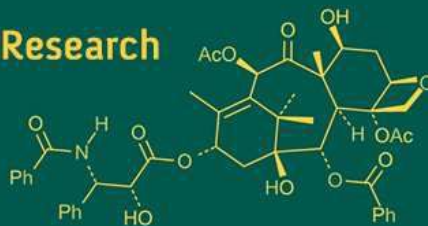
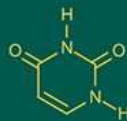


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## Ethno-veterinary medicines and practices followed by Kangayam cattle farmers in Western agro-climatic zone of Tamil Nadu

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### Abstract

The present study was conducted in Coimbatore, Erode, Karur and Tirupur districts of Tamil Nadu with the objective to document the Ethno-veterinary medicines followed by the Kangayam cattle farmers. Snowball sampling technique was pursued to identify 50 *Kangayam* cattle farmers in each district, thus a total of 200 respondents were selected for the study. The ethno-veterinary medicines, plants and most common livestock ailments of the study area were found by direct questioning and through Participatory Rural Appraisal (PRA) technique. Informant Consensus Methodology was adopted to find out the importance of medicinal plants, authenticity and homogeneity among the informants about EVM practices. Results revealed that among the three categories of ailment studied, the farmers had followed many ethno-veterinary practices using several locally available plants and herbs to take care of digestive disorders of their Kangayam cattle with a mean FIC of 0.96 followed by reproductive disorders (mean FIC= 0.95) and respiratory disorders (mean FIC= 0.86).

**Keywords:** Ethno-veterinary medicines, medicinal plants and informants

### Introduction

Ethno-veterinary medicine (EVM), the scientific term for traditional animal health care, encompasses the knowledge, skills, methods, practices and beliefs about animal health care found among the members of a community (Mc Corkle, 1995) [5]. Ethno-veterinary practice (EVP) is based on folk beliefs, traditional knowledge, skills, methods and practices to cure diseases and maintain health of animals (Tabuti *et al.*, 2003) [8]. Majority of indigenous diagnostic and ethnobotanical knowledge methods used in cattle healthcare have been passed down from generation to generation, mainly by word of mouth and apprenticeship (Bredemus, 2021) [1]. Furthermore, these ethnoveterinary medicine are very dynamic and multipurpose as they can treat several different types of livestock disorders, along with being readily available in the remote areas and cheapest as compared to the synthetic drugs (Ullah *et al.*, 2013) [10]. Therefore, if not documented, the immense knowledge, skills, and experience accumulated over generations may become extinct in developing countries because of migrations, urbanisation, and technological development (Crane *et al.*, 2017) [2]. Thus, this study attempt to document the Ethno veterinary medicines and practices being used by the Kangayam farmers in the western agro climatic zone of Tamil Nadu.

### Materials and Methods

Four districts (Coimbatore, Erode, Karur and Tirupur) of Tamil Nadu were purposively selected since they were identified as the breeding tract with considerable cattle population. Descriptive research design was employed to obtain pertinent and precise information concerning the phenomenon under quest and to draw possible valid general conclusions. Since the cattle farmers were scattered in the selected four districts, Key informants including local Veterinarians, cattle breeders, officials of Primary Milk Producers Cooperative Societies, representatives of NGOs and progressive farmers were involved to identify the initial respondents for the study in each district. Through these initially identified respondents, other respondents were identified and selected through snowball sampling technique leading to a total of 50 respondents in each district. Thus, a total of 200 respondents were selected for the study.

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common livestock ailments of the study area were found by direct questioning and through Participatory Rural Appraisal (PRA) technique as well where in which gathering, learning, reviewing and analyzing data should be on spot while staying with the community, *i.e.*, on the spot analysis.

The basic principle of this method is that farmers are well aware of the environment, in which they do farming operations, and that answers too many questions can be found in the collective experience of the farming community and their informal experiments carried out over years. This method can be used to unpack the practices of successful farmers, so that information can be disseminated to a wider group of farmers.

Data on plants used as EVM, category of illness for which EVM were used and number of farmers following EVM were collected and triangulated - a method of cross-checking data from multiple sources to search for regularities in the research data. In this study, progressive farmers and local healers were the sources used to search for regularities. To verify the importance of medicinal plants, authenticity and homogeneity among the informants about EVM practices, the Informant Consensus Methodology followed by Mandal and Rahaman (2014)<sup>[4]</sup> was adopted.

### Informant Consensus methodology

Consensus methodology estimates the Informant Consensus Factor ( $F_{ic}$ ) for each category of diseases to identify the agreements of the informants on the reported EVM practices for the group of diseases and to identify most potentially effective medicinal plant species as well as plant based remedies used in the culture of rural people of the study area. Informants' Consensus Factor,  $F_{ic}$  (Trotter and Logan, 1986)<sup>[9]</sup> is expressed by the formula,

$$F_{ic} = \frac{N_{ur} - N_t}{N_{ur} - 1}$$

where,

$N_{ur}$  = number of use-reports of informants for particular illness usage, where a use-report is a single record for use of a plant based remedy mentioned by an informant.

$N_t$  = total number of remedies used for a particular illness category by all informants.

In this study, each polyherbal remedy was considered as a single use-report. The value of  $F_{ic}$  provides a range of 0 to 1, where a higher value signifies its greater authenticity as few plants are used frequently for a particular disease or disease category and lower values reflects the disagreement among the informants. Based on the  $F_{ic}$ , the plants which were

commonly used as EVM by the respondents were identified and documented.

## Results and Discussion

### Ethno-veterinary medicines and practices followed by Kangayam cattle farmers during digestive, respiratory and reproductive disorders

Ethno-veterinary medicines cover people's knowledge, skills, practices, methods, and beliefs about the care of their animals. In Indian situation, ethno-veterinary medicine plays a significant role in livestock production and health care. Hence, it often becomes the only available means for farmers to treat ill animals in rural areas. Consequently, it was opined exceptionally to document and further disseminate indigenous knowledge on different uses of plants as animal health care component in order to help the farmers and to promote conservation measures. Thus, an attempt was made to explore and document the ethno-veterinary therapeutic practices followed by Kangayam cattle farmers in the study area through participatory mode and the results were presented herewith.

#### 1.1 Documentation of most commonly used ethno-veterinary medicines (EVM) followed by Kangayam cattle farmers

An attempt was made to document the veterinary medicines (EVM) followed by Kangayam cattle farmers in the study area and the results were presented in Table 1. A total of 75 ethno veterinary medicines were identified through participatory mode and documented in three categories. The three categories of ailment were Digestive disorders, Respiratory disorders and Reproductive disorders. Digestive disorders include treatment of Anorexia (Six), Bloat (Ten), Diarrhea / Enteritis / Calf scour (Fourteen), Impaction and Constipation (Seven) and Indigestion (Five). Respiratory disorders include treatment of Pneumonia (Seven), Bronchitis (Three) and Lung emphysema (Two). Reproductive disorders include treatment of Retained placenta (Nine), Anoestrus (Five), Repeat breeding and Infertility (Four) and Uterine infections (Metritis / Endometritis etc. - Three).

#### 1.2 Identification of ailment category for which more ethno-veterinary medicines (EVM) and practices were followed by Kangayam cattle farmers

The method of Informants' consensus factor ( $F_{ic}$ ) had been used to identify most potentially effective medicinal plant species as well as plant based remedies prevailed in Kangayam cattle farming. Each polyherbal preparation used for treating the disease condition has been considered as single use-report.

**Table 1:** Ethnoveterinary medicines and practices followed in Kangayam cattle farming for Digestive, Respiratory gland and Reproductive disorders

| S. No.     | EVM ingredients                                                                                                                                                                                                                                                                                       | Preparation                                                                                                                                                                                                                             | Application/ Administration                                                                                                           |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>A</b>   | <b>Digestive Disorders</b>                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                         |                                                                                                                                       |
| <b>I</b>   | <b>Anorexia</b>                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                         |                                                                                                                                       |
| 1          | Pirandai ( <i>Cissus quadrangularis</i> ) and Common salt                                                                                                                                                                                                                                             | Five pods of one foot length pirandai roughly smashed and mixed with handful of salt                                                                                                                                                    | Pirandai smash along with salt was rubbed on the tongue and upper palate of the cattle.                                               |
| 2          | Turmeric ( <i>Curcuma longa</i> ), Ginger ( <i>Zingiber officinale</i> ), Bitter gourd ( <i>Mimordica charantia</i> ) and Jaggery                                                                                                                                                                     | About 50 g each of Turmeric, ginger and bitter gourd were ground and mixed with 200 g of jaggery for one application                                                                                                                    | The ground mixture was administered orally twice a day for 2 days.                                                                    |
| 3          | Ginger ( <i>Zingiber officinale</i> ), Onion ( <i>Allium cepa</i> ), Chithirathai ( <i>Alpinia galanga</i> ) and Karunchiragam ( <i>Nigella sativa</i> )                                                                                                                                              | About 25 g of Ginger, 50 g of Onion, 25 g of Chithirathai and 10 g of Karunchiragam were ground for one application                                                                                                                     | The ground mixture was fed orally along with 200 ml of water once daily for 2 days.                                                   |
| 5          | Poduthalai ( <i>Lippia nodiflora</i> )                                                                                                                                                                                                                                                                | About 100 g of fresh leaf boiled in 500 ml of water to make leaf decoction                                                                                                                                                              | The leaf decoction was administered once daily for three days.                                                                        |
| 6          | Sothukathalai ( <i>Aloe vera</i> )                                                                                                                                                                                                                                                                    | The inner part of the four sothukathalai leaves of one foot length (Soru) was taken and washed in water to remove bitterness and mixed with small amount of common salt                                                                 | The core of Sothukathalai along with salt was applied on the tongue and upper palate of the cattle.                                   |
| <b>II</b>  | <b>Bloat</b>                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                         |                                                                                                                                       |
| 1          | Baking soda and water                                                                                                                                                                                                                                                                                 | About three table spoon of baking soda was mixed with water                                                                                                                                                                             | Drenched orally after onset of bloat.                                                                                                 |
| 2          | Erukku ( <i>Calotropis gigantea</i> ) and Gingelly oil (sesame oil)                                                                                                                                                                                                                                   | Four inch of erukku twig along with leaves and 100 ml of gingelly oil was taken                                                                                                                                                         | Animal was made to chew the twig of erukku along with leaves and administered 100 ml of gingelly oil orally only once.                |
| 3          | Ginger ( <i>Zingiber officinale</i> ), Pepper ( <i>Piper nigrum</i> ), Betel leaves ( <i>Piper betel</i> ), Pirandai ( <i>Cissus quadrangularis</i> ) and Common salt                                                                                                                                 | About 50 g of ginger, 25 g of pepper pods, ten betel leaves and 200 g of Pirandai were pounded and mixed with 50 g of salt and made as small balls                                                                                      | The preparation was rubbed on the tongue and upper palate of the cattle thrice a day. Later salt with warm water was provided orally. |
| 4          | Cumin seeds ( <i>Cuminum cyminum</i> ), Turmeric ( <i>Curcuma longa</i> ), Pepper ( <i>Piper nigrum</i> ), Onion ( <i>Allium cepa</i> ), Garlic ( <i>Allium sativum</i> ), Ginger ( <i>Zingiber officinale</i> ), Betel leaf and Veldt grape - pirandai ( <i>Cissus quadrangularis</i> ) and Jaggery. | Each 25 g of Cumin seeds, onion, garlic and turmeric, 15 g of pepper, 100 g of ginger, 10 numbers of betel leaves and Veldt grape (local name-Pirandai) were ground roughly and mixed with 200 g of Jaggery and made into small boluses | Three to five boluses were fed orally and the application repeated until symptom reduced.                                             |
| 5          | Betal leaves ( <i>Piper betel</i> ), Pepper ( <i>Piper nigrum</i> ), Omum ( <i>Trachyspermum ammi</i> ) Karunjeeragam ( <i>Nigella sativa</i> ) and Asafoetida                                                                                                                                        | About 10 numbers of Betal leaves and 25 g of Pepper, Omum, Karunjeeragam and Asafoetida were ground well                                                                                                                                | The ground mixture was mixed with water and fed orally once daily for 3 days.                                                         |
| 6          | Thumbai ( <i>Leucas aspera</i> )                                                                                                                                                                                                                                                                      | About 250 ml of Thumbai juice has to be prepared by grinding the flowers.                                                                                                                                                               | Administered orally at the onset of symptom                                                                                           |
| 7          | Alam pazham- Ficus fruit ( <i>Ficus bengalensis</i> ), Ginger ( <i>Zingiber officinale</i> ) and salt                                                                                                                                                                                                 | About 10 g of Ficus fruit, 50 g of Ginger were ground well and mixed with salt                                                                                                                                                          | This mixture was fed daily once for seven days.                                                                                       |
| 8          | Tamarind ( <i>Tamarindus indica</i> ) and Gingelly leaves ( <i>Sesamum indicum</i> )                                                                                                                                                                                                                  | About 50 g of Tamarind ( <i>Tamarindus indica</i> ) and 100 g of gingelly leaves ( <i>Sesamum indicum</i> ) were pounded                                                                                                                | The extract was drenched orally for three days                                                                                        |
| 9          | Bamboo ( <i>Bambusa arundinacea</i> ) leaves and Kovai ( <i>Coccinia indica</i> ) leaves                                                                                                                                                                                                              | Equal amount of bamboo leaves and kovai leaves ground well and made into extract                                                                                                                                                        | Administered orally for two days                                                                                                      |
| 10         | Ashwagandha ( <i>Withania somnifera</i> ), Onion ( <i>Allium cepa</i> ), Karu umathai ( <i>Datura metel</i> ) and Vasambu ( <i>Acorus calamus</i> )                                                                                                                                                   | Paste made by grounding Ashwagandha, Onion, Karu umathai root and vasambu rhizome                                                                                                                                                       | Administered orally for three days                                                                                                    |
| <b>III</b> | <b>Diarrhoea / Enteritis / Calf scour</b>                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                         |                                                                                                                                       |
| 1          | Ginger ( <i>Zingiber officinale</i> ), Vasambu ( <i>Acorus calamus</i> ) and Guava leaves ( <i>Psidium guajava</i> )                                                                                                                                                                                  | About 50 g of Ginger plus two numbers of Vasambu and 200 g of Guava leaves were ground and made into a bolus                                                                                                                            | Administered orally to the animals twice daily for three days                                                                         |
| 2          | Guava ( <i>Psidium guajava</i> ) leaves                                                                                                                                                                                                                                                               | A handful (50 g) of Guava leaves                                                                                                                                                                                                        | Administered to the animals in early morning hours for three consecutive days                                                         |
| 3          | Moringa ( <i>Moringa oleifera</i> ) leaves, Cumin ( <i>Cuminum cyminum</i> ) seeds and fermented rice porridge.                                                                                                                                                                                       | About 500 g of Moringa leaves and 100 g of Cumin seeds were pounded and mixed with one litre of fermented rice porridge.                                                                                                                | Drenched once the symptoms were noticed in the morning                                                                                |
| 4          | Tamarind ( <i>Tamarindus indica</i> )                                                                                                                                                                                                                                                                 | About 100 gms of tamarind without seed is made into bolus                                                                                                                                                                               | Administered to the animal as soon as the symptoms appeared                                                                           |
| 5          | Avarai ( <i>Cassia auriculata</i> )                                                                                                                                                                                                                                                                   | Tender shoot tips of Avarai were ground with butter milk and jaggery                                                                                                                                                                    | Administered orally to the animals twice daily for three days.                                                                        |
| 6          | Pungamaram ( <i>Pongamia pinnata</i> )                                                                                                                                                                                                                                                                | Stem bark of pungamaram made in to decoction                                                                                                                                                                                            | Decoction of stem bark given orally twice daily for three days                                                                        |

|           |                                                                                                                                                                                                                                                                   |                                                                                                                                            |                                                                                                        |
|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 7         | Thuththi ( <i>Abutilon indicum</i> )                                                                                                                                                                                                                              | About 100 g of leaves ground and mixed with 500 ml butter milk                                                                             | Extract administered orally twice daily for three days                                                 |
| 8         | Navalmaram ( <i>Syzygium cumini</i> )                                                                                                                                                                                                                             | About 100 g of Stem bark finely ground and mixed with curd to made into paste                                                              | Administred orally once daily for three days                                                           |
| 9         | Bamboo ( <i>Bambusa arundinacea</i> )                                                                                                                                                                                                                             | About 100 g of Bamboo Leaves                                                                                                               | Fed orally twice daily until symptoms reduced                                                          |
| 10        | Vilvam leaves ( <i>Aegle marmelous</i> ), Onion( <i>Allium cepa</i> ) and Cumin ( <i>Cuminum cyminum</i> )                                                                                                                                                        | About 50 g of Vilvam leaves, 100 g of Onion and 25 g of Cumin seeds were ground well and made into paste                                   | Administered orally once for two days                                                                  |
| 11        | Karu oomathai ( <i>Datura metal</i> )                                                                                                                                                                                                                             | Seven to ten leaves of Karu oomathai mixed with grass                                                                                      | Fed to cattle once a day in the morning                                                                |
| 12        | Kumatti ( <i>Citrullus colocynthis</i> ), Neem ( <i>Azadirachta indica</i> ) oil and Amanakku ( <i>Ricinus communis</i> ) oil                                                                                                                                     | About 25 ml fruit extract of Kumatti mixed with neem oil and Amanakku oil in the ratio of 1:3:4                                            | Administered orally once a day                                                                         |
| 13        | Avaram ( <i>Cassia auriculata</i> ) leaves                                                                                                                                                                                                                        | Avaram leaves ground with water                                                                                                            | Administered orally twice daily for three days                                                         |
| 14        | Leaves of Sangupoo ( <i>Clitoria ternatea</i> ), Jaggery and butter milk                                                                                                                                                                                          | About 100 g of sangupoo leaf paste mixed with 25 g jaggery and 500 ml butter milk                                                          | Administered orally once a day for three days.                                                         |
| <b>IV</b> | <b>Impaction and Constipation</b>                                                                                                                                                                                                                                 |                                                                                                                                            |                                                                                                        |
| 1         | Castor oil                                                                                                                                                                                                                                                        | About 200 ml of Castor oil                                                                                                                 | Drenched orally at the onset of symptom                                                                |
| 2         | Kuppaimeni ( <i>Acalypha indica</i> ) leaves and Sothukathalai ( <i>Aloe vera</i> )                                                                                                                                                                               | Two handful (50 g) of Kuppaimeni leaves and a leaf sheath of Sothukathalai were finely ground                                              | The ground mixture was administered as a bolus twice daily until the symptom abated                    |
| 3         | Sothukathalai ( <i>Aloe vera</i> ), Gingelly leaves ( <i>Sesamum indicum</i> ) and tender coconut water                                                                                                                                                           | About 200 gms of Sothu Katthalai, 20 gm gingelly leaves and 200 ml of tender coconut water were mixed well                                 | The ground mixture was administered as a drench twice daily until the symptoms reduced                 |
| 4         | Roots of Ginger ( <i>Zingiber officinale</i> )                                                                                                                                                                                                                    | Roots of crushed Ginger rhizome ground with wheat flour                                                                                    | The ground mixture was administered as a bolus twice daily for three days                              |
| 5         | Vaagai ( <i>Albizia lebbek</i> ) root, Kumatti ( <i>Citrullus colocynthis</i> ) fruit, Betal leaves ( <i>Piper betel</i> ) and Pepper seeds ( <i>Piper nigrum</i> )                                                                                               | Equal amount of Vaagai root, sliced fruit of Kumatti, leaves of betal leaves and spoonful of pepper was ground into paste                  | The pastewas applied on toungue and upper palate once daily.                                           |
| 6         | Thumbai ( <i>Leucas aspera</i> ), Thulasi ( <i>Ocimumsanctum</i> ) and Musu musukkai ( <i>Melothriama deraspatana</i> ) leaves                                                                                                                                    | Equal parts of (approximately 50 g) Thumbai, Thulasi and Musu musukkai leaves were ground well                                             | The ground mixture was administered orally for two days                                                |
| 7         | Kolingji ( <i>Tephrosia purpurea</i> ), Chillies and Red gram                                                                                                                                                                                                     | About 50 g of Kolingji leaves and red gram along with 5 green chillies were ground and made as paste                                       | The ground paste was administered orally as a bolus and smeared on the palate at the onset of symptoms |
| <b>V</b>  | <b>Indigestion</b>                                                                                                                                                                                                                                                |                                                                                                                                            |                                                                                                        |
| 1         | Bamboo leaves ( <i>Bambusa arundinacea</i> )                                                                                                                                                                                                                      | Leaf extract of about 500 ml was prepared                                                                                                  | Bamboo leaves extract was feed orally in the morning hours for five days                               |
| 2         | Kizhanelli ( <i>Phyllanthus amarus</i> ), Thulasi ( <i>Ocimum sanctum</i> ), Thumbai ( <i>Leucas aspera</i> ) Pepper ( <i>Piper nigrum</i> ) and Butter milk                                                                                                      | Whole plant of Kizhanelli (100 g) ground with leaves of thulasi (50 g), thumbai (50 g) and pepper seeds (25 g) and made into paste         | The prepared paste was diluted with 500 ml of butter milk and fed orally once daily for three days     |
| 3         | Coconut( <i>Cocos nucifera</i> ) oil                                                                                                                                                                                                                              | About 100 ml coconut oil                                                                                                                   | Given orally once a day in the morning hours                                                           |
| 4         | Sothukathalai ( <i>Aloe vera</i> ) leaves                                                                                                                                                                                                                         | Two to three succulent leaves of Sothukathalai                                                                                             | Given orally once a day in the morning hours                                                           |
| 5         | Pirandai ( <i>Cissus quadrangularis</i> ), Thumbai ( <i>Leucas aspera</i> ), Kozhunji ( <i>Tephrosia purpurea</i> ), Neem ( <i>Azadirachta indica</i> ), Onion ( <i>Allium cepa</i> ), Seeragam ( <i>Cuminum cyminum</i> ), and Turmeric ( <i>Curcuma longa</i> ) | Equal amount (50 g) of Pirandai stem, leaves of thumbai, kozhunji, neem, onion bulb, seeragam and turmeric ground well and made into paste | Administered orally to the cattle once or twice a day for three days                                   |
| <b>B</b>  | <b>Respiratory Disorders</b>                                                                                                                                                                                                                                      |                                                                                                                                            |                                                                                                        |
| <b>I</b>  | <b>Pneumonia</b>                                                                                                                                                                                                                                                  |                                                                                                                                            |                                                                                                        |
| 1         | Benzoin resin (Sambrani powder)                                                                                                                                                                                                                                   | About 50 g of Benzoin resin powder was sprinkled on red hot charcoal                                                                       | The animal was made to breath through the smoke of Benzoin resin during evening time for a week time   |
| 2         | Ginger( <i>Zingiber officinale</i> ) and Pepper ( <i>Piper nigrum</i> )                                                                                                                                                                                           | About 100 gms of ginger and 10 pods of pepper were ground to prepare a mixture.                                                            | The mixture was administered orally twice daily for three days.                                        |
| 3         | Pepper ( <i>Piper nigrum</i> ) and cow's milk                                                                                                                                                                                                                     | About 20 g of pepper was ground and mixed in 100 ml of cow's milk.                                                                         | This mixture was administred orally .once daily for 15 days                                            |
| 4         | Bamboo leaves ( <i>Bambusa arundinacea</i> )                                                                                                                                                                                                                      | 100 g of bamboo leaves has to ground well and made into small balls                                                                        | These balls has to feed to animals orally daily for two weeks                                          |
| 5         | Citron fruits ( <i>Narhangai</i> ) ( <i>Citrus medica</i> )                                                                                                                                                                                                       | Four citron fruits has to cut into four pieces                                                                                             | The whole cut fruit (16 pieces) has to administer orally daily for three                               |

|            |                                                                                                                                                                                                                         |                                                                                                                                                                                  |                                                                                                                                                         |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
|            |                                                                                                                                                                                                                         |                                                                                                                                                                                  | days.                                                                                                                                                   |
| 6          | Cow Ghee, Pepper ( <i>Piper nigrum</i> ), Ginger ( <i>Zingiber officinale</i> ) and Garlic ( <i>Allium sativum</i> )                                                                                                    | A paste has to made from ghee (2 teaspoon), pepper (15 pods), ginger (100 g) and 10 g of garlic has to ground well to made into paste                                            | The prepared paste was divided into two parts. One part was feed to the animal and the other part was applied topically over the animals head and neck. |
| 7          | Kovai ( <i>Coccinia grandis</i> )                                                                                                                                                                                       | About 100 g of leaves of Kovai was ground well with ghee and prepared as an extract                                                                                              | The prepared extract has to instilled into nostrils in the morning hours for three days                                                                 |
| <b>II</b>  | <b>Bronchitis</b>                                                                                                                                                                                                       |                                                                                                                                                                                  |                                                                                                                                                         |
| 1          | Erukku ( <i>Calotropis bracteole</i> ) Pepper ( <i>Piper nigrum</i> ) seeds, Ginger ( <i>Zingiber officinale</i> ), Valmilagu ( <i>Piper cubeba</i> ) seeds and Garlic ( <i>Allium sativum</i> )                        | Paste was prepared by grinding 50 g of each erukku flower, bud and root bark with milagu, dried rhizome of ginger, valmilagu and garlic.                                         | Paste diluted with water and fed orally                                                                                                                 |
| 2          | Ginger ( <i>Zingiber officinale</i> ), Garlic ( <i>Allium sativum</i> ), Perungayam ( <i>Ferula asafetida</i> ), Onion ( <i>Allium cepa</i> ) and Palmyra palm ( <i>Borassus flabellifer</i> )                          | Equal part of ginger, garlic, perungayam, onion and palm sugar were ground well and made into boluses.                                                                           | These bolouses were fed twice a week orally.                                                                                                            |
| 3          | Notchi ( <i>Vitex negundo</i> ), Thumbai ( <i>Leucas aspera</i> ) leaves and Onion ( <i>Allium cepa</i> ) bulb                                                                                                          | Paste prepared by grinding each 100 g of notchi leaves with thumbai leaves and 50 g of onion bulb                                                                                | The paste was applied on the nose of the cattle to cure bronchitis                                                                                      |
| <b>III</b> | <b>Lung emphysema</b>                                                                                                                                                                                                   |                                                                                                                                                                                  |                                                                                                                                                         |
| 1          | Mudakkathan ( <i>Cardiospermum halicacabum</i> ), Kozhunji ( <i>Tephrosia purpurea</i> ), Seenthil ( <i>Tinospora cordifolia</i> ), Veliparuthi ( <i>Daemia extensa</i> ) and Sirugurunjan ( <i>Gymnema sylvestre</i> ) | About 50 g of leaves of Mudakkathan, Kozhunji, Seenthil, Veliparuthi and Sirugurunjan were ground well and made into paste.                                                      | The prepared paste was fed orally once daily for three days                                                                                             |
| 2          | Korai kizhangu ( <i>Cyperus rotundus</i> ), Vasambu ( <i>Acorus calamus</i> ), Tobacco ( <i>Nicotiana tabacum</i> ), Val milagu ( <i>Piper cubeba</i> ) seeds and Cow milk                                              | About 50 g of rhizome of Korai kizhangu was ground well with 50 g of vasambu, 25 g of tobacco and 25 g of valmulaku seeds to make into paste and mixed with 100 ml of cow's milk | The preparation was administered orally in the morning hours for a week time                                                                            |
| <b>C</b>   | <b>Reproductive Disorders</b>                                                                                                                                                                                           |                                                                                                                                                                                  |                                                                                                                                                         |
| <b>I</b>   | <b>Retention of Placenta</b>                                                                                                                                                                                            |                                                                                                                                                                                  |                                                                                                                                                         |
| 1          | Sesame leaves                                                                                                                                                                                                           | About 250 g of Sesame leaves were pounded well and mixed with 1 litre of water                                                                                                   | This was drenched after eight hrs of calving if placenta was not shed                                                                                   |
| 2          | Paddy ( <i>Oryza sativum</i> ) and jaggery                                                                                                                                                                              | A handful of paddy seeds (50 g) mixed with 50 g of Jaggery                                                                                                                       | This was administered orally after eight hrs of calving if placenta had not shed                                                                        |
| 3          | Bamboo leaves ( <i>Bambusa vulgaris</i> )                                                                                                                                                                               | About 200 g of bamboo leaves                                                                                                                                                     | This was administered orally after six hours of calving, if placenta was not shed                                                                       |
| 4          | Vendai kai - Lady's finger ( <i>Hibiscus esculantus</i> )                                                                                                                                                               | About one kg of Vendai kai- Lady's finger sprinkled with salt                                                                                                                    | This was administered after six hours of calving, if placenta was not shed                                                                              |
| 5          | Anai nerunji - Large Caltrops ( <i>Pedaliu murex</i> )                                                                                                                                                                  | About 100 g of Anai nerunji leaves was ground well and mixed with 500 ml of luke warm water.                                                                                     | This was drenched orally after six hours of calving, if placenta was not shed                                                                           |
| 6          | Horse gram ( <i>Vigna unguiculate</i> ) and Palm sugar                                                                                                                                                                  | About 500 g of horse gram was boiled, strained and mixed with 100 g of palm sugar                                                                                                | Administered after eight hours of calving, if placenta was not shed                                                                                     |
| 7          | Nerungi ( <i>Tribulus terrestris</i> ) and Mango                                                                                                                                                                        | About 100 g of whole plant of Nerungi was crushed and boiled along with mango leaves in one litre of water                                                                       | Drenched orally after six hrs of calving, if placenta was not shed                                                                                      |
| 8          | Ellu ( <i>Sesamum indicum</i> ), Palmyra palm ( <i>Borassus flabellifer</i> ) and sugar                                                                                                                                 | Paste prepared from whole plants of ellu (100 g) and palm sugar                                                                                                                  | Administered orally after six hrs of calving, if placenta was not shed                                                                                  |
| 9          | Onion ( <i>Allium cepa</i> ) and Sandal powder                                                                                                                                                                          | About 50 g of sandal powder and 50 g of onion was ground well and mixed with 250 ml of milk                                                                                      | Drenched orally after six hours of calving, if placenta was not shed                                                                                    |
| <b>II</b>  | <b>Anoestrus</b>                                                                                                                                                                                                        |                                                                                                                                                                                  |                                                                                                                                                         |
| 1          | Curry Leaves ( <i>Murraya Koenigii</i> )                                                                                                                                                                                | About 100 g of curry leaves was taken                                                                                                                                            | Fed curry leaves for 10 days after insemination.                                                                                                        |
| 2          | Ashwagandha - Winter Cherry - ( <i>Withania Somnifera</i> ), Gingelly seeds, Eggs and Bananas ( <i>Musa Paradisica</i> )                                                                                                | About 150 g of Ashwagandha, 150 g of Gingelly seeds was ground well and mixed with two numbers of eggs and two fruits of Bananas                                                 | The preparation was administered orally in the morning hours for a week period.                                                                         |
| 3          | Coconut ( <i>Cocos nucifera</i> ) and Turmeric ( <i>Curcuma longa</i> )                                                                                                                                                 | About 250 g of coconut and 50 g of rhizome of turmeric was ground well                                                                                                           | This was administered orally once for 10 days.                                                                                                          |
| 4          | Banana ( <i>Musa Paradisica</i> ) and Sugar                                                                                                                                                                             | Twelve pieces of Banana mixed with 400 g of sugar                                                                                                                                | This was administered orally once for five days.                                                                                                        |
| 5          | Ashoka tree ( <i>Saraca asoca</i> )                                                                                                                                                                                     | About 100 g of barks of Ashoka tree was taken                                                                                                                                    | This was feed to cattle in the morning hours for a week                                                                                                 |

| III | Repeat breeding and Infertility                                                                  |                                                                                                                                                       |                                                                               |
|-----|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| 1   | Neem ( <i>Azadirachta indica</i> ) oil, Turmeric ( <i>Curcuma longa</i> ) powder and Egg albumin | About 200 ml of Neem seed oil was mixed with 50 g of turmeric and four egg albumin                                                                    | Administered orally in the morning hours for three days                       |
| 2   | Aduthinnapalai ( <i>Aristolochia bracteolata</i> ) and Salt                                      | About 100 g of leaves of aduthinnapalai and spoonful of salt mixed                                                                                    | Administered orally in the morning hours once a week                          |
| 3   | Kondakkadalai ( <i>Cicer arietinum</i> ) and Thulasi ( <i>Ocimum sanctum</i> ) and egg yolk      | About 250 g of sprouted kondakkadalai was crushed with 50 g of thulasi leaves and mixed with two egg yolks                                            | This was administered orally once for 10 days.                                |
| 4   | Sukkunaripul ( <i>Cymbapogan citratus</i> ), Chinnavengayam – small onion ( <i>Allium cepa</i> ) | About 100 g of Sukkunaripul leaves and 100 g of bulb of chinnavengayam was pounded well and made into paste                                           | Administered orally in the morning hours for three days or a week.            |
| IV  | Uterine infections (Metritis / Endometritis etc)                                                 |                                                                                                                                                       |                                                                               |
| 1   | Sanghu pushpam - Morning glory ( <i>Convolvulus microphyllus</i> )                               | About 100 g powder of root or bark of the Sanghu pushpam ( <i>Convolvulus microphyllus</i> ) was mixed with 300 ml of water and boiled for 10 minutes | This concoction was filtered and fed to the animals once a day for three days |
| 2   | Seeragam ( <i>Cuminum cyminum</i> ) and Mullangi – Radish ( <i>Raphanus sativus</i> )            | About 10 g of Seeragam ( <i>Cuminum cyminum</i> ) was crushed well with one piece of mullangi – Radish (150-200 g)                                    | This pastes was smeared on the tongue of the animal daily once for five days. |
| 3   | Nari ilanthai ( <i>Zyzyphus rummularia</i> )                                                     | About 100 ml of root extract of Nari ilanthai was taken                                                                                               | Administered orally in the morning hours for three days.                      |

**Table 2:** Categories of ailments and Informant consensus factor (F<sub>IC</sub>) for each disease category

| S. No. | Ailment category                                 | Nur (number of use-reports) | Nt (total number of remedies or number of taxa) | FIC (Informants' consensus factor) | Mean FIC (Informants' consensus factor) |
|--------|--------------------------------------------------|-----------------------------|-------------------------------------------------|------------------------------------|-----------------------------------------|
| A      | Digestive disorders                              |                             |                                                 |                                    |                                         |
| I      | Anorexia                                         | 188                         | 6                                               | 0.97                               | 0.96<br>(I)                             |
| II     | Bloat                                            | 175                         | 10                                              | 0.95                               |                                         |
| III    | Diarrhea / Enteritis / Calf scour                | 175                         | 14                                              | 0.93                               |                                         |
| IV     | Impaction and Constipation                       | 175                         | 7                                               | 0.97                               |                                         |
| V      | Indigestion                                      | 165                         | 5                                               | 0.98                               |                                         |
| B      | Respiratory disorders                            |                             |                                                 |                                    |                                         |
| I      | Pneumonia                                        | 25                          | 7                                               | 0.75                               | 0.86<br>(VII)                           |
| II     | Bronchitis                                       | 35                          | 3                                               | 0.94                               |                                         |
| III    | Lung emphysema                                   | 10                          | 2                                               | 0.89                               |                                         |
| C      | Reproductive disorders                           |                             |                                                 |                                    |                                         |
| I      | Retained placenta                                | 145                         | 11                                              | 0.93                               | 0.95<br>(II)                            |
| II     | Anoestrus                                        | 75                          | 5                                               | 0.95                               |                                         |
| III    | Repeat breeding and Infertility                  | 85                          | 4                                               | 0.96                               |                                         |
| IV     | Uterine infections (Metritis / Endometritis etc) | 75                          | 3                                               | 0.97                               |                                         |

A perusal of Table 2 shows that there was varying range of consensus among the respondent regarding the plant species used for treating a particular disease condition in the study area. The mean F<sub>IC</sub> value for different ethno-veterinary medicines used for treating various illnesses had ranged from 0.96 to 0.86 with an average value of 0.92 which point out that there exist a high level of consensus among the respondents regarding different phyto – therapeutic uses of local medicinal plants. Similar results were reported by Ragupathy *et al.*, (2008) [7] with the F<sub>IC</sub> > 0.71.

Among the three categories of ailment studied, it was found that the farmers had followed many ethno-veterinary practices using several locally available plants and herbs to take care of digestive disorders of their Kangayam cattle with a mean F<sub>IC</sub> of 0.96 followed by reproductive disorders (mean F<sub>IC</sub> = 0.95) and respiratory disorders (mean F<sub>IC</sub> = 0.86). The high level of consensus among the respondents in using various plants and herbs to cure the disease condition of their cattle showed wide spread traditional knowledge and practices in the community level. Meena *et al.*, (2019) [6] reported that Informant consensus (Fic) shows a high degree of consensus for gastrointestinal, respiratory, and reproductive (0.95 each) ailments, which were followed by parasitic infection and wound healing (0.90 each) for the

traditional veterinary practices associated with cattle healthcare in Marwar region of Rajasthan. Similarly, (Khandelwal 2017) [3] reported that majority of the plants in Banaskantha district, Gujarat are used to treat different types of gastrointestinal problems of the cattle like diarrhea, expulsion of worms, constipation, and so forth. It has been found that stomach infections are more common in lactating cows which might be due to poor quality of fodder and drinking water. Informant consensus results also showed the highest informant citation for gastrointestinal, respiratory, and gynaecological problems.

### Conclusion

Due to modernization, there is danger of loss of knowledge on traditional ethnoveterinary practices. Therefore, documentation of this knowledge is valuable for the farmers and their future generations to properly cure their domestic animals through scientific implementation. The traditional uses of medicinal plants in health care practices provide valid clues to new areas of research for the discovery of new drugs on novel biological compounds. Ultimately this results in improvement of socio-economic conditions of farmers and reduces the pressure on natural resources.

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