatu Pala	Moraceae	Bark	Bark is pounded with goat milk and juice is given orally for 7 days
		Borassus flabellifer L.	Panai	Arecaceae	Jaggery	Plant bark, *Citrus limon* juice and jaggery from *Borassus flabellifer* are ground well with egg white yolk and made into solid paste. Given orally in morning for 5-6 days
		Citrus limon (L.) Burm.f.	Elumichai	Rutaceae	Fruit	
		Lannea coromandelica (Houtt.) Merr	Kuli Maathi	Anacardiaceae	Bark	
		Ficus benghalensis L.	Aala maram	Moraceae	Bark	Bark materials are ground together and paste is applied externally on broken spot and bandages are made using white cloth
		Ficus racemosa L.	Athi maram	Moraceae	Bark	
		Ipomoea staphylina Roem. & Schult.	Unangodi	Convolvulaceae	Latex, bark	Bark and latex are pound together. Paste is applied on white cloth and tied on the affected part once in 5 days for 2 times
		Ipomoea staphylina Roem. & Schult.	Unangodi	Convolvulaceae	Latex, bark	Latex is applied externally at the fractured regions, and the bark is kept on the surface of fractured area as support and tied. This procedure is followed once in 7 days for 3-4 times

(Contd...)

Table 3: ***(Continued)***

S. No	Name of the disease	Binomial Name	Vernacular names	Family	Parts used	Mode of preparation, administration, and dosage
		Premna tomentosa Willd.	Poda nari	Lamiaceae	Leaf	Paste prepared from leaves is applied externally on cattle for bone fractures especially for goats
		Premna tomentosa Willd.	Poda nari	Lamiaceae	Leaf	With leaves, small quantity of *Sesamum indicum* seeds or oil is added and ground well. Paste is applied externally on the area up to cure
		Sesamum indicum L.	Ellu	Pedaliaceae	Seed or Oil	
26.	Iduppu naluvuthal (hip dislocation)	*Artocarpus hirsutus* Lam.	Kattu Pala	Moraceae	Barl	All materials are ground well and small quantity of cow dung is also added. Boiled and decoction is applied externally
		Diospyros montana Roxb.	Karipaalai	Ebenaceae	Bark	
		Phaseolus mungo L.	Ulundhu	Fabaceae	Seed	
		Tamarindus indica L.	Puli	Ceasalpinaceae	Seed	
27.	Meichal illamai (laziness in feeding - Anorexia)	*Alangium salviifolium* (L.f.) Wangerin	Alingi maram	Alangiaceae	Leaf, root	Plant parts are pounded in stone mortar. Mixed with milk or buttermilk and juice is administered orally once in a day for 500 ml up to cure. Also used for *Thiruttu noi*
		Azadirachta indica A.Juss.	Vembu	Meliaceae	Bark	All plant materials are pound together and decoction is prepared in water. ½ L of the preparation is administered orally, in single dose
		Ficus racemosa L.	Athi maram	Moraceae	Bark	
		Pongamia pinnata (L.) Pierre	Punga maram	Fabaceae	Bark	
		Terminalia arjuna (Roxb. ex DC.) Wight & Arn.	Mathura maram	Combretaceae	Bark	
		Murraya koenigii (L.) Spreng.	Kariveppilai	Rutaceae	Leaf	Given orally as such along with fodder or separately
		Zingiber officinale Rosc.	Inji	Zingiberaceae	Rhizhome	
28.	Vayitru pochigal (Endoparasites)	*Rubia cordifolia* L.	Otti thalai	Rubiaceae	Stem	Stem paste ground with water is given orally once in a month for intestinal endoparasitic worms
		Syzygium cumini (L.) Skeels	Naval maram	Myrtaceae	Bark	Bark juice in hot water is given orally in morning hours for 2 days once in a month for intestinal endoparasitic worms
29.	Komari (Kaal Komari/Vaai Komaari) (foot and mouth disease)	*Borassus flabellifer* L.	Panai	Arecaceae	Vellam or Karkandu	All plant materials with *Panankargandu* (Rock sugar candy) or *Panai Vellam* (Jaggery) are taken in equal quantity. *Curcuma longa* (Fresh rhizome) and *Eleusine coracana* flour also added and made into paste. Lemon sized paste is administered orally for two per time and for 2 or 3 days daily 2 times
		Curcuma longa L.	Manjal	Zingiberaceae	Rhizome (Fresh)	
		Eleusine coracana Gaertn.	Raahi	Poaceae	Grains	
		Limonia acidissima L.	Vila	Rutaceae	Fruit	
		Mimosa pudica L.	Thotta Surungi	Mimosaceae	Leaf	
		Musa paradisiaca L.	Monthan Valai	Musaceae	Fruit	
		Ricinus communis L.	Muthu Kottai	Euphorbiaceae	Seed	
		Musa paradisiaca L.	Vazhai	Musaceae	Fruit	Two or three fruits are longitudinally spilit into two and pig ghee is placed in the split. Given orally in mornings for 3-5 days, which ensures the speedy recovery from pain and wounds
30.	Wounds and injuries	*Cleistanthus collinus* (Roxb.) Hook.f.	Oduvanthalai	Euphorbiaceae	Fruit	Fruit pulp is ground into paste and applied externally
		Gardenia gummifera L.f.	Kambi maram	Rubiaceae	Resin	Resin is applied fresh or if dried mixed with gingelly oil and applied externally
		Leucas aspera Link	Thumbai	Lamiaceae	Leaf	Leaf paste is applied up to cure
		Premna tomentosa Willd.	Poda nari	Lamiaceae	Leaf	Boiled leaves fixed on the injured area by means of Castor oil
		Ricinus communis L.	Kottai Muthu	Euphorbiaceae	Oil	
		Tridax procumbens L.	Kinathu poondu	Asteraceae	Leaf	Leaf juice is applied to control the bleeding and paste is tied on the wounds up to cure

(Contd...)

Table 3: ***(Continued)***

S. No	Name of the disease	Binomial Name	Vernacular names	Family	Parts used	Mode of preparation, administration, and dosage
31.	*Kannil Kuchi Patta Pun* (eye wounds due to stick injuries)	*Diospyros montana* Roxb.	Vekkana maram	Ebenaceae	Leaf	All materials are taken in equal amount, pound and juice is applied externally as drops in eyes through white cloth 2 or 3 times up to cure
		Pedalium murex L.	Aanai Nerunji	Pedaliaceae	Leaf	
		Tephrosia purpurea (L.) Pers.	Usithuvarai	Fabaceae	Leaf	
		Tephrosia purpurea (L.) Pers.	Usithuvarai	Fabaceae	Leaf	Leaf extract is administered externally as drops to cure wounds in eyes made by sticks. Continued up to cure daily for 3 times
32.	Maggoty wounds	*Annona squamosa* L.	Seetha	Annonaceae	Leaf	Root paste is applied externally up to cure
		Azadirachta indica A.Juss.	Veppa maram	Meliaceae	Seed	Oil is applied externally to repel maggots from wounds which facilitate the healing. In addition, it prevents the further attack of flies
		Ficus racemosa L.	Athi maram	Moraceae	Bark	To remove or control the maggots formed in the wounds fresh paste of these plant material are applied externally. It is specifically recommended for the wounds formed due to Komari
		Secamone emetica (Retz.) Schult.	Puluvu kodi	Asclepiadaceae	Leaf	
		Gardenia gummifera L.f.	Kambi maram	Rubiaceae	Leaf	Leaves are ground with hot water and made into paste. Applied externally up to cure
		Leucas aspera Link	Thumbai	Lamiaceae	Leaf	Leaf paste is applied on the wounds which repels and kills the maggots
33.	*Thavalai Noi/ Manna Mari Kattu* (Swelling in neck and cheeks)	*Cardiospermum halicacabum* L.	Kothan kodi	Sapindaceae	Entire plant	Made into garland like and wore on the neck of the cattle
34.	Swellings due to injuries	*Erythrina indica* Lam.	Kalyana Murungai	Fabaceae	Leaf	Leaf paste is applied externally on the surfaces
		Moringa oleifera Lam.	Murungai	Moringaceae	Leaf	Leaf paste is applied on the injured swelling up to cure
		Wattakaka volubilis Stapf	Perukurinjan	Asclepiadaceae	Leaf	Leaf ground well into paste mixed with salt and applied externally
35.	*Kaluthu Katti* (yoke galls)	*Azadirachta indica* A.Juss.	Vembu	Meliaceae	Oil	Rhizome powder mixed with castor oil and applied on the wounds up to cure. Same time *Azadirachta indica* oil also applied to prevent the attack of flies
		Curcuma longa L.	Manjal	Zingiberaceae	Rhizome	
		Ricinus communis L.	Kottai Muthu	Euphorbiaceae	Oil	
		Euphorbia tirucalli L.	Paacham Palupu	Euphorbiaceae	Stem	Hot water is poured on affected area and massaged. The paste of the stem is applied externally on the wounds to reduce swelling and pain
		Tephrosia purpurea (L.) Pers.	Kolinji	Fabaceae	Leaf	Paste is applied externally on the wounds up to cure
36.	*Madi Vaatham* (inflammation in udder - Swelling, pain, injuries, blood in milk, etc.,)	*Cayratia pedata* Gagnep.	Panni Kaai ilai	Vitaceae	Leaf	All plant materials are ground with *Curcuma longa* (fresh rhizome) and made into paste.
		Curcuma longa L.	Manjal	Zingiberaceae	Rhizome	Paste is applied on the udder and teat after removing the pus and waste blood materials present in the udder. Applied twice a day for 5 days or up to cure
		Justicia gendarussa Burm.f.	Karu Nochi	Acanthaceae	Leaf	
		Stachytarpheta indica Vahl	Seemai Naayuruvi	Verbenaceae	Leaf	
		Cosmostigma racemosum Wight	Padai Miratti kodi	Asclepiadaceae	Leaf	All plant materials are made into paste with hot water and small quantity of *Kolambu Sakkarai* (Common salt) added. The above paste is applied externally on the swelling regions and any one plant twig is used for "*Othadam*" (Fomentation)

(Contd...)

Table 3: *(Continued)*

S. No	Name of the disease	Binomial Name	Vernacular names	Family	Parts used	Mode of preparation, administration, and dosage
		Jatropha curcas L.	Kaattu Kotai	Euphorbiaceae	Leaf	
		Vitex negundo L.	Vellai Nochi	Verbenaceae	Leaf	
		Eleusine coracana Gaertn.	Raahi	Poaceae	Grains	500 gm of *Eleusine coracana* flour and 500 gm of *Phaseolus mungo* flour, 250 g of *Tamarindus indica* seed flour and 250 g of Maidha flour are added together. Boiled in hot water and made into paste. Then, anyone twig of the plant given is used to apply the preparation externally on the infected udder
		Tamarindus indica L.	Puli	Caesalpiniaceae	Seed	
		Vigna mungo (L.) Hepper	Ulundhu	Fabaceae	Seed	
		Musa paradisiaca L.	Vazhai	Musaceae	Leaf	Used as fodder to control mastitis
		Capsicum annuum L.	Milahai	Solanaceae	Fruit	Along with leaves, two dry chilies and salt are added and juice is administered orally. Paste of the same also applied on the teat and udder
		Wattakaka volubilis Stapf	Peru Kurinjan	Asclepiadaceae	Leaf	
37.	Snake bite	*Achyranthes aspera* L.	Navirinji	Amaranthaceae	Root	All the materials in equal quantities are ground into paste along with small quantities of *Allium sativum* and *Piper nigrum*. Paste is to be kept in a white cloth or cotton cloth and 50 ml of extract is to be administered for cattle through nostril (10 ml for human being)
		Calotropis gigantea (L.) W.T.Aiton	Erukku	Asclepiadaceae	Root	
		Canthium parviflorum Lam.	Kaarai	Rubiaceae	Root	
		Cassia fistula L.	Sarakkonnai	Caesalpiniaceae	Root	
		Nicotiana tabacum L.	Puhai ilai	Solanaceae	Leaf	
		Notonia grandiflora DC.	Musakathu ilai	Asteraceae	Leaf	
		Tylophora indica Merr.	Kuthu Paalai/ Kuruthala Paalai	Apocynaceae	Leaf, root	
		Alangium salviifolium (L.f.) Wangerin	Alingi	Alangiaceae	Root	Root paste is given orally in a lemon size for 2 days
		Mangifera indica L.	Ma	Anacardiaceae	Leaf	Leaf juice along with seed powder (if available) given orally
38.	Visa Kadi (poison bites) and Poochi Kadi (insect bite)	*Calotropis gigantea* (L.) W.T.Aiton	Erukku	Asclepiadaceae	Leaf	Any one of this material or in urgency any other fodder plant can be used for "*Paadam Poduthal*" in poison bites. Then administered along with other fodder or drinking water
		Citrus limon (L.) Burm.f.	Elumichai	Rutaceae	Fruit	
		Gossypium hirsutum L.	Paruthi	Malvaceae	Seed	
		Datura metel L.	Oomathai	Solanaceae	Leaf	Leaf paste in hot water is applied to reduce the pain
		Piper nigrum L.	Milahu	Piperaceae	Seed	Seed powder made into paste with hot water or any plant oil and is applied externally which reduces pain
39.	Kirumi Naasini (antiseptics)	*Acorus calamus* L.	Vasambu	Araceae	Rhizome	Rhizome is ground with hot water and made into paste. Paste can be applied after cleaning of wound with hot water and also backsides of the cow after delivery to avoid flies
		Azadirachta indica A.Juss.	Vembu	Meliaceae	Leaf	Leaf paste is applied externally on the surfaces

(Contd...)

Table 3: ***(Continued)***

S. No	Name of the disease	Binomial Name	Vernacular names	Family	Parts used	Mode of preparation, administration, and dosage
		Curcuma longa L.	Manjal	Zingiberaceae	Rhizome	Rhizome paste is applied on the wounds as antiseptics
40.	Infertility	*Ceiba pentandra* Gaertn.	Ilavu maram	Bombacaceae	Leaf	Crushed leaves with boiled rice water after 12 hrs is mixed together and about 500 ml is given orally twice daily for 3-5 days
		Cicer arietinum L.	Kondai Kadalai	Fabaceae	Seeds	250 g of seeds is soaked in water for 12 hrs and ground well. Preparation is administered through drinking water in the morning for 20 to 30 days to the cows will regulate proper development of uterus
41.	Delivery problems and recovery	*Dendrocalamus strictus* Nees	Siruvarai/Aan Mungil	Poaceae	Leaf	Leaves are used as fodder at the time of delivery to facilitate the delivery
		Borassus flabellifer L.	Panai	Arecaceae	Jaggery	*Eleusine coracana* gel is prepared along with jaggery and boiled. At bearable heat this paste is given orally to cattle as health tonic. It should be administered after 3-4 days of delivery which clears the placenta or any other remains present in the uterus and post-natal pains
		Eleusine coracana Gaertn.	Rahi	Poaceae	Seed	
		Lagenaria siceraria (Molina) Standl.	Suraikkai	Cucurbitaceae	Fruit	All seeds are soaked in water for 12 hrs and boiled with pieces of *Lagenaria siceraria* tender fruit. Given as fodder for 5 days. It is given from 3 to 10 days after delivery as health tonic
		Macrotyloma uniflorum (Lam.) Verdc.	Kollu	Fabaceae	Seed	
		Sorghum vulgare Pers.	Solam	Poaceae	Seed	
		Vigna unguiculata (L.) Walp.	Thattai Payiru	Fabaceae	Seed	
		Cocos nucifera L.	Thennai maram	Arecaceae	Fruit	*Pacharisi* (Rice) soacked in water and pieces of coconut is added and ground well. Preparation is given in the evenings. This process is to be done after 7-20 days of delivery for 5-10 days. It acts as health tonic as well as to control the post-natal problems
		Oryza sativa L.	Nel	Poaceae	Seed	
42.	Sathai Vilathu Iruthal (release of retained placenta)	*Artocarpus heterophyllus* Lam.	Palaa maram	Moraceae	Leaf	Leaf juice is given orally for 2 days once in a day for about ½ L
		Grewia asiatica L.	Thadasi maram	Tiliaceae	Leaf	10-15 leaves are crushed and the paste is administered orally at the time of delivery which regulates the proper removal of placenta
		Grewia tiliifolia Vahl	Valukkai maram	Tiliaceae	Bark	Along with the bark of the plant, *Allium sativum, Cuminum cyminum* and *Piper nigrum* are added in small quantity and ground into paste. Lemon size is administered orally for 2 times
		Aloe vera (L.) Burm.f.	Sothu Kathalai	Liliaceae	Entire Plant	Plant materials are ground well along with small quantities of *Allium sativum* and *Piper nigrum* and made into paste. Preparation is given orally twice in a day
		Grewia asiatica L.	Thadasi maram	Tiliaceae	Bark	
		Grewia tiliifolia Vahl	Valukkai maram	Tiliaceae	Bark	
43.	Ottunni Poochihal (ectoparasites)	*Annona squamosa* L.	Seetha maram	Annonaceae	Leaf	Leaf juice is applied externally to control ectoparasites like ticks and mites
		Acalypha indica L.	Kuppai Meni	Euphorbiaceae	Leaf	Leaf paste is applied externally to repel the insect

(Contd...)

Table 3: ***(Continued)***

S. No	Name of the disease	Binomial Name	Vernacular names	Family	Parts used	Mode of preparation, administration, and dosage
		Acorus calamus L.	Vasambu	Zingiberaceae	Rhizome	Rhizome paste is applied externally to control the lice especially for the nutrient deficient kids of goats
		Azadirachta indica A.Juss.	Vembu	Meliaceae	Leaf	Fumigation to cattle sheds controls the ectoparasites
		Chloroxylon swietenia DC.	Porusa maram	Rutaceae	Leaf	Fumigation to cattle sheds controls the ectoparasites
		Cleistanthus collinus (Roxb.) Hook.f.	Oduvanthalai	Euphorbiaceae	Leaf	Twigs are acts as insect repelants. Leaf paste is applied on cattle to avoid attack of insects. But it is poisonous to human being
		Ocimum basilicum L.	Thiruneetru Pachilai	Lamiaceae	Leaf	Growing the plant near the cattle sheds or fumigation with dried plant material inside the cattle shed will repels the insects and flies
		Strychnos potatorum L.f.	Thaethan maram	Loganiaceae	Leaf	Fumigation to cattle sheds for the control of ectoparasites
44.	Sulukku (Sprain) or Thasai Pidippu (muscle contraction)	*Agave americana* L.	Periya Kathalai	Agavaceae	Leaf	*Agave americana* leaf juice and *Eleusine coracana* seed powder are boiled and made into gel. It is applied on the affected area for 3-5 times at an interval of 3 days
		Eleusine coracana Gaertn.	Rahi	Poaceae	Grains	
		Agave americana L.	Periya Kathalai	Agavaceae	Leaf	*Agave americana* leaf juice and *Tamarindus indica* seed powder are mixed and boiled. Paste is applied externally in bearable heat on the affected area for 3-5 days
		Tamarindus indica L.	Puli	Caesalpiniaceae	Seed	
45.	Padukkan Kolli Eruthu	Cassia auriculata L.	Aavarai	Caesalipiniaceae	Leaf	3 tender leaves of each plant are ground together and paste is applied on the *Mookanangayiru* (A thread wore in the nose) in the morning and evening for 2 days
		Leucas aspera Link	Thumbai	Lamiaceae	Leaf	
46.	Theratha maduhal (weak cattle)	*Aloe vera* (L.) Burm.f.	Sothu Kathalai	Liliaceae	Leaf	Central gel portion is given orally in morning hours once in a month for general health of digestive tract
		Albizia procera (Roxb.) Benth.	Koodu Mathuram	Mimosaceae	Bark	All materials are pounded and soaked in water for 20 days. Juice is administered orally for about 100 ml a day for the weak cattle
		Lannea coromandelica (Houtt.) Merr	Othiya maram	Anacardiaceae	Bark	
		Mangifera indica L.	Ma	Anacardiaceae	Bark	
		Pterocarpus marsupium Roxb.	Vengai maram	Fabaceae	Bark	
		Terminalia arjuna (Roxb. ex DC.) Wight & Arn.	Aathu Mathuram	Combretaceae	Bark	
		Polyalthia cerasoides (Roxb.) Bedd.	Senthalam	Annonaceae	Bark	Bark is pounded and soaked in water for 5 hrs and administered orally for body strength
47.	Milk yielding (lactation)	*Bambusa arundinacea* Retz.	Moongil	Poaceae	Leaf	Fresh leaves used as fodder to increase lactation
		Leptadenia reticulata (Retz.) Wight and Arn.	Thummal kodi/Palai kodi	Asclepiadaceae	Entire Plant	Used as fodder to increase lactation process in cattle
		Vanilla walkeriae Wight.	Aanai Pirandai	Orchidaceae	Stem	Used as fodder to increase milk yielding capacity in cattle
48.	Spritual	*Calotropis gigantea* (L.) W.T.Aiton	Erukku	Asclepiadaceae	Tender Twig	Tender twig is used for *Paadam Poduthal*
		Cardiospermum halicacabum L.	Mudakkathan	Sapindaceae	Tender Twig	Tender twig is used for *Paadam Poduthal*

help in the field of herbal research and enumeration of new medicinal plant. At the same time, the detailed biochemical and pharmacological investigations and scientific validation of these plants will be very helpful for inventing and designing novel drugs for EV health care.

ACKNOWLEDGMENTS

One of the authors (MK) is thankful to The Chancellor, Vinayaka Missions University, Salem. The authors also thankful to the resident tribes of the study area for the response and participation in survey by sharing their knowledge on plants. The authors also grateful to Dr. R. Prabakaran, Head, Department of Botany, Vivekanandha College of Arts and Sciences for Women, Tiruchengode, for accompanying field visits. A special word of gratitude for tribal informant Mr. A. Murugesan, who helped the author a lot during the study and Dr. E. Vekatesa Kumar, Department of Veterinary and Clinical Medicine, Government. Veterinary College, Namakkal district, Tamil Nadu, for his suggestions.

REFERENCES

1. Yadav DK. Ethno-veterinary practices: A boon for improving indigenous cattle productivity in Gaushalas. Livest Res Rural Dev 2007;19(6):1-5.
2. Manoj Y, Anupama Y, Ekta G. Ethno veterinary practices in Rajasthan, India – A review. Int Res J Biol Sci 2012;1(6):80-2.
3. Ashok PS, Sonawane BN, Reddy PG. Traditional ethno veterinary practices in Karanji Ghat areas of Pathradi Tahasil in Ahmednagar District, (M.S), India. Int J Plant Anim Environ Sci 2012;1(2):64-9.
4. Rupeshkumar M, Kavitha K, Haldar PK. Role of herbal plants in the diabetes mellitus therapy: An overview. Int J Appl Pharm 2014;6(3):1-3.
5. Mishra D, Patro L. Ethno veterinary practices among the rural people of Ganjam District, (Orissa), India – A case study on some common ailments. Bioscan 2010;3:739-46.
6. Lakshminarayana V, Rao GM. Ethnoveterinary practices in north coastal districts of Andhra Pradesh, India. J Nat Remedies 2013;13(2):109-17.
7. Monoj Y, Ekta G. Ethnoveterinary practices by live stock owner in animal fair at Pushkar, Rajasthan, India. Int Res J Environ Sci 2014;3(4):1-4.
8. Panda SS, Dhal NK. Plants used in ethno-veterinary medicine by native people of Nawrangpur District, Odisha, India. World J Pharm Pharm Sci 2014;3(7):787-98.
9. Tyagai R, Sharma G, Jasuja ND, Menghani E. Indian medicinal plants as an effective antimicrobial agent. J Crit Rev 2016;3(2):69-71.
10. Malik BK, Panda T, Padhy RN. Ethnoveterinary practices of aborigine tribes in Odisha, India. Asian Pac J Trop Biomed 2012;10:S1520-5.
11. Mishra KK, Kumar KA. Ethno veterinary practices among the Konda Reddi of East Godavari District of Andhra Pradesh. Stud Tribes Tribals 2004;2(1):37-44.
12. Kulkarni S, Kulkarni DK, Deo AD, Pande AB, Bhagat RL. Use of Ethno-Veterinay Medicines (EVM), from Vidarbha region (MS), India. Biosci Discov 2014;5(2):180-6.
13. Santhivimalarani S, Pavadai P. Ethnoveterinary practices among the tribes of Kolli hills in Tamilnadu, India. Int J Pharm Sci Rev Res 2014;28(2):267-71.
14. SriBalaji N, Vikrama Chakravarthi P. Ethnoveterinary practices in India – A review. Vet World 2010;3(12):549-51.
15. Ganesan S, Chandhirasekaran M, Selvaraj A. Ethnoveterinary healthcare practices in southern districts of Tamil Nadu. IJTK 2008;1(2):347-54.
16. Deepa P, Murugesh S, Sowndhararajan K, Manikandan P. Plants used in ethno-veterinary medicine by Malayali tribals of Melur, Bodha hills, Southern Eastern Ghats, Namakkal District, Tamil Nadu. World J Pharm Res 2014;3(6):831-43.
17. Alagesaboopathi C. Medicinal plants used in the treatment of livestock diseases in Salem district, Tamil Nadu, India. World J Pharm Res 2015;4(4):829-36.
18. Alagesaboopathi C. Ethnomedicinal plants and their utilization by villagers in Kumaragiri Hills of Salem district of Tamil Nadu, India. Afr J Tradit Complement Altern Med 2009;6(3):222-7.
19. Alagesaboopathi C. Ethnobotanical studies on useful plants of Kanjamalai Hills of Salem district of Tamil Nadu, Southern India. Arch Appl Sci Res 2011;3(5):532-9.
20. Alagesaboopathi C. Ethnobotanical survey of medicinal plants used by Malayali tribals and rural people in Salem district of Tamilnadu. India J Pharm Res 2012;5(12):5248-52.
21. Alagesaboopathi C. Ethnobotanical plants used for the treatment of snakebites by Malayali tribals and rural people in Salem district, Tamilnadu, India. Int J Biosci 2013;3(2):42-53.
22. Alagesaboopathi C. Herbal treats practiced by tribal and rural populace in Arunoothmalai Hills of Salem district, Tamilnadu, India. Int J Curr Res Biosci Plant Biol 2014;1(1):15-25.
23. Kadavul K, Dixit AK. Ethnomedicinal studies of the woody species of Kalrayan and Shervarayan Hills, Eastern Ghats, Tamil Nadu. Indian J Tradit knowl 2009;8(4):592-7.
24. Kadavul K, Parthasarathy N. Population analysis of *Alphonsea sclerocarpa* Thw. (*Annonaceae*) in the Kalrayan hills of Eastern Ghats, India. Int J Ecol Environ Sci 2001;27:51-4.
25. Mishra SB, Dwivedi S, Shashi A, Prajapati K. Ethnomedicinal uses of some plant species by ethnic and rural people of the Salem district of Tamil Nadu with special reference to the conservation of vanishing species. Ethnobot Leaflet 2008;12:873-87.
26. Natarajan V, Anbazhagan M, Rajendran R. Studies on ethnomedicinal plants used by the Malayali tribe of Kalrayan Hill, Tamil Nadu state. Res Plant Biol 2012;2(1):15-21.
27. Parthipan M, Aravindhan V, Rajendran A. Medico-botanical study of Yercaud Hills in the Eastern Ghats of Tamil Nadu, India. Anc Sci Life 2011;30(4):104-9.
28. Rekha R, Kumar SS. Ethnobotanical plants used by the Malayali tribes in Yercaud hills of Eastern Ghats, Salem District, Tamil Nadu, India. Global J Res Med Plants Indigen Med 2014;3(6):243-51.
29. Rekka R, Kumar SS. Ethnobotanical notes on wild edible plants used by Malayali tribals of Yercaud hills, Eastern Ghats, Salem District, Tamil Nadu. Int J Herbal Med 2014;2(1):39-42.
30. Sakthivel R, Manivel M, Raj NJ, Pugalanthi V, Raju DK. Role of remote sensing in geomorphic mapping: A case study from Kalrayan hills, parts of Eastern Ghats, Tamil Nadu. Indian J Geomorphol 2006;11:103-12.
31. Sakthivel R, Manivel M, Raj NJ, Pugalanthi V, Ravichandran N, Anand VD. Remote sensing and GIS based forest cover change detection study in Kalrayan hills, Tamil Nadu. J Environ Biol 2010;31(5):737-47.
32. Sankaran S, Alagesaboopathi C. Some medicinal plants used by the tribals of Shevaroy Hills, Tamilnadu. Int J Flora Fauna 1995;1:137-8.
33. Senthil Kumar T, Krishnamurthy KV. Ethnobotanical study on Shevaroy hills of Eastern Ghats. Solai Bull Ethnopharmacol 1997;31-6.
34. Manikandan S, Lakshmanan GM. Ethnobotanical survey of medicinal plants in Kalrayan hills, Eastern Ghats, Tamil Nadu. Int Lett Nat Sci 2014;12(2):111-21.
35. Selvaraju A, Ayyanar M, Rathinakumar SS, Sekar T. Plants used in ethno-veterinary by Malayali tribals in Salem district of Tamil Nadu, India. Med Plants 2011;3(3):1-7.
36. Vemban NA, Subramaniam KS, Gopalakrishnan K, Rao V. Major Faults/Dislocations/Lineaments of Tamil Nadu. Geol Survey of India's Misc Publication; 1977;31:53-6.
37. Jain SK, editor. Ethnobotany, its scope and various sub-disciplines. In: A Manual of Ethnobotany. Jodhpur: Scientific Publishers; 1987. p. 1-11.
38. Gamble JS, Fischer CE. Flora of the Presidency of Madras. Vol. I-III. London, Calcutta: Adlard and Son, Ltd.; 1935.
39. Matthew KM. The Flora of Tamil Nadu Carnatic. Vol. I-III. Tiruchirapalli, India: The Rapinat Herbarium; 1983.
40. Tan KK, Wiart C. Botanical descriptions, ethnomedicinal and non-medicinal uses of the genus *Artabotrys* R. Br. Int J Curr Pharm Res 2014;6(1):34-40.