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Original Research Article

Ethnoveterinary Medicine in Si Somdet District, Roi Et Province, Northeastern Thailand: An Alternative Approach to Animal Healthcare

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ABSTRACT

Ethnoveterinary medicine encompasses traditional knowledge and practices local communities employ for animal healthcare. This study investigates ethnoveterinary medicine practices in Si Somdet District, Roi Et Province, Northeastern Thailand, where traditional healing methods remain essential in livestock management. Through interviews with local farmers and traditional healers, we documented a range of plant-based remedies, spiritual healing practices, and indigenous veterinary techniques used to treat common livestock ailments. Two quantitative indices were utilized for data analysis: Use Value (UV) and Informant Consensus Factor (F_{ic}). Thirty-two plant species, 32 genera from 23 families, were identified as part of local ethnoveterinary practices. The family Fabaceae was the most represented, and the study revealed an even reliance on both native and introduced species, highlighting a rich diversity of medicinal plant resources. Among the most significant species, based on UV, were *Curcuma longa* L. (0.33) *Zingiber montanum* (J. Koenig) Link ex A.Dietr. (0.30), and *Tinospora cordifolia* (Willd.) Hook.f. & Thomson (0.28), reflecting their importance in local veterinary care. The results underscore the effectiveness, accessibility, and sustainability of ethnoveterinary medicine as an alternative or complementary approach to modern veterinary medicine. Despite its potential, challenges such as knowledge erosion and the lack of scientific validation remain. This study emphasizes the need for further research to integrate ethnoveterinary medicine with conventional veterinary practices, ensuring the preservation and responsible application of traditional knowledge for sustainable animal healthcare.

Keywords: Ethnoveterinary Medicine, Herbal Medicine, Livestock Care, Roi Et Province, Thailand

Introduction

Ethnoveterinary medicine refers to the traditional knowledge, practices, and beliefs utilized by indigenous and local communities to manage animal health and treat diseases.[1] This field encompasses medicinal plants, spiritual healing, and locally developed treatment techniques, all passed down through generations.[2] In many rural areas worldwide, ethnoveterinary medicine remains a vital aspect of animal healthcare, particularly in regions with limited access to conventional veterinary services.[3] The reliance on these traditional healing practices for livestock care reflects cultural heritage and ecological adaptability.[4] Understanding such practices provides valuable insights into sustainable healthcare strategies, especially in developing regions where modern veterinary medicines may be scarce or economically unfeasible.[5] In Thailand, particularly in the northeastern region, rural communities depend on ethnoveterinary medicine to address livestock health issues.[6] This is particularly true in Si Somdet District, Roi Et Province, where livestock farming is crucial to the local economy. Farmers in this region raise cattle, buffalo, poultry, and pigs, relying heavily on indigenous knowledge for disease prevention and treatment.[7] While modern veterinary services are available, factors such as high costs, accessibility challenges, and trust in traditional methods contribute to the continued use of ethnoveterinary medicine.[8] The local environment provides a rich diversity of medicinal plants that have historically been used to treat various animal ailments, ranging from digestive disorders to dermatological conditions and respiratory diseases.[9] Systematically documenting these practices will facilitate the preservation of indigenous knowledge and offer insights into potential applications for promoting sustainable veterinary care.[10]

The significance of ethnoveterinary medicine extends beyond its immediate practical applications. It represents a form of indigenous knowledge that reflects the relationship between humans, animals, and the environment.[11] Many traditional remedies are derived from locally available plants, emphasizing the interconnectedness between biodiversity conservation and healthcare.[12] The use of medicinal plants in veterinary care aligns with global trends toward natural and holistic treatments, which are gaining recognition for their potential efficacy and sustainability.[13] However, scientific validation of these traditional practices is essential for fully understanding their pharmacological

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properties, safety, and effectiveness.[14] Integrating ethnoveterinary medicine with modern veterinary science could offer innovative approaches to livestock healthcare, particularly in regions where conventional treatments may be less accessible.[15]

Despite the continued use of ethnoveterinary medicine in Si Somdet District, challenges remain in preserving and integrating these practices into broader veterinary frameworks. Traditional knowledge of animal healthcare is often passed down orally, making it vulnerable to loss due to socio-economic changes, modernization, and the diminishing number of traditional healers.[16] Younger generations are increasingly turning to modern veterinary methods, gradually eroding indigenous wisdom.[17] Additionally, the commercialization of agriculture and the introduction of synthetic veterinary drugs have influenced livestock management practices, sometimes leading to a diminished reliance on traditional medicine.[18] Addressing these challenges requires systematic documentation, awareness-building, and collaboration between traditional practitioners, veterinarians, and researchers.

This study aims to document the ethnoveterinary practices used in Si Somdet District, focusing on the types of medicinal plants and traditional treatment methods employed by local farmers. Through field surveys and interviews with community members, we seek to identify common health issues among livestock and the corresponding indigenous remedies. The findings of this research could provide a foundation for future studies on the efficacy and potential integration of ethnoveterinary medicine into mainstream veterinary practice. Furthermore, this study highlights the importance of preserving traditional knowledge as a valuable cultural and scientific resource for sustainable animal healthcare solutions.[19]

Materials and Methods

Study area

Si Somdet District, located in Roi Et Province, comprises eight sub-districts and 82 villages (Figure 1). The terrain is predominantly undulating, with an elevation of approximately 170 meters above sea level. The district has no rivers flowing through it, and the soil is primarily sandy with moderate fertility.[20] Agriculture is the main occupation, with residents engaged in rice farming and livestock raising, including cows, buffaloes, and pigs, as secondary livelihoods. Additionally, households keep ducks, chickens, and aquatic animals for domestic consumption. Due to limited access to modern veterinary care, traditional medicine remains widely used for treating animal diseases. Many villagers cultivate medicinal herbs in their kitchen gardens and gather them from the forest, as the region retains a significant portion of its natural resources.

Data collection

Ethnoveterinary medicine data were collected in 2024 from 40 informants, specifically livestock farmers who used herbal plants to treat animal diseases. Informed consent was obtained from all participants before the interviews. During the interviews, details on common ailments in domesticated animals, plant-based ingredients used in traditional therapies, and local healing practices were recorded. For each cited plant taxon, data were gathered on the following aspects: local name(s), plant part used, preparation method, category and mode of use, ailments treated, animals treated (with local name(s)), and any related beliefs or rituals.

Field surveys were conducted monthly from January 2024 to December 2024 to collect specimens and document herbal species throughout Si Somdet District, Roi Et Province. These surveys focused on specimens collected from home gardens and community forests. All specimens were deposited at the Vascular Plant Herbarium, Mahasarakham University (VMSU), Thailand.

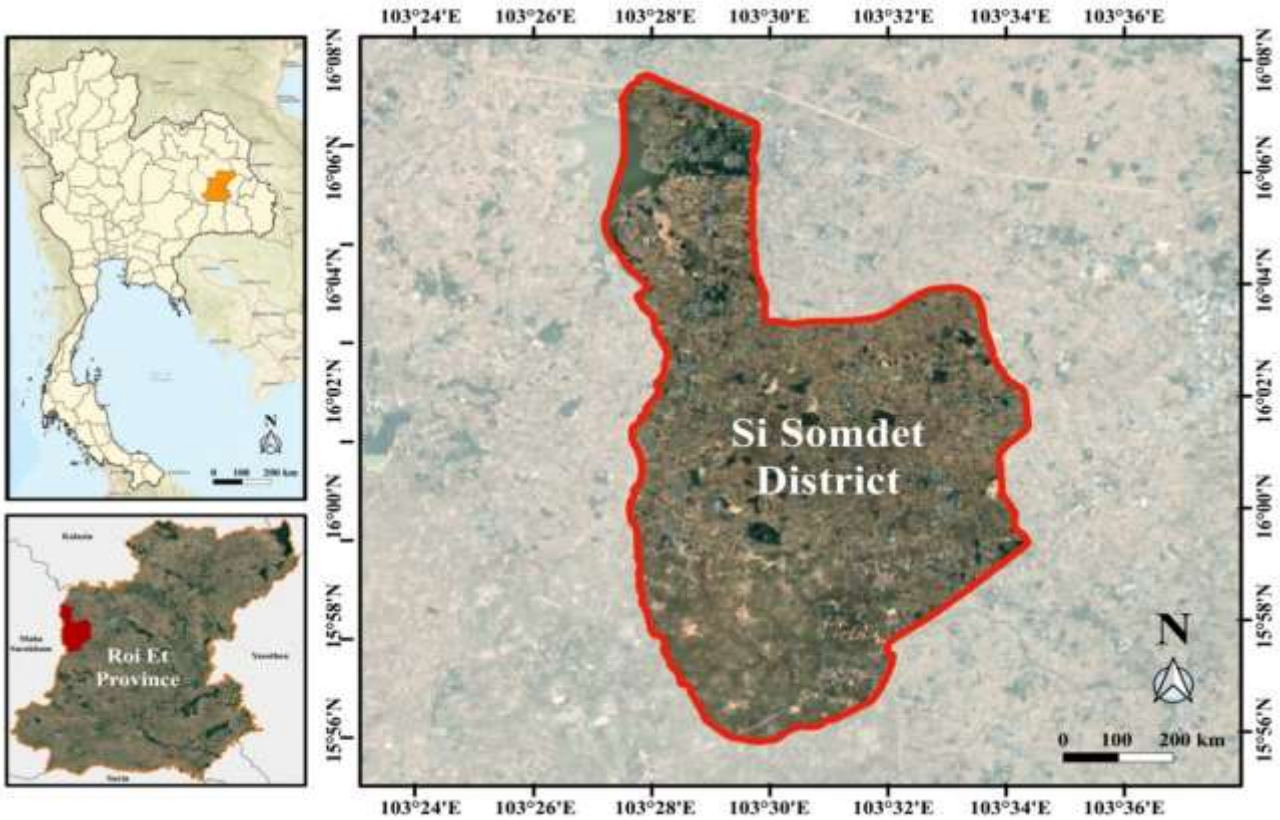

Figure 1: The study area is in Si Somdet District, Roi Et Province, Northeastern Thailand, Created using the Pixelmator Pro Program (Version 3.6.5 (Archipelago), 2023, Pixelmator Team, Vilnius, Lithuania) by Thawatphong Boonma.

Identification of plant species

The morphological characteristics of the celandine samples were examined under a stereoscopic microscope (Stemi 2000-C, Zeiss, Oberkochen, Germany). Measurements were made using a ruler and vernier caliper to ensure accurate documentation. Species identification was verified by comparing the specimens' descriptions and reference

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materials available through the Plant of the World Online (POWO).[21] A comprehensive review of key taxonomic literature and research databases (including Scopus, Web of Science, and Google Scholar) was conducted, as well as comparisons with digital images from Kew's Herbarium and Kew Science website.

Data analysis

Use value (UV)

The use value (UV) indicates the significance of a plant in a given area and is calculated using the following formula[22]:

$$UV = \frac{\sum_i UV_{is}}{n_s}$$

Where UV_{is} represents the number of use reports for each plant species, and n_s denotes the total number of informants.

Informant consensus factor (F_{ic})

The Informant Consensus Factor (F_{ic}) was determined using the formula proposed by Heinrich (1998)[23] to assess the variability in the use of medicinal plants.

$$F_{ic} = \frac{n_{ur} - n_t}{n_{ur} - 1}$$

Where n_{ur} represents the total number of use reports within a specific category, and n_t denotes the number of plant taxa used in that category. The F_{ic} value indicates the agreement among informants regarding medicinal plant usage, with higher values signifying stronger consensus on applying specific plant species for particular therapeutic purposes. The grouping of diseases is based on the group of drugs listed in the NLEM 2024.[24]

Results and Discussion

The study identified 32 plant species belonging to 32 genera from 23 plant families in ethnoveterinary practices in Si Somdet District, Roi Et Province (Table 1, Figure 2). The family Fabaceae was the most represented, with 6 species. Families like Acanthaceae, Arecaceae, Cucurbitaceae, and Zingiberaceae each contributed 2 species. Additionally, 17 other families, such as Amaryllidaceae, Annonaceae, Apiaceae, and Asteraceae, each had 1 species. This variety of plant species indicates a rich diversity of ethnoveterinary resources available in the area. The distribution of plant species used in ethnoveterinary practices was evenly split between native and introduced species, with 16 species from each category. This species distribution suggests a balanced reliance on locally occurring and non-native plants for medicinal purposes in the region.

The ethnoveterinary plants identified in this study showed varying use values (UV), reflecting their significance in local medicinal practices (Table 1). The highest UV was recorded for *Curcuma longa* (0.33), followed by *Zingiber montanum* (0.30) and *Tinospora cordifolia* (0.28). *Citrus* × *aurantium* and *Phyllanthus emblica* also had a UV of 0.28, indicating their importance. Several other species, such as *Andrographis paniculata*, *Tamarindus indica*, and *Xylia xylocarpa*, each had a UV of 0.25, marking them as significant in ethnoveterinary use. Conversely, plants like *Acanthus ebracteatus*, *Helianthus tuberosus*, and *Tetracera scandens* had lower UV values, reflecting a less frequent use in medicinal preparations. This variation in UV emphasizes the diverse reliance on different plant species for regional livestock healthcare.

The parts of plants used in ethnoveterinary practices were varied (Table 2, Figure 3), with fruits being the most utilized at 21.88%. Bark and leaves accounted for 18.75%, while the whole plant was used 12.50% of the time. Rhizomes stems, and tubers each made up 6.25%, and smaller proportions of the plants used included bulbs, peels, and roots, each contributing 3.13%. This distribution reflects the diverse plant parts employed in local medicinal practices for livestock care.

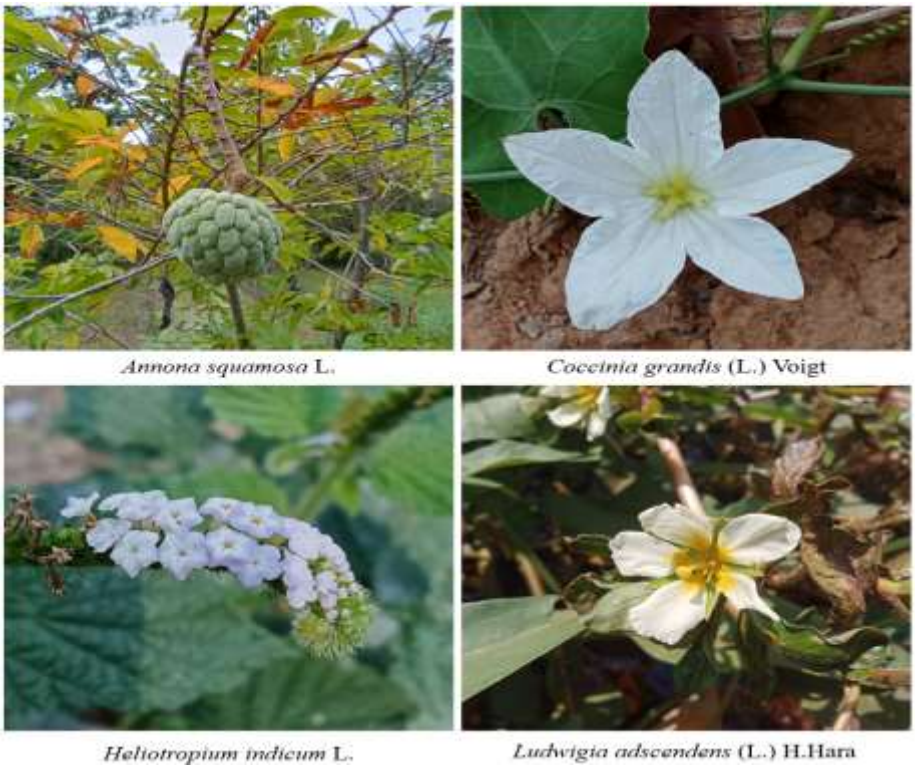

Figure 2: Illustrations of plant species utilized as ethnoveterinary medicines

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Table 1: Medicinal plants for livestock, along with their local names, distribution, use value (UV), and collector no.

No.	Family	Scientific name	Local name	Distribution	URs	UV	Collector no.
1.	Acanthaceae	*Andrographis paniculata* (Burm.f.) Wall. ex Nees	Fa Thalai Chon	Introduce	10	0.25	TJ301
2.	Acanthaceae	*Acanthus ebracteatus* Vahl	Ngueak Pla Mor	Native	2	0.05	TJ302
3.	Amaryllidaceae	*Allium sativum* L.	Krathiam	Introduce	9	0.23	TJ303
4.	Annonaceae	*Annona squamosa* L.	Noina	Introduce	7	0.18	TJ304
5.	Apiaceae	*Apium sellowianum* H.Wolff	Khuen Chai	Introduce	4	0.10	TJ305
6.	Arecaceae	*Areca catechu* L.	Mak	Introduce	3	0.08	TJ306
7.	Arecaceae	*Borassus flabellifer* L.	Tan	Introduce	4	0.10	TJ307
8.	Asteraceae	*Helianthus tuberosus* L.	Kaen Tawan	Introduce	2	0.05	TJ308
9.	Boraginaceae	*Heliotropium indicum* L.	Ya Nguangchang	Introduce	4	0.10	TJ309
10.	Bromeliaceae	*Ananas comosus* (L.) Merr.	Sapparod	Introduce	6	0.15	TJ310
11.	Capparaceae	*Crateva adansonii* DC.	Phak Kam	Native	5	0.13	TJ311
12.	Cleomaceae	*Cleome viscosa* L.	Phak Sian Phi	Native	4	0.10	TJ312
13.	Clusiaceae	*Garcinia mangostana* L.	Mangkhut	Introduce	7	0.18	TJ313
14.	Cucurbitaceae	*Citrullus lanatus* (Thunb.) Matsum. & Nakai	Taeng Mo	Introduce	8	0.20	TJ314
15.	Cucurbitaceae	*Coccinia grandis* (L.) Voigt	Tamlueng	Native	6	0.15	TJ315
16.	Dilleniaceae	*Tetracera scandens* (L.) Merr.	Rotsukhon	Native	3	0.08	TJ316
17.	Ebenaceae	*Diospyros martabanica* C.B.Clarke	Ma Kluea	Native	6	0.15	TJ317
18.	Fabaceae	*Derris elliptica* (Wall.) Benth.	Hang Lai	Native	4	0.10	TJ318
19.	Fabaceae	*Peltophorum pterocarpum* (DC.) Backer ex K.Heyne	Nonsi	Native	4	0.10	TJ319
20.	Fabaceae	*Pueraria candollei* Wall. ex Benth.	Kwao Khruea Khao	Native	5	0.13	TJ320
21.	Fabaceae	*Sesbania grandiflora* (L.) Poir.	Khae	Introduce	7	0.18	TJ321
22.	Fabaceae	*Tamarindus indica* L.	Makham	Introduce	10	0.25	TJ322
23.	Fabaceae	*Xylia xylocarpa* (Roxb.) W.Theob.	Daeng	Native	9	0.23	TJ323
24.	Lecythidaceae	*Careya arborea* Roxb.	Kra Don	Native	8	0.20	TJ324
25.	Menispermaceae	*Tinospora cordifolia* (Willd.) Hook.f. & Thomson	Boraphet	Native	11	0.28	TJ325
26.	Moraceae	*Streblus asper* Lour.	Khoi	Native	9	0.23	TJ326
27.	Myrtaceae	*Psidium guajava* L.	Farang	Introduce	8	0.20	TJ327
28.	Onagraceae	*Ludwigia adscendens* (L.) H.Hara	Phak Phangphuai	Native	6	0.15	TJ328
29.	Phyllanthaceae	*Phyllanthus emblica* L.	Makham Pom	Native	10	0.25	TJ329
30.	Rutaceae	*Citrus × aurantium* L.	Manao	Introduce	11	0.28	TJ330
31.	Zingiberaceae	*Curcuma longa* L.	Khamin Chan	Introduce	13	0.33	TJ331
32.	Zingiberaceae	*Zingiber montanum* (J.Koenig) Link ex A.Dietr.	Wanfai	Native	12	0.30	TJ332

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Table 2: Traditional medicinal applications of local plants in ethnoveterinary practices

No.	Family	Scientific name	Used parts	Ethnoveterinary practices	Application	Medicinal properties	Species affected
1.	Acanthaceae	*Andrographis paniculata* (Burm.f.) Wall. ex Nees	Whole plant	Serves as an ingredient in the animal feed	Medicine orally	Possesses anti-inflammatory, fever-reducing, antimicrobial, and antiviral properties. Additionally, it is effective in the treatment of colds, dysentery, diarrhea, and acute diarrhea	Pig
2.	Acanthaceae	*Acanthus ebracteatus* Vahl	Leaves	Mix with brown sugar, then allow the mixture to ferment for approximately 15 days, filter to obtain only the liquid, and mix it with the food.	Medicine orally	Enhances immune function, prevents viral infections, reduces inflammation, promotes wound healing, and supports the nourishment of the digestive system	Poultry
3.	Amaryllidaceae	*Allium sativum* L.	Bulb	Serves as an ingredient in the animal feed	Medicine orally	Enhances immune function, prevents viral infections, reduces inflammation, promotes wound healing, and supports the nourishment of the digestive system	Ruminants
4.	Annonaceae	*Annona squamosa* L.	Leaves	Pound finely, then extract only the liquid	Medicine orally	Anthelmintic	Ruminants
5.	Apiaceae	*Apium sellowianum* H.Wolff	Whole plant	Mix with brown sugar, then allow the mixture to ferment for approximately 15 days.	Medicine orally	Enhances appetite, promotes good health, supports healthy weight gain, and accelerates growth	Poultry
6.	Arecaceae	*Areca Catechu* L.	Fruits	Serves as an ingredient in the animal feed	Medicine orally	Anthelmintic	Poultry
7.	Arecaceae	*Borassus flabellifer* L.	Fruits	Extract the juice from the fruit and mix it with salt	Medicine orally	Aids in enhancing the digestive system	Ruminants
8.	Asteraceae	*Helianthus tuberosus* L.	Tuber	Serves as an ingredient in the animal feed	Medicine orally	Enhances immune function, prevents viral infections, reduces inflammation, and supports the nourishment of the digestive system	Ruminants
9.	Boraginaceae	*Heliotropium indicum* L.	Whole plant	Mix the whole plant with brown sugar and water. Boil the mixture and strain it to obtain only the liquid.	Medicine orally	Treatment of mastitis	Ruminants

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10.	Bromeliaceae	*Ananas comosus* (L.) Merr.	Stems	Pound the ingredients until finely crushed, then extract only the liquid.	Medicine orally	Aids in enhancing the digestive system	Ruminants
11.	Capparaceae	*Crateva adansonii* DC.	Bark	Soak the bark in a rice mixture, washing water and salt for one night.	Medicine orally	Aids in enhancing the digestive system	Ruminants
12.	Cleomaceae	*Cleome viscosa* L.	Whole plant	Use the whole plant, pound it with salt until finely crushed, then add water.	Medicine orally	Aids in enhancing the digestive system	Ruminants
13.	Clusiaceae	*Garcinia mangostana* L.	Peel	Dried peel, finely ground into powder form	Medicine orally	Enhances immune function, mitigates oxidative stress by neutralizing free radicals, reduces inflammation, and exhibits antiviral activity	Pig
14.	Cucurbitaceae	*Citrullus lanatus* (Thunb.) Matsum. & Nakai	Fruits	Create an opening in the watermelon and insert the sweet-fermented rice. Conceal the fruit within a heap of rice husks for 2–3 days.	Medicine orally	Provide the body with adequate nourishment to promote a healthy, well-rounded physique and enhance the quality of fur.	Ruminants
15.	Cucurbitaceae	*Coccinia grandis* (L.) Voigt	Leaves	Mix the leaves with white clay filler and pound them until finely crushed. Then, extract only the liquid.	Medicine orally	Aids in enhancing the digestive system	Ruminants
16.	Dilleniaceae	*Tetracera scandens* (L.) Merr.	Leaves	Apply a compress to the area of skin bitten by a snake and securely wrap it with a cloth.	Applied to skin	Antivenom	Pig, ruminants
17.	Ebenaceae	*Diospyros martabanica* C.B.Clarke	Fruits	Grind the fruit with salt and mix it with water	Medicine orally	Anthelmintic	Ruminants
18.	Fabaceae	*Derris elliptica* (Wall.) Benth.	Roots	Crush the roots and soak them in water for one day. Filter the mixture to obtain only the liquid. Use the liquid to spray the coop.	Spraying in the coop	Mite elimination	Poultry
19.	Fabaceae	*Peltophorum pterocarpum* (DC.) Backer ex K.Heyne	Bark	Boil the bark in water, allow it to cool, and pour the solution into the fishpond.	Apply the solution to the fishpond	Antimicrobial	Fish
20.	Fabaceae	*Pueraria candollei* Wall. ex Benth.	Tuber	Dried tuber, finely ground into powder form	Medicine orally	Stimulates improved growth, promotes normal estrus in female pigs, and facilitates breeding and offspring production.	Pig

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21.	Fabaceae	*Sesbania grandiflora* (L.) Poir.	Bark	Boil the bark in water, allow it to cool, and pour the solution into the fishpond.	Apply the solution to the fishpond	Antimicrobial	Amphibians, Fish
22.	Fabaceae	*Tamarindus indica* L.	Fruits	Crush the tamarind together with salt	Sweep and rub the tongue	Alleviates tongue stiffness, excessive drooling, and difficulty in consumption	Ruminants
23.	Fabaceae	*Xylia xylocarpa* (Roxb.) W.Theob.	Bark	Boil the bark with salt	Medicine orally	Aids in enhancing the digestive system	Ruminants
24.	Lecythidaceae	*Careya arborea* Roxb.	Bark	Soak the bark in water, then filter to extract only the liquid	Medicine orally	Treat diarrhea	Ruminants
25.	Menispermaceae	*Tinospora cordifolia* (Willd.) Hook.f. & Thomson	Stems	Mix stems of *Tinospora cordifolia*, *Andrographis paniculata*, and *Allium sativum* with brown sugar, then allow the mixture to ferment for approximately one month.	Medicine orally	Increases beneficial microorganisms, reduces pathogenic organisms, and stimulates immune function.	Pig, poultry
26.	Moraceae	*Streblus asper* Lour.	Bark	Crush the bark and soak it in salt for about three days	Medicine orally	Anthelmintic	Ruminants
27.	Myrtaceae	*Psidium guajava* L.	Leaves	Pound and mix with water	Medicine orally	Treat diarrhea	Pig, ruminants
28.	Onagraceae	*Ludwigia adscendens* (L.) H.Hara	Whole plant	Mix the leaves with salt and pound them until finely crushed. Then, extract only the liquid.	Medicine orally	Aids in enhancing the digestive system	Ruminants
29.	Phyllanthaceae	*Phyllanthus emblica* L.	Fruits	Pound and mix with salt	Medicine orally	Aids in enhancing the digestive system	Ruminants
30.	Rutaceae	*Citrus* × *aurantium* L.	Fruits	Utilize fruit juice mixed with salt	Sweep and rub the tongue and throat	Alleviate cough symptoms	Ruminants
31.	Zingiberaceae	*Curcuma longa* L.	Rhizome	Dried rhizome, finely ground into powder form, serves as an ingredient in the animal feed.	Medicine orally	Enhances immune function, prevents viral infections, reduces inflammation, promotes wound healing, and supports the nourishment of the digestive system	Amphibians, Poultry
32.	Zingiberaceae	*Zingiber montanum* (J.Koenig) Link ex A.Dietr.	Rhizome	Dried rhizome, finely ground into powder form, serves as an ingredient in the animal feed.	Medicine orally	Enhances immune function	Amphibians

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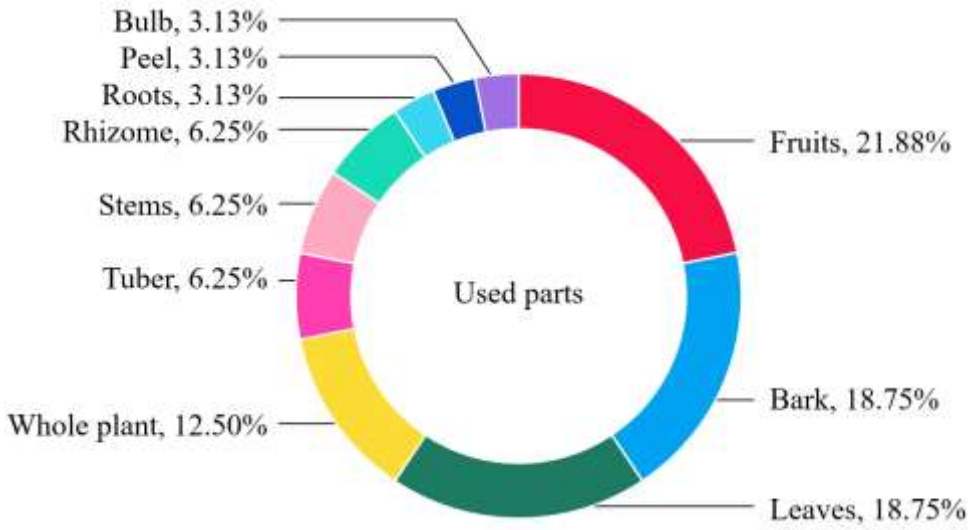

Figure 3: Illustration showing various plant parts used in remedy preparation

The preparation of medicinal plant remedies in Si Somdet District, Roi Et Province, involves various methods, each specifically suited to the plants' properties and uses (Table 2). One of the most common techniques is fermentation, where plant materials are mixed with brown sugar and left to ferment for 15 days or longer. This method is primarily used for *Acanthus ebracteatus* and *Apium sellowianum* plants. After fermentation, the liquid is filtered and mixed with animal feed, allowing livestock to benefit from the plant's medicinal properties. Other widely used preparation methods are pounding and liquid extraction. Plants like *Ananas comosus* and *Ludwigia adscendens* are finely crushed to extract their liquid. This liquid is then strained to remove solid particles, resulting in a concentrated solution that can be administered directly to animals or mixed with their food. This method is particularly effective for treating digestive or immune-related issues. Soaking is also a standard method, where plant parts such as the bark of *Crateva adansonii* and *Careya arborea* are immersed in water, sometimes with added salt, and left to soak overnight. After soaking, the mixture is filtered, and the resulting liquid is used orally or topically to address conditions such as digestive problems or inflammation. This method is perfect for extracting water-soluble medicinal compounds. Boiling is another preparation technique that involves heating plant materials like *Sesbania grandiflora* and *Xylia xylocarpa* in water. The plants are boiled until their medicinal compounds infuse into the liquid. Once cooled, the solution can be given orally or applied topically to treat various livestock ailments, such as skin conditions or digestive issues.

Plants like *Garcinia mangostana* and *Curcuma longa* are dried and ground into powder for some remedies. The powdered form is then mixed with animal feed or water and given to livestock. This method works well for plants with potent active ingredients that retain their effectiveness even in dried form. Lastly, topical applications are commonly used to treat external conditions such as wounds or skin infections. For instance, *Tetracera scandens* is often prepared as a compress and applied to areas of the skin affected by snakebites. These treatments are ideal for addressing specific conditions that require direct intervention on the animal's skin. Each preparation method reflects local farmers' deep knowledge and understanding of their area's medicinal plants, enabling them to treat livestock with sustainable, locally available resources effectively.

The ethnoveterinary medicinal plants identified in Si Somdet District, Roi Et Province, were classified based on their primary therapeutic uses, targeting various animal body systems (Table 2). The digestive system was the most treated, with eight plant species (*Ananas comosus*, *Borassus flabellifer*, *Cleome viscosa*, *Coccinia grandis*, *Crateva adansonii*, *Ludwigia adscendens*, *Phyllanthus emblica*, and *Xylia xylocarpa*) employed to enhance digestion and relieve gastrointestinal discomfort. Additionally, three species (*Andrographis paniculata*, *Careya arborea*, and *Psidium guajava*) were explicitly used to treat diarrhea, reflecting the importance of managing digestive health in livestock. Four plant species (*Annona squamosa*, *Areca catechu*, *Diospyros martabanica*, and *Streblus asper*) demonstrated anthelmintic properties, indicating their use in preventing and treating parasitic infections. Meanwhile, *Derris elliptica* was reported for mite elimination, addressing external parasitic infestations. Several plants were recognized for their immune-boosting and antimicrobial properties. *Peltophorum pterocarpum* and *Sesbania grandiflora* exhibited antimicrobial activity, while a significant number of plants (*Acanthus ebracteatus*, *Allium sativum*, *Curcuma longa*, *Garcinia mangostana*, *Helianthus tuberosus*, *Tinospora cordifolia*, and *Zingiber montanum*) were documented for enhancing immune function, preventing viral infections, reducing inflammation, and promoting wound healing. *Tinospora cordifolia* was notable for improving gut microbiota by increasing beneficial microorganisms and reducing pathogenic bacteria.

For respiratory ailments, *Citrus* × *aurantium* was used to alleviate cough symptoms, while *Tamarindus indica* was employed to address tongue stiffness, excessive drooling, and difficulty in consumption, conditions that could be linked to respiratory or oral health issues. The reproductive system was also an area of focus, with *Pueraria candollei* used to promote regular estrus cycles, facilitate breeding, and enhance reproductive success in female livestock. Additionally, *Heliotropium indicum* was documented for its role in the treatment of mastitis, an inflammatory condition affecting lactating animals. A few plants were utilized for anti-inflammatory and antivenom purposes. *Andrographis paniculata* possesses anti-inflammatory, fever-reducing, antimicrobial, and antiviral properties, making it valuable for treating colds, dysentery, and fever-related conditions. *Tetracera scandens* was uniquely noted for its antivenom properties, highlighting its importance in treating cases of envenomation in animals. Certain plants contributed to nutritional and growth support. *Citrullus lanatus* was used to promote good health, support weight gain, and enhance overall vitality in livestock, while *Apium sellowianum* stimulated appetite and contributed to growth. This classification underscores the diversity of ethnoveterinary knowledge in Si Somdet District, where medicinal plants are crucial in maintaining animal health and providing alternative treatments for common livestock ailments.

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Although the reported cases affect various animal species (Table 2), most were associated with ruminants, accounting for 54.05% (20 reports). Cases involving poultry and pigs were equally reported, each comprising 16.22% (6 reports). In contrast, fewer reports were linked to fish (5.41%, 2 reports) and amphibians (8.11%, 3 reports).

The Informant Consensus Factor (F_{ic}) values revealed varying levels of agreement among informants regarding using medicinal plants for different ailment categories (Table 3). The highest F_{ic} values (1.00) were observed for respiratory system diseases and poisoning/toxicology, indicating complete agreement among informants regarding using specific plant species for these conditions. The nutrition and blood category had a F_{ic} of 0.91, followed by the immune system (0.89) and reproductive and mammary systems (0.88), reflecting a high level of consensus. The gastrointestinal system and infection and parasites categories exhibited a F_{ic} of 0.86, suggesting that while multiple plant species were reported, informants still had strong agreement. These findings highlight the consistency of traditional knowledge in treating certain ailments and suggest a firm reliance on specific medicinal plants for managing livestock health in the study area.

Table 3: Informant Consensus Factor (ICF) values for different ailment categories treated with ethnoveterinary medicinal plants

Main ailments treated	Number of use report (N_{ur})	Number of species (N_t)	ICF
Gastrointestinal system	60	9	0.86
Immune system	56	7	0.89
Infection and parasites	66	10	0.86
Nutrition and blood	12	2	0.91
Poisoning and toxicology	3	1	1.00
Reproductive and mammary system	9	2	0.88
Respiratory system	11	1	1.00

The present study highlights the diverse range of medicinal plants used in ethnoveterinary practices in Si Somdet District, Roi Et Province. Identifying 32 plant species spanning 32 genera and 23 families underscores the rich botanical knowledge held by local livestock caretakers. The dominance of the Fabaceae family, with six species, is consistent with previous ethnobotanical studies that emphasize its medicinal importance due to its bioactive compounds (e.g., flavonoids and alkaloids) beneficial for livestock health.[25] The balanced distribution between native (16 species) and introduced (16 species) plants suggests a dynamic ethnoveterinary system that integrates traditional knowledge and external influences. This highlights the adaptability of local practices in utilizing available plant resources to maintain livestock health. The presence of introduced species, such as *Curcuma longa*, *Citrus* × *aurantium*, and *Tamarindus indica*, with high Use Values (UV), indicates their significant role in ethnoveterinary medicine, possibly due to their well-established pharmacological properties and widespread availability in the region. The variation in UV among the identified plants reflects their relative importance in local medicinal practices. *Curcuma longa* (0.33) was the most frequently cited, aligning with its well-documented anti-inflammatory and antimicrobial properties.[8] Similarly, *Zingiber montanum* (0.30) and *Tinospora cordifolia* (0.28) are widely recognized for their immunomodulatory and therapeutic benefits.[26] On the other hand, species with lower UV, such as *Acanthus ebracteatus* and *Helianthus tuberosus*, may be used less frequently or for more specific ailments, indicating areas where further research is needed to validate their efficacy.

The analysis of plant parts utilized in remedy preparations further supports the diversity of ethnoveterinary knowledge. Fruits (21.88%), bark (18.75%), and leaves (18.75%) were the most commonly used parts, suggesting their high bioactive compound concentrations and ease of harvesting.[27] The use of rhizomes, stems, and tubers in smaller proportions may be linked to the specific phytochemical properties required for treating certain livestock ailments.[28] The preparation of medicinal plant remedies in Si Somdet District involves various methods, each specifically suited to the plants' properties and uses. One of the most common techniques is fermentation, where plant materials are mixed with brown sugar and left to ferment for 15 days or longer. This method is primarily used for *Acanthus ebracteatus* and *Apium sellowianum* plants. After fermentation, the liquid is filtered and mixed with animal feed, allowing livestock to benefit from the plant's medicinal properties.[29] Another widely used preparation method is pounding and liquid extraction. Plants like *Ananas comosus* and *Ludwigia adscendens* are finely crushed to extract their liquid. This liquid is then strained to remove solid particles, resulting in a concentrated solution that can be administered directly to animals or mixed with their food. This method is particularly effective for treating digestive or immune-related issues.[30] Soaking is also a standard method, where plant parts such as the bark of *Crateva adansonii* and *Careya arborea* are immersed in water, sometimes with added salt, and left to soak overnight. After soaking, the mixture is filtered, and the resulting liquid is used orally or topically to address conditions such as digestive problems or inflammation.[31] This method is perfect for extracting water-soluble medicinal compounds. Boiling is another preparation technique that involves heating plant materials like *Sesbania grandiflora* and *Xylia xylocarpa* in water. The plants are boiled until their medicinal compounds infuse into the liquid. Once cooled, the solution can be given orally or applied topically to treat various livestock ailments, such as skin conditions or digestive issues.[32]

Plants like *Garcinia mangostana* and *Curcuma longa* are dried and ground into powder for some remedies. The powdered form is then mixed with animal feed or water and given to livestock. This method works well for plants with potent active ingredients that retain their effectiveness even in dried form.[33] Lastly, topical applications are commonly used to treat external conditions such as wounds or skin infections. For instance, *Tetracera scandens* is often prepared as a compress and applied to areas of the skin affected by snakebites. These treatments are ideal for addressing specific conditions that require direct intervention on the animal's skin.[34] The ethnoveterinary medicinal plants identified in Si Somdet District were classified based on their primary therapeutic uses, targeting various animal body systems. The digestive system was the most treated, with species such as *Ananas comosus*, *Borassus flabellifer*, and *Phyllanthus emblica* used to enhance digestion and relieve gastrointestinal discomfort. Several plants, including *Andrographis paniculata* and *Psidium guajava*, were specifically used to treat diarrhea, highlighting the importance of managing digestive health in livestock.[35] Four plant species (*Annona squamosa*, *Areca catechu*, *Diospyros martabanica*, and *Streblus asper*) demonstrated anthelmintic properties, indicating their role in preventing and treating parasitic infections.[36-38] Meanwhile, *Derris elliptica* was used for mite elimination, addressing external parasitic infestations. Several plants exhibited immune-boosting and antimicrobial properties,

with *Curcuma longa*, *Tinospora cordifolia*, and *Zingiber montanum* being particularly significant. *Citrus* × *aurantium* was used for respiratory ailments.[39] *Tamarindus indica* was employed for oral health issues.[40] The reproductive system was also a focus, with *Pueraria candollei* used to promote regular estrus cycles.[41] *Heliotropium indicum* is documented for treating mastitis. The Informant consensus factor (F_{ic}) values revealed varying levels of agreement among informants regarding the use of medicinal plants. The highest F_{ic} values (1.00) were observed for respiratory system diseases and poisoning/toxicology, indicating complete agreement among informants regarding using specific plant species for these conditions. The nutrition and blood category had a F_{ic} of 0.91, followed by the immune system (0.89) and reproductive and mammary systems (0.88), reflecting a high level of consensus. The gastrointestinal system and infection and parasites categories exhibited a F_{ic} of 0.86, suggesting a strong reliance on specific medicinal plants for managing livestock health.[42-48]

This study underscores the importance of ethnoveterinary medicine in livestock healthcare within the region. The reliance on native and introduced species demonstrates a rich and evolving knowledge system. Future research should focus on the pharmacological validation of these medicinal plants to ensure their efficacy and safety. Additionally, conservation efforts should be encouraged to protect native plant species and traditional knowledge from potential loss due to environmental and socio-economic changes.

Conclusion

The findings of this study highlight the rich ethnoveterinary knowledge present in Si Somdet District, Roi Et Province, showcasing the diverse range of medicinal plants utilized by local livestock caretakers. Identifying 32 plant species across 23 families, with a significant representation from the Fabaceae family, reflects the deep botanical understanding embedded in traditional livestock healthcare practices. The balanced presence of native and introduced species underscores the adaptability of local practitioners in integrating new plant resources while preserving indigenous knowledge. The identified plant species' varying Use Values (UV) emphasize their differing roles and perceived effectiveness in ethnoveterinary medicine. The high citation frequency of species such as *Curcuma longa*, *Zingiber montanum*, and *Tinospora cordifolia* aligns with their well-documented pharmacological properties. Lesser-used species indicate potential areas for further study. The diversity in plant parts utilized and the range of preparation methods further illustrate the depth of traditional veterinary practices and their reliance on practical, resource-efficient techniques. The therapeutic applications of these plants span multiple livestock health concerns, with a particular emphasis on gastrointestinal issues, infections, immune support, and parasitic management. The high Informant consensus factor (F_{ic}) values for specific health categories indicate a strong shared understanding among local practitioners regarding the efficacy of specific medicinal plants. This consensus underscores the reliability of these remedies within the community and highlights the importance of preserving and scientifically validating such knowledge. Overall, this study emphasizes the crucial role of ethnoveterinary medicine in maintaining livestock health in the region. The continued use of native and introduced plant species suggests a dynamic and evolving knowledge system that balances tradition with innovation. Future research should focus on these medicinal plants' pharmacological validation and safety assessments to ensure their efficacy and potential integration into broader veterinary practices. Additionally, conservation efforts must be prioritized to protect native plant species and safeguard the traditional knowledge that sustains ethnoveterinary medicine in Si Somdet District.

Conflict of interest

The author`s declare no conflicts of interest.

Authors' Declaration

The authors hereby declare that the work presented in this article is original and that any liability for claims relating to the content of this article will be borne by them.

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