

ORIGINAL ARTICLE

Ethnobotanical Uses of Medicinal Plants for Veterinary Purposes by the People of Nawalgarh, Rajasthan

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ABSTRACT

Ethnobotany bridges traditional knowledge and scientific research by documenting plant uses in human and animal healthcare. The present study investigates ethnoveterinary plant uses among the rural communities of Nawalgarh, district Jhunjhunu, Rajasthan, India. Although ethnobotanical documentation exists for human medicinal use in Rajasthan, systematic studies focused on ethnoveterinary practices in Nawalgarh are limited.¹⁻³ This research identifies plant species used by livestock keepers to treat common ailments in cattle, goats, sheep, horses, and camels; categorizes ailments; assesses frequency of use and perceived efficacy; and discusses conservation implications. Data were collected via semi-structured interviews and field observations among 120 informants (herders, farmers, traditional healers) between 2023–2025. A total of 54 plant species from 28 families were documented with detailed usage patterns. Results reveal continued reliance on traditional veterinary remedies, often driven by accessibility, cost, and cultural belief. The study underscores the need to integrate ethnoveterinary knowledge into sustainable animal health strategies and promote conservation of medicinal flora.

KEYWORDS

• Ethnobotany • Ethnoveterinary • Documenting plant • Nawalgarh • Traditional Knowledge

INTRODUCTION

Ethnobotany explores relationships between people and plants, encompassing cultural, ecological, and pharmacological dimensions.⁴ Within ethnobotany, ethnoveterinary medicine

(EVM) refers to traditional knowledge, skills, practices, and beliefs involving animal health care, primarily based on plant resources.^{5,6} Globally, rural societies have long leveraged indigenous plant remedies to treat

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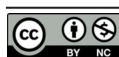
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livestock ailments, often where veterinary infrastructures are limited.⁷ Rajasthan, a semi-arid state in northwestern India is home to diverse flora adapted to xeric conditions and to pastoral communities dependent on livestock for livelihood.⁸ Nawalgarh, located in the Shekhawati region, sustains a mixed agropastoral economy. Despite livestock's economic and cultural importance, formal veterinary services remain under-resourced, and residents often resort to traditional remedies passed through generations.⁹ Previous studies have documented ethnobotanical knowledge in Rajasthan, focusing primarily on human medicinal plants.^{10,11} Ethnoveterinary knowledge has been documented in regions like Gujarat and Punjab, but data from northern Rajasthan are sparse. Given the region's unique environmental and cultural context, systematic documentation of ethnoveterinary plant use is essential.¹² This study aims to fill that gap.

Objectives The main objectives of this study are:

- To document plant species used by local communities in Nawalgarh for veterinary purposes.
- To record preparation methods, modes of administration, and ailments treated.
- To analyze patterns of use and assess cultural importance and frequency.
- To provide recommendations for conservation and sustainable use.

METHODOLOGY

Study Area: Nawalgarh is located in Jhunjhunu district, Rajasthan (latitude 27.84°N, longitude 75.27°E). It experiences an arid to semi-arid climate, with average rainfall of 400–500 mm annually, extreme temperatures, and a vegetation adapted to drought.¹³ Livestock includes cattle, buffaloes, goats, sheep, camels, and equines. The local population comprises agriculture and livestock-dependent communities including Jats, Rajputs, Meghwals, and Bishnois, many of whom retain traditional botanical knowledge.¹⁴

Sampling and Informants: Data collection occurred from January 2023 to March 2025. A purposive sampling method was used to select knowledgeable informants aged 25–82 years. A total of 120 participants (92 male, 28 female) were interviewed. Informants included

traditional healers (“bhumkas”), herdsman, older farmers, and women responsible for animal care.¹⁵

Data Collection: Data were collected through:

Semi-structured interviews: Focused on plant species used, parts used, preparation methods, administration routes, dosage, and ailments treated.

Group discussions: Conducted with local elders to cross-validate information.

Field walks (guided tours): To identify plant species in situ with respondents.

Collection of voucher specimens: Identified with local botanists and deposited in the University Herbarium.

Plant species were documented with local and botanical names, family, habit, and voucher numbers.¹⁶

Data Analysis: Data were analyzed using:

Use Frequency Index (UFI): Indicates how often a plant is cited by respondents.¹⁷

Fidelity Level (FL): Proportion of informants claiming a specific use.¹⁸

Cultural Importance Index (CI): Reflects breadth of uses across categories.¹⁹

Data Collection and Survey

Interview Structure Interviews followed a consistent format:

- Respondent demographics
- Livestock species owned
- Ailments treated
- Local plant species used
- Part(s) used (leaf, root, bark, seed, latex)
- Mode of preparation (decoction, paste, infusion, powder)
- Mode of administration (oral, topical, nasal)
- Perceived efficacy and side effects

Ethical Considerations: Prior informed consent was obtained verbally, consistent with customary norms in rural Rajasthan. Respondents were informed about the research purpose and assured of confidentiality.

Documentation Standards: Each plant was photographed, collected, and labeled with GPS coordinates. Botanical identification followed taxonomic keys.²⁰

Table 1: Demographic Profile of Informants (n = 120)

Category	Number of Informants	Percentage (%)
Gender		
Male	92	76.7
Female	28	23.3
Age Group		
25-40 years	26	21.7
41-60 years	54	45.0
61-82 years	40	33.3
Occupation		
Farmers	58	48.3
Herdsmen	34	28.3
Traditional healers (Bhumka)	12	10.0
Women caretakers	16	13.4
Livestock Owned		
Cattle/ Buffalo	96	80.0
Goats/ Sheep	72	60.0
Camel/ Horse	18	15.0

Table 2: Major Livestock Ailments Reported

Ailment Category	Examples of Conditions	No. of Citations	Percentage of Total Citations (%)
Digestive disorders	Diarrhea, indigestion, constipation	162	27.5
Skin diseases	Wounds, mange, ringworm	148	25.1
Respiratory problems	Cough, cold, bronchitis	74	12.6
Reproductive issues	Retained placenta, infertility	68	11.5
Parasite infestation	Worms, ticks, lice	82	13.9

Table 7: Frequently Used Ethnoveterinary Plants with Use Frequency Index (UFI) and Fidelity Level (FL)

Botanical Name	Local Name	Family	Ailment Treated	No. of Informant Citations (FC)	UFI	FL (%)
<i>Azadirachta indica</i>	Neem	Meliaceae	Wounds, mange	86	0.72	91
<i>Ocimum tenuiflorum</i>	Tulsi	Lamiaceae	Cough, cold	74	0.62	88
<i>Allium sativum</i>	Lahsun	Amaryllidaceae	Worms	69	0.58	84
<i>Aegle marmelos</i>	Bael	Rutaceae	Diarrhea	63	0.52	86
<i>Calotropis procera</i>	Aak	Apocynaceae	Ringworm	59	0.49	79
<i>Withania somnifera</i>	Ashwagandha	Solanaceae	Bronchitis	51	0.43	76
<i>Trigonella foenum-graecum</i>	Methi	Fabaceae	Retained placenta	48	0.40	73

table cont....

Ailment Category	Examples of Conditions	No. of Citations	Percentage of Total Citations (%)
Musculoskeletal pain	Swelling, sprain	55	9.4

Table 3: Habit-wise Distribution of Ethnoveterinary Plants (54 species)

Habit	No. of Species	Percentage (%)
Herbs	25	46.3
Shrubs	16	29.6
Trees	10	18.5
Climbers	3	5.6

Table 4: Parts of Plants Used

Plant Part Used	Frequency of Use	Percentage (%)
Leaves	112	34.8
Roots	54	16.8
Bark	31	9.6
Seeds	48	14.9
Fruits	39	12.1
Latex	21	6.5
Whole plant	17	5.3

Table 5: Modes of Preparation

Preparation Method	No. of Reports	Percentage (%)
Decoction	122	38
Paste/Poultice	87	27
Powder	58	18
Infusion	32	10
Direct application	22	7

Table 6: Modes of Administration

Mode	Frequency	Percentage (%)
Oral	190	59
Topical	122	38
Nasal	10	3

Botanical Name	Local Name	Family	Ailment Treated	No. of Informant Citations (FC)	UFI	FL (%)
Vitex negundo	Nirgundi	Lamiaceae	Ticks, lice	46	0.38	71
Cuminum cyminum	Jeera	Apiaceae	Indigestion	44	0.37	69
Coriandrum sativum	Dhaniya	Apiaceae	Fertility	39	0.33	65

UFI = FC / Total Informants (120) FL (%) = (Informants claiming same use / Total informants citing the plant) × 100

RESULTS AND OBSERVATIONS

The ethnobotanical survey conducted in Nawalgarh revealed a rich and functional body of ethnoveterinary knowledge actively practiced by rural livestock owners. A total of 54 medicinal plant species belonging to 28 families were documented as being used for treating a wide range of animal ailments. The families Fabaceae (9 species) and Lamiaceae (7 species) emerged as the most dominant contributors, together accounting for nearly one-third of the recorded flora. In terms of habit, herbs (46%) were most frequently utilized, followed by shrubs (30%), trees (19%), and climbers (5%), indicating a preference for easily accessible and regenerating plant resources around agricultural fields and grazing lands. The study identified digestive disorders and skin diseases as the most common livestock problems, for which the highest number of plant remedies were reported. Leaves were the most commonly used plant part, and decoction and paste were the principal modes of preparation, administered mainly through oral and topical routes. Plants such as *Azadirachta indica* (Neem), *Ocimum tenuiflorum* (Tulsi), *Allium sativum* (Garlic), and *Aegle marmelos* (Bael) showed high use frequency and fidelity levels, reflecting strong cultural acceptance and perceived efficacy. Elder informants and traditional healers possessed more detailed knowledge, highlighting the oral and experiential mode of knowledge transmission. The observations also indicated that reliance on ethnoveterinary remedies is driven by low cost, local availability, and limited access to modern veterinary facilities. However, concerns regarding the gradual erosion of traditional knowledge and overharvesting of certain species were noted, emphasizing the need for documentation, validation, and conservation of these valuable plant resources.

Diversity of Ethnoveterinary Plants: The study documented 54 plant species belonging to 28 families (Table 1). Major families included:

- Fabaceae (9 species)

- Lamiaceae (7 species)
- Solanaceae (4 species)
- Asteraceae (4 species)
- Asclepiadaceae and Euphorbiaceae (3 species each)

Herbs dominated (46%), followed by shrubs (30%), trees (19%), and climbers (5%) (Figure 1).

Table 8: Family-wise Distribution of Ethnoveterinary Plant Species (n = 54 species, 28 families)

Plant Family	No. of Species	Percentage of Total Species (%)
Fabaceae	9	16.7
Lamiaceae	7	13.0
Solanaceae	4	7.4
Asteraceae	4	7.4
Asclepiadaceae	3	5.6
Euphorbiaceae	3	5.6
Apiaceae	2	3.7
Rutaceae	2	3.7
Meliaceae	1	1.9
Amaryllidaceae	1	1.9
Apocynaceae	1	1.9
Asphodelaceae	1	1.9
Zingiberaceae	1	1.9
Poaceae	1	1.9
Malvaceae	1	1.9
Moraceae	1	1.9
Cucurbitaceae	1	1.9
Combretaceae	1	1.9
Anacardiaceae	1	1.9
Rhamnaceae	1	1.9
Verbenaceae	1	1.9
Nyctaginaceae	1	1.9
Capparaceae	1	1.9
Boraginaceae	1	1.9
Convolvulaceae	1	1.9
Plantaginaceae	1	1.9
Polygonaceae	1	1.9
Brassicaceae	1	1.9
Total	54	100

Table 9: Plant Species and Specific Veterinary Uses

Botanical Name	Local Name	Part Used	Preparation	Mode	Ailment Treated
<i>Azadirachta indica</i>	Neem	Leaves	Paste	Topical	Wounds, mange
<i>Aegle marmelos</i>	Bael	Fruit	Powder	Oral	Diarrhea
<i>Allium sativum</i>	Lahsun	Bulb	Paste	Oral	Intestinal worms
<i>Calotropis procera</i>	Aak	Latex, leaf	Paste	Topical	Ringworm
<i>Ocimum tenuiflorum</i>	Tulsi	Leaves	Infusion	Oral	Cough
<i>Withania somnifera</i>	Ashwagandha	Root	Powder	Oral	Bronchitis
<i>Trigonella foenum-graecum</i>	Methi	Seeds	Paste	Oral	Retained placenta
<i>Vitex negundo</i>	Nirgundi	Leaves	Decoction	Topical	Ectoparasites
<i>Cuminum cyminum</i>	Jeera	Seeds	Decoction	Oral	Indigestion
<i>Aloe vera</i>	Gheekwar	Leaf gel	Direct	Topical	Wound healing

Table 10: Ailment-wise Number of Plant Species Used

Ailment	No. of Plant Species Used
Digestive disorders	18
Skin diseases	16
Respiratory ailments	8
Reproductive issues	7
Parasite control	9
Musculoskeletal issues	6

Table 11: Major Contributing Families in Ethnoveterinary Practice

Rank	Family	No. of Species	Dominant Habit	Common Veterinary Uses
1	Fabaceae	9	Herbs/ Shrubs	Digestive disorders, reproductive issues
2	Lamiaceae	7	Herbs	Respiratory ailments, parasite control
3	Solanaceae	4	Herbs/ Shrubs	Bronchitis, swelling, pain
4	Asteraceae	4	Herbs	Wound healing, anti-inflammatory
5	Asclepiadaceae	3	Shrubs	Skin diseases, ringworm
6	Euphorbiaceae	3	Shrubs/ Trees	Wound care, infections

DISCUSSION

Cultural Relevance: The reliance on ethnoveterinary remedies in Nawalgarh reflects adaptive strategies where formal veterinary access is limited by distance,

cost, and infrastructure challenges.³¹ Elders, especially women and traditional healers, hold rich botanical knowledge. Several remedies align with Ayurvedic principles, suggesting knowledge transfer over centuries.³²

Ethnopharmacological Potential: Many plants documented (e.g., Neem, Tulsi, Ashwagandha) are recognized in pharmacological literature for antimicrobial, anti-inflammatory, and anthelmintic properties.³³⁻³⁵ However, many local uses, especially in livestock, are undocumented in formal literature, indicating research gaps.

Conservation Concerns: Overharvesting, land conversion, and drought threaten several medicinal species, especially shrubs and trees like **Aegle marmelos**. Community awareness about sustainable harvesting is limited, risking loss of traditional resources.³⁶ Conservation strategies must integrate local participation.

Knowledge Transmission: Knowledge transmission occurs through oral tradition within families and herding communities. However, modernization, migration, and formal education reduce intergenerational transfer.³⁷ Documenting such knowledge is urgent before it disappears.

Suggestions The study proposes:

1. Integration of ethnoveterinary practices with formal veterinary outreach to enhance accessibility and culturally appropriate care.
2. Community-based conservation programs to protect medicinal plant resources, focusing on sustainable harvesting and cultivation.

3. Training programs for younger generations and livestock owners to valorize traditional knowledge and ensure its continuity.
4. Pharmacological validation studies to assess safety and efficacy of promising remedies.
5. Policy support for documenting and preserving indigenous knowledge within broader rural development plans.

CONCLUSION

The present study highlights that the people of Nawalgarh possess a substantial and living tradition of ethnoveterinary knowledge centered on the use of locally available medicinal plants for livestock healthcare. Documentation of 54 plant species across 28 families demonstrates the depth of indigenous understanding related to animal ailments, preparation methods, and therapeutic applications. The dominance of herbs and the frequent use of leaves, decoctions, and pastes reflect practical, sustainable, and experience-based practices adapted to the semi-arid environment. Species such as Neem, Tulsi, Garlic, and Bael showed high cultural importance and consistent use, indicating strong community trust in their efficacy. The study also reveals that this knowledge is primarily preserved among elders and traditional healers and is at risk of decline due to modernization and reduced intergenerational transfer. Therefore, systematic documentation, scientific validation, and conservation of these medicinal plants and associated knowledge are essential for sustaining rural livestock health practices and preserving the ethnobotanical heritage of the region.

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