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Livestock Systems: Exploring the Potential of Ethnoveterinary Medicine and Traditional Knowledge for Sustainable Development

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Abstract

The economical, social interactions and historical aspects of rural populations are supported by the conventional agriculture method of raising livestock. Cattle, like other livestock, are prone to a number of ailments that raise mortality and cause financial losses. The aim of basic research is to investigate the chemical evaluation and Ethnoveterinary information regarding plants used in India to cure bovine ailments. When compile information from 10 relevant studies, a number of scientific resources were carefully investigated. Ten various form of cow ailments were treated using 310 medicinal plants from 81 different families. The most often used plant groups were Leguminosae, Compositae, Asparagaceae, and Xanthorrhoeaceae. Although direct and topical application represented 26 and 22%, accordingly, to the method of delivery mode, which was primarily generic (52%) in nature, infusion and solution were widely utilized as getting ready procedures. Diseases throughout the entire body, reproduction concerns, and digestive problems were the most frequently managed ailments. Using pertinent bioassays for bovine diseases, These 310 organisms were recently studied for a range of physiological activity on about approximated 21 percent of them. The research' findings supported the necessity for Ethnoveterinary health care, particularly in rural regions, for treating cattle infections.

Key words: Cattle Farming, Ethnoveterinary, Food Security, Livestock, Antibacterial

1. Introduction

In terms of ensuring agricultural safety, reducing destitution, and fostering a variety of societal operations, specifically in agricultural areas, the animals rising is essential to growing counties' regional economics. Livestock are an important resource of protein and nutrition, necessary money, and nitrogen-rich excrement to supply restocking lands and other purposes (Bakare *et al.*, 2020). Everywhere that people interact closely without

livestock, including communities were raising livestock was their main source for income, Ethnoveterinary medicines has a necessity (Dzoyem *et al.*, 2020). According to some theories, a veterinarian medicine evolved somewhat concurrently through people medicines and primarily a result of observations of livestock self-medication (Chai, and Gichuhi, 2021). Based on the health care guidelines, *Myrothamnus flabellifolius* was utilized for treating manipulates like sadness and mental illness, asthma, infections, difficulty troubles irritation, epilepsy, heartburn, headaches, diabetes, kidney issues, hypertension, haemorrhoids, shingles, stroke, and the face criteria. Numerous secondary metabolites found in *Flabellifolius* are effective in a range of cell and animal types. Such metabolites may be helpful in livestock productivity for an improvement in development, nutrition and accessibility, inside organism habitat, operation, and wildlife disease because of their antibacterial and antioxidant properties. They are Necessary for the control and operation of cells (Chakale *et al.*, 2022). Indigenous knowledge is the organized information that has been gathered throughout time by local groups. It is mostly transmitted indirectly through customs, instructions, and the evolutionary dreams of ancestors. The medicinal care of many human and animal concerns between the local populations is based on indigenous plant knowledge, mostly for the benefit of those in need. Indigenous knowledge networks that frequently comprise cultural systems depend heavily on medical organisms as a reliable information source for the community (Chakale *et al.*, 2021). These Strategies both determined the basic curriculum that missionary and imperial rulers, including slavery, brought throughout the rejection of the continent's indigenous knowledge systems. The colonial rulers largely scorned indigenous knowledge systems, dismissing them as fetishist, archaic, religious, and devoid of objective truth. Following the submission to the national domination ideology promoted by imperial education, many people thought that occidental information was the only thing that humanity should attempt to acquire (Engdasew, 2022).

Ezeanya-Esiobu *et al.*, (2020) provide a protracted period of disrespect for indigenous knowledge's support to sustainable development and importance currently is a resurgence of interest in the role it plays for disadvantaged communities. Indigenous knowledge is receiving consideration because of its importance in areas such as learning, social reduction, environmental resources use and management, community resilience, and livelihoods. It is feasible to understand the acknowledgement and inclusion of indigenous knowledge in infrastructure design as a reaction to a specific society's struggle for the preservation of traditional uniqueness and their right to self-determination (J.C.N 2020). Ezeanya-Esiobu *et al.*, (2021) presents the ethno-veterinary studies and how much of it is Technical and Vocational Education and Training (TVET) curriculum across that nation mirroring this. Some traditional medical method utilized by local livestock farmers to heal their cattle is the competence that is being evaluated. The study determines an ignoring of Indigenous knowledge in the education by discussions with landowners, TVET students, and TVET professors, as well as an analysis of the present TVET veterinary education, despite having found which regional landowners used the ranges of Indigenous medicinal developments for healing their livestock. Hassen *et al.*, (2022) indigenous knowledge (IK) is being demonstrated to be equally significant as technology information in promoting financial progress and environmental improvement globally. Despite the widespread support and passion it is receiving, IK studies still appears to drop missing. Indigenous Knowledge (IK) has always been at a disadvantage and alone since the data it receives is unverified and unable to provide any technical solutions. Madisha and McGaw, (2023) outlines the claimed use of IK for tick control in goats and lists the findings of biologic activity testing carried out on these plants. The usage of Ethno-Veterinary Medicine (EVM) in IK and the research into

the possible effectiveness of the plants employed were both the subject of a literature review. Ticks are the main insects in prevent goat production. Acaroids are used too often, which leads to tick resistance development and negative environmental effects. Malapane *et al.*, (2022) present the contribution of IK must be valued in order to counteract these effects. Local Indigenous Knowledge (IK) influences choices on essential facets of existence. The incorporation of indigenous knowledge is rising in popularity as a way to improve cattle veterinarian treatment. Overall present research's objective was towards quantifying the utilization of local knowledge in managing livestock check problems. Males used IK (76.58%) more than females did, and there was a relationship between the two. Indigenous knowledge has several definitions, yet as of yet, no one term is agreed upon. Miara *et al.*, (2019) provide the many concepts aid in clarifying, elaborating, or even enhancing the earlier definitions rather than contradicting one another. According to the indigenous knowledge refers to the body of information amassed by locals via the collection of encounters, unusual research, and in-depth awareness of the surrounding environment in a particular cultural. Mkwanazi *et al.*, (2020) provides the economical development of the region is largely influenced by agriculture, particularly the breeding of cattle. The industry is hampered by a number of livestock diseases that hurt industries and imperil the protein supplied, most of which depend significantly on imports. The high cost of traditional therapy, the dearth of veterinarian facilities, and the remote location of certain rural agricultural communities make it difficult for farmers to provide medical attention for their sick animals. Local inhabitants' social, economical, and religious needs are served by this classical livestock-raising method of agriculture. Mkwanazi *et al.*, (2021) presented the similar to other animals; cattle are susceptible to a number of illnesses that result in fatalities and financial losses (Eiki *et al.*, 2022). The application of botanicals in the management of cattle ailments and the related knowledge is common in rural families, particularly where access to traditional veterinarians is limited. Nantapo *et al.*, (2022) provided Ethnoveterinary medication is frequently used to address cattle issues in many rural areas, particularly those whose utilization of standard veterinarians is limited; even despite it is still little-researched. An investigation of the tradition within the usage of certain plants to treat animal dermatological conditions and agricultural respiration was conducted in the River region's urban area. Seile *et al.*, (2022) present they are raising of livestock is a crucial aspect of economy. However, cattle illnesses remain a significant barrier, specifically in villages with minimal access to conventional veterinary treatment. In several agro-climatic zones, this research looked at medicinal plants and procedures used to cure cattle illnesses.

2. Materials and methods

Selection of Scientific Publications

The Ethnoveterinary investigations carried out until served as the foundation for the evaluation. Literature, notifications from internal and local corporate study paperwork and theses, interaction operations, and avoidance and separate organizations were used to gather traditional/indigenous knowledge regards their creatures used to respect livestock conditions. Research was looked up with particular searching terms in global web databases as Scientific Directly, Google Scholar and Scopus. The search terms are included during the process: Ethnoveterinary medicine, native wisdom, cattle health care, regional animals' agriculture, typical animals medical care, equine psychology, tree, Ethnomedicinal, folk medicine, natural products for animals' issues, and ethnobotanical objects with details on organisms that were definitely connected to animals' conditions. One option for finding study material is to read through the suggestions.

Selection Criteria

Information on applying was gathered, including methods to use circumstances, plan, organize, and manage them, classify cattle illnesses and ailments, and utilize plants medicinally. A research should include throughout offer specifics about particular EVM entities matched to such as utilization for treatment bovine ailments over the research's period in sequence to be included in the evaluation. Evaluation papers, these providing consisted just focused on current treatments, and those in which cattle were not the topic matter were all eliminated. Writings, interviews, guides, suggestions, including articles covering only people experiments had similarly excluded from the study. The technique of choosing the item involved four steps. First, based on the researches were evaluated for relevancy. Abstracts were compared against the inclusion criteria in the second phase of the evaluation process. In the third phase, the complete manuscript was looked for and evaluated by the authors before the authors decided whether to include it in the review if that publication's summary was initially examined, but it could never include enough details to allow for informed decision-making. Finally, individuals who satisfied the requirements over selection got recovered with further evaluation (Figure 1).

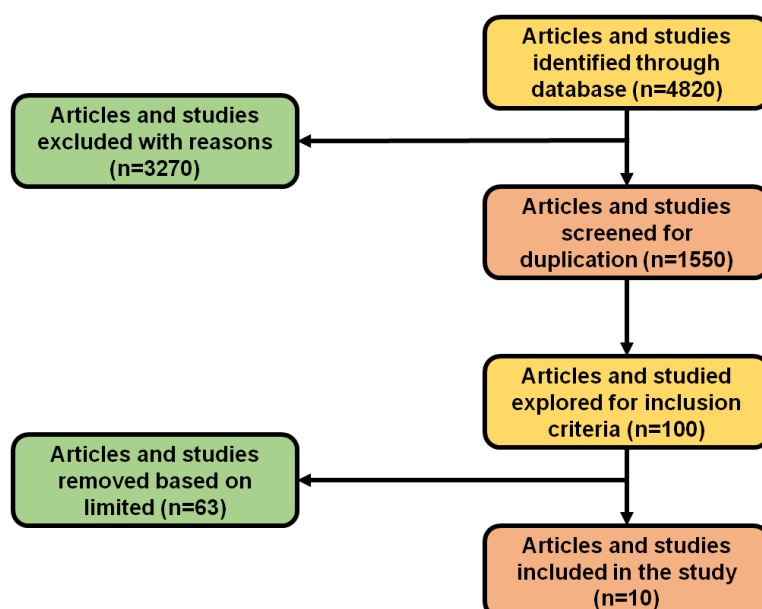


Figure 1: Study selection

3. Results and Discussion

Ethnoveterinary Medicine Studies

The majority of local village people on traditional medical procedures to maintain and they may improve that condition of their cattle by preventing and managing illnesses. Veterinary problems that influence cattle had an influence on culture and the economics. As an alternate to or a crucial component of conventional veterinary care in rural areas, Ethnoveterinary techniques contribute more to the wellbeing of livestock. Classical medical methods and the usage of medicine herbs are never simply for treating people illnesses; they may also be used to cure a variety of cattle maladies. Producers believed that natural techniques and species proved easy to use and work, affordable, and least certain to harm their livestock. The work of contains one of the earliest indications of the usage of the additional research has been done to expand the collection of treatments for ailments and disorders that affect animals (Table 1).

Table 1: Studies of Ethnoveterinary Medicine

Qualities of the participants	Number of families of plants	Quantity of plant varieties	Ailments and diseases	Methodological setup (methods, collection of information and assessment)
Farmers	9	9	8	structured questionnaires and sampling objectives
Members of the Community	6	6	1	Objective sampling in a cross-sectional poll using a semi-structured questionnaire
Herders, farmers, anthropologists, agricultural extension agents, and traditional healers	9	18	1	Semi-structured interviews, observations, field surveys, and the RRA technique
Farmers	5	7	1	Questionnaire
Community members, farmers, and traditional healers	13	24	17	Group interviews, semi-structured questionnaires, and snowball sampling
Neighborhood homes	8	6	2	Semi-structured questionnaires, field observations, analysis, and objective sampling
Farmers	7	7	6	Focus groups, interpretative phenomenological technique, a semi-structure guide
Herbalists and herbalists	4	9	Not specified	Random sampling, field walks, and structured questionnaires
Herders, farmers, veterinary technicians, and herbalists	7	11	7	Semi-structured interview and rapid rural assessment
Local officials, community leaders, and extension officers	8	9	3	Descriptive statistical analysis and a semi structured questionnaire.

Overview of Medicinal Plants and Families

The groups of the organisms, their scientific labels (using synonyms in parentheses), their

traditional names the plant parts used, the methods for processing and transmission, including the medical issues that they were supposed to cure can be recorded. In addition, the plants are organized geographically according to the ailments they heal. There were 310 plant species total, spanning 81 groups. Prevent a number of cattle illnesses. According to recent study, contains a wide variety of EVM creatures and related traditional practices. In the present research, it was determined which facilities were cited the most, accounting for 5.5% of the inventory, and how infrequently they were used to treat livestock. The unusually frequent references of these herbs are evidence of great effectiveness in preventing a variety of cow illnesses (**Figure 2 and Table 2**). The 14 major plant families that are utilized for cure the illnesses in cattle.

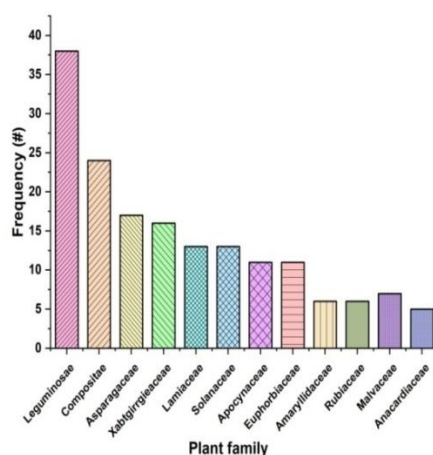


Figure 2: Families of plants used to heal ailments in cattle

Table 2: Families of plants used to heal ailments in cattle

Plant family	Frequency (#)
Leguminosae	38
Compositae	24
Asparagaceae	17
Xabtgirrgieaceae	16
Lamiaceae	13
Solanaceae	13
Apocynaceae	11
Euphorbiaceae	11
Amaryllidaceae	6
Rubiaceae	6
Malvaceae	7
Anacardiaceae	5

Treat Cattle Diseases

EVMs frequently exhibit the preference for leaves as one among the most desired plant parts. For a variety of factors, particularly their greater accessibility in comparison with different plant parts, causes continue to be preferred over other plant components. A total of 14 plant parts/components were used to the study of cow illnesses depicted in (**Figure 3**) and (**Table 3**). The most often utilized ingredient in EVM for treating bovine illnesses was leaves (30.7%). Additionally, certain significant botanical added substances believed to might have therapeutic effects are synthesized in foliage.

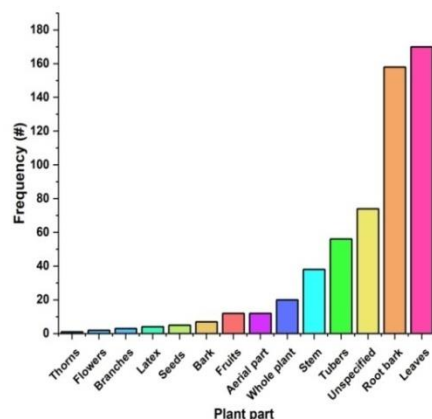


Figure 3: Parts of medicinal plants distributed

Table 3: Parts of medicinal plants distributed

Plant part	Frequency (#)
Thorns	1
Flowers	2
Branches	3
Latex	4
Seeds	5
Bark	7
Fruits	12
Aerial part	12
Whole plant	20
Stem	38
Tubers	56
Unspecified	74
Root bark	158
Leaves	170

Each tree is frequently not endangered by leaf harvesting for medical purposes from a conservation standpoint. Because they contain a large number of active chemicals, particularly terpenes, roots, which made up 27% of all plant tissues, became the next commonly utilized plant parts. The choice of the plant's subterranean components, such as the foundations, is not practical since it impacts plant life and is thought to be extremely harmful to the growth of the entire plants if not carried out in a responsible way. Successful collecting methods and conservation practices are essential to ensuring the permanent usage of medicinal plants.

Application of Multi-Plants

Although vaccinations were usually frequently used for managing livestock ailments in combinations of multiple botanicals were occasionally used instead. In certain cases, a mixture of six (6) herbs was recommended as a therapy option for curing cow fleas. Along the order to induce simultaneous or increasing effects in cattle, combinations are sometimes created using a single herb. According to a research, herb mixes are frequently used to reduce cow impotence. Additionally, conventional pharmacy frequently combines different plant components to create medications for a range of medical ailments.

Method of Preparing the Medicinal Plants

Different processing techniques are performed the while administering medicine materials to treating bovine ailments; these processing techniques might vary based on the area and culture. For the treatment of cattle illnesses, six (6) different preparation techniques were utilized presented in (Figure 4) and (Table 4). A common technique was injection, which involves adding freezing steaming, or heated liquid to the plant component and letting the combination cool. Decomposition was the next step, which entailed heating plant components with a predetermined level of water before letting the combination cool before use. In contrast to other nations, when breaking and hammering were the most often utilized preparation techniques for cattle illnesses, the present experience is different. The minimal frequency of conventional preparing techniques, including for poultice, crushing, to fermenting averaged between 4 to 7%. There are a number of pre-treatment strategies employed based on the disease while the disease having managed. Water was used in the bulk of the processes.

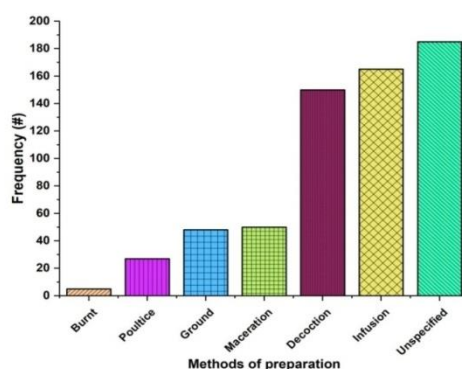


Figure 4: Diversity of medicinal Methods of preparing medicinal herbs

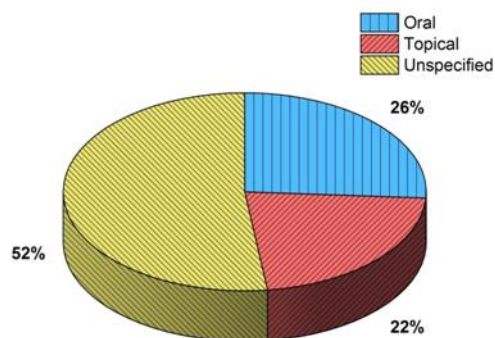
Table 4: Medicinal plants Preparation methods

Methods of preparation	Frequency (#)
Burnt	5
Poultice	27
Ground	48
Maceration	50
Decoction	150
Infusion	165
Unspecified	185

Utilizing Medicinal Plants

When treating cattle illnesses, regional populations give EVM herbs using a number of techniques (Figure 5). For EVM plants, oral ingestion was the primary method of delivery. A straightforward and non-invasive method of systemic therapy is oral delivery. The method makes it possible for the prepared medications to be quickly absorbed, distributed, and supplied with enough curative potency. In circumstances when it wasn't clear how herbal treatments should be used, topical application had been probably instant most popular method. Since oral administration of medicinal plants provides quick and direct contact with various plant chemicals at the location of actions, it is a very popular method of treating sickness in cattle throughout many civilizations. The dose and vehicle utilization were left out of most research in the field included in current analysis. Dose is significant since it specifies the scale of measuring and how much should be used to treat the cattle. However,

it is generally acknowledged that EVM present a serious fault in terms of uniformity and precision.



Medicinal plants used to treat cattle diseases

Figure 5: Distribution of medicinal plant administration methods

Associated Indigenous Knowledge

There was 310 medicinal plants utilized in all, and they were divided into 10 main categories (Figure 6) and (Table 5) to cure a variety of ailments in cattle. The research of light treatments served as the foundation for the categorization of the various ailments. Overall structure infections, reproductive illnesses, digestive system issues, skin issues, internal/external parasitic organisms, orthopedic structures, and respiratory issues were some of the predominate types. On the other hand, the published analysis found very few citations of the therapy of ailments including eye disorders, tick-borne illnesses, and reproductive system issues.

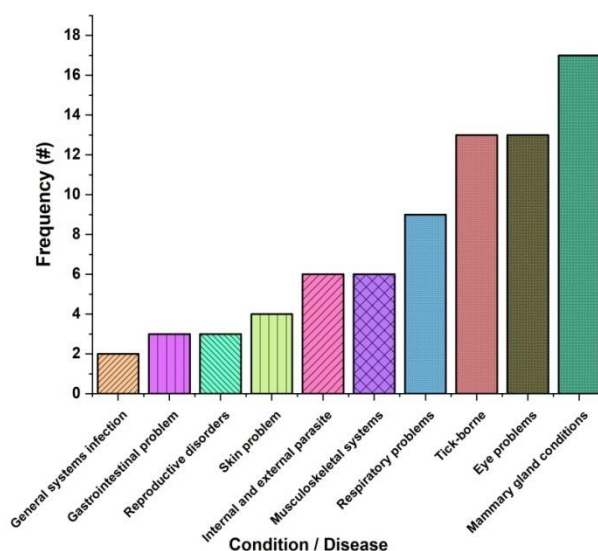


Figure 6: Common Cow Illnesses That Can Be Cured With Herbs

Table 5: An overview of common medicinal plants

Condition / Disease	Frequency (#)
General systems infection	2
Gastrointestinal problem	3
Reproductive disorders	3
Issue in skin	4
external and internal infection	6
Systems of musculoskeletal muscles	6
Issues with breathing	9
Tick-borne	13
Eye problems	13
Mammary gland conditions	17

The greatest prevalent illness group in cattle was thought to be overall systemic diseases. The fact that most of these medical issues, particularly digestion issues, could be quickly identified by respondents using inspection may account for this significant frequency of remarks. The nine prevalent diseases were recognized as anaplasmosis, delayed fatal tissue among injuries indigestion, anemia, headgear, and indigestion in the present analysis. These were shown to be the plants that were most frequently recommended for healing ailments in cattle.

Overview of Biological Evaluation of Plants

Approximately 21% (66 plants) of the 310 plants have undergone focused testing for biological activity in relation to EVM used to treat bovine illnesses. Antibacterial, antifungal, anti-tick, antioxidants, anti-micro bacterial, anti-inflammatory, and dangerous biochemical properties of plants were examined. Antibiotic function was tested in almost 70% of the plants, making it the natural process that has been the focus of the most research. Additionally, 38% of the plants were examined for safety based on toxicological impact, and 51% of the plants had their anthelmintic properties assessed. This plant marlothii, which has been checked in 11 tests, was the species which was checked the most consistently. Typically, there was believed species many more creatures than experience being exposed by different therapeutic herbs were harmless. This is primarily because, for many years, people have been using medicinal plants to heal illnesses based on fundamental knowledge that has been acquired and passed down from generations to century.

4. Conclusion

In conclusion, the exploration of Ethnoveterinary medicine and traditional knowledge in livestock systems has immense potential for sustainable development. The investigation has illuminated the wealth of customary knowledge and methods that communities have passed through the decades. These indigenous knowledge systems offer valuable insights into the management of livestock health and contribute to the overall well-being of both animals and humans. Ethnoveterinary medicine, which encompasses the traditional practices and remedies utilized in the area of alleviating animal illnesses, has proven with effective in many cases. It not only provides affordable and accessible healthcare options for farmers and herders but also promotes the conservation of biodiversity and the responsible exploitation of environmental elements.

Furthermore, Enhanced livestock medical results may result from integrating incorporation for classical information throughout contemporary veterinarian treatments by combining scientific research with indigenous knowledge; they should create novel, situation-specific approaches to meet some particular difficulties posed by livestock systems. Throughout our study, there was a wealth of conventional information and methods that we found on, transmitted through the years. Traditional healers and Ethnoveterinary practitioners play a crucial role in providing healthcare solutions for livestock, utilizing local resources and indigenous knowledge to diagnose, treat, and prevent diseases. Their expertise is deeply rooted in an understanding of the local ecosystem, cultural beliefs, and the holistic relationship between humans, animals, and the environment.

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