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An Ethnobotanical Survey of Medicinal Plants in Alaniya Village, Kota District, Rajasthan

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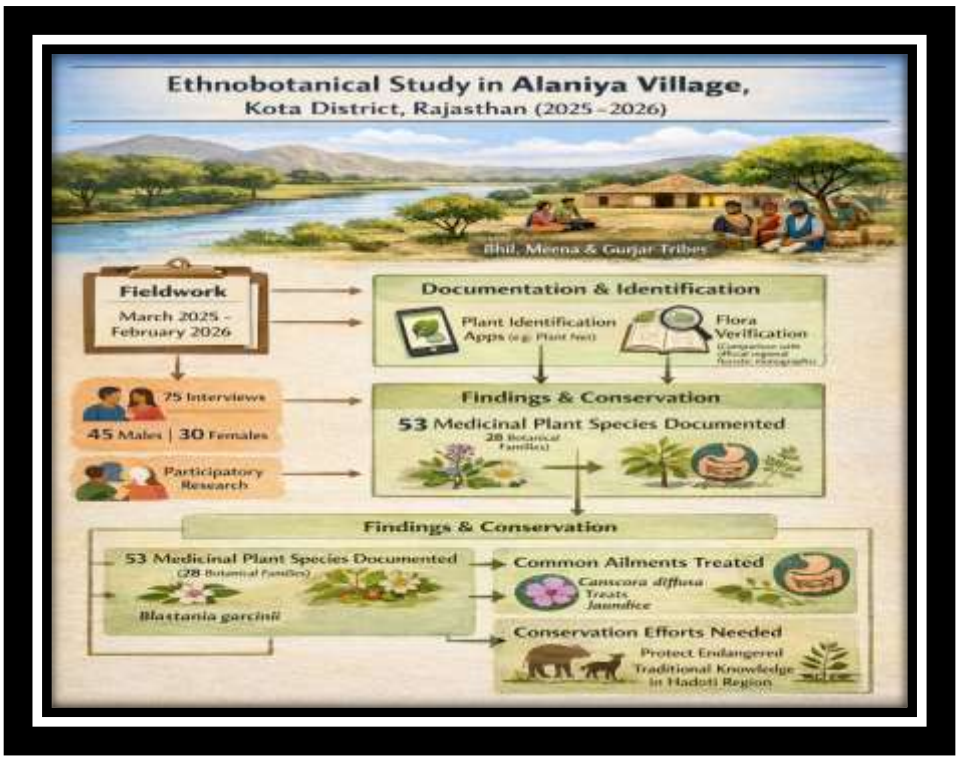
ABSTRACT

The ethnobotanical heritage protection and the systematic description of the traditional ecological knowledge are unavoidable requirements in modern pharmacognosy and biodiversity conservation. The study is an ethnobotanical survey of the Alaniya Village located in Ladpura tehsil of the Kota District, Rajasthan. The area is characterized by semi-dry climate and hydrological effect of the Chambal River basin, thus maintaining a specific floristic community used by the native population, especially Bhil, Meena, and Gurjar tribes. The focus was to discover, document, and critically examine the medicinal flora that was used in the local traditional treatment regimes. The field work lasted between March 2025 and February 2026 and utilized unstructured interviews and participatory methodologies of rural appraisal carrying out 75 interviews (45 males and 30 females). Identifications of the specimens were made possible through the application of Plant Net and later compared against the official regional floristic monographs. The survey produced 53 medicinal taxa spread out in 28 botanical families. The predominant ones were Fabaceae (10 species), then Asteraceae (7 species) and Euphorbiaceae (5 species). The findings revealed new traditional uses including the use of *Canscora diffusa* in archaeological refuse to prevent neurodamage and use of *Blastania garcinii* to treat jaundice. Gastro-intestinal and dermatological afflictions proved to be the most common mentioned categories of ailments. All these observations add to the urgent need of concerted efforts to preserve the endangered diversity of the Hadoti region and globally by promoting unified conservation efforts to preserve a fading body of traditional knowledge.

Graphical Representation of Abstract



Keywords: Ethnobotany, Medicinal plants, Kota District, Rajasthan, Traditional knowledge, Indigenous medicine, Biodiversity conservation, Fabaceae

INTRODUCTION

Traditional medicine remains the main health care facility to about 80% of the global population especially in developing countries (Pushpangadan, 1995). Such a long-lasting dependence is deeply embedded in the cultural tradition and the availability of local plants. However, the twin menaces of fast disappearance of the biodiversity, and destruction of the native knowledge systems offer a great challenge to the bio-cultural diversity of the planet. With the current Anthropocene, species extinction is becoming alarmingly high, and side by side with the concept of biological extinction is the process of what we could refer to as an extinction of experience: on both the traditional ecological knowledge of the indigenous population. Therefore, ethnobotanical records are not only an exercise in scholarship but also a conservation emergency. It would fill the gap between the ancient knowledge and the modern science possibly providing solutions to the modern health issues and also establishing the intellectual property of the indigenous people. Convention on Biological diversity (CBD) and Nagoya Protocol highlight the just and equitable distribution of benefits of genetic resources hence making systematic documentation of such knowledge as both legal and ethical priority in the global biodiversity framework.

In India, a country that is regarded to be among the twelve mega-biodiversity centres in the world, ethnobotanical practices documentation takes utmost significance (Jain, 1995). The subcontinent has a rich tradition of herbal medicine as recorded in ancient traditions like Ayurveda, Siddha and Unani. These are well documented codified systems in ancient works such as the Charaka Samhita and Sushruta Samhita. However, alongside these formalized traditions, there exists an enormous mass of uncodified folk knowledge, which is passed down across generations of tribal and rural societies, which are orally transmitted. The Little Tradition is an active, localized and closely coupled with local ecosystems. It takes into consideration the utilization of thousands of plant species which have not been featured in the classical literature but without which the over seven hundred tribal groups of India cannot survive. Although Ayurveda has traditionally used about 1,200 -1,500 species, ethnobotanical surveys have estimated that over 7,500 species are used by the indigenous tribes in medicinal practices- highlighting the immense breadth of uncodified knowledge that has not been well explored by science.

The largest state in India, Rajasthan, has a unique phytogeographical pattern that is caused by its dry to semi-arid climate (Bhandari, 1978). Plants in this region have developed outstanding mechanisms to adapt to thermal stress, high salinity, and a lack of water. These xerophytic characteristics are reflected in the production of strong secondary metabolites such as alkaloids, flavonoids, tannins, terpenoids, and essential oils, which are defences against the stressor of the environment and herbivory produced by plants. These phytochemical adaptations often end up giving the plant important therapeutic capabilities, which form the basis of the local pharmacopeia. As an example, the excessive deposition of gum and resins in some trees like Acacia and Commiphora is also a physiological reaction to heat, but is also an important source of medicine to humankind. Although arid western regions of the Thar Desert have received considerable research (Bhandari, 1990; Singh, 1998), the southeastern region, the Hadoti region, including Kota, Bundi, Baran, and Jhalawar districts needs to be better researched ethnobotanically due to its distinctive transitional ecology.

The Hadoti region is a perfect ecotone that represents a nearing of the Vindhyan scarp lands into the Aravalli hill ranges. Geologically, it is defined as the Deccan Trap lava flows mixed with Vindhyan sandstones giving it a varied edaphic environment comprising fertile black cotton soils (Vertosols) and rocky skeletal bases. The area has the drainage Chambal River and its tributaries such as Kali Sindh, Parvan and Alaniya rivers. This hydrological framework promotes a microclimate much more humid than the western areas in Rajasthan, therefore, sustaining a mosaic of dry deciduous forest and riverine scrub, as well as ravine thorn forest. The Chambal basin behead/ravine lands are eco- unique since they act as refugia to biodiversity which has disappeared in the surrounding agricultural plains. This ecological diversity supports a floristic assemblage that combines components of a dry Thar desert with the moister Central Indian forests, making it an extremely important hot spot in terms of bioprospecting.

There are a few indigenous communities in the region in terms of social life, including the Bhil, Meena and Gurjar tribes and the Sahariya in different regions. Those communities have lived in the woods and river basins over centuries, developing a deep experience of the local flora and fauna. Bhil's who are known as one of the oldest aboriginal tribes in India are famous due to their knowledge of arrow poisons, herbal contraceptives, and fracture-healing plants. The Meena's who is traditionally a martial and agrarian community have vast knowledge in veterinary medicine and crop protection in the form of plant extracts. Gurjar's, who are mainly pastoralists, have an expert knowledge of fodder plants and ethnoveterinary. Their culture is spread orally by way of folklore, songs, and also by elders to the young ones by way of apprenticeship. Nevertheless, this transmission is increasingly threatened by modernization and changes in lifestyle.

Although the Hadoti area is a highly productive region of the country in terms of floristic abundance, the specifics of specific micro-habitats like Alaniya Village are under-documented (Malav et al., 2023). The literature available is mostly concentrated on the developed reserves such as Darrah National Park or Mukundra Hills and often ignores the ethnomedicinal value of rural agro-ecosystems and unprotected revenue lands. Alaniya Village is the best example of such a landscape, a rural complex of agriculture, riverine scrub, and human habitation where the contact of the human and plant is most dramatic. In addition, urbanization, industrialization and changing socioeconomic patterns in Kota, enhance the loss of the traditional botanical knowledge (Jain et al., 2004). The younger generations are becoming detached to the traditional healing practices thus creating a disconnection in the oral transmission of wisdom. Although there are indisputable advantages of modern allopathic medicine, traditional remedies get undermined and forsaken because of its high prevalence usually. This paper, therefore, will compile systematically the medicinal plants in the Alaniya Village by capturing the vernacular names, parts employed, methods of preparation, and uses of the plants in treatment. This study attempts to fill the knowledge gap between traditional and scientific records by offering a platform on the future pharmacological validation and biodiversity conservation studies in southeastern Rajasthan.

MATERIALS AND METHODS

Study Area

The case study research was conducted in Alaniya Village and its surrounding in Ladpura tehsil of Kota District, Rajasthan. Their geographical position is 25°06' 01N, 75°45' 01E with a mean elevation of 280m above mean sea level. The location of Alaniya is the south western plateau of Rajasthan about 20km south of Kota city. This landscape is a composite of varied topography, which consists of level farmlands, rocky hillocks, which belong to the Vindhyan range and deep ravines carved by the seasonal Alaniya River, which is a tributary of the Chambal. The climate is semi dry and the members are mostly rural. Hot weather (March to June) Summer season is very hot with temperatures often between 38°C and 45°C thus constituting a high thermal load. The average amount of rain is 600-800mm per year, the soil type in the low-lying agricultural areas is on the form of deep-built black clayey soils, whereas the hillocks or elevated terrains are characterized by reddish-brown sandy loam soils to skeletal soils.

Ethnobotanical Survey

Multiple terrestrial field surveys were carried out between March,2025 and February, 2026 to cover all phenological stages of local flora represented. The research methodology combined both unstructured interviews and Participatory Rural Appraisal (PRA) (Jain, 1991). Field visits were to be done at a bio-monthly interval, and increased in frequency during the monsoon. Transect walks were carried out in the various habitat types such as agricultural fields, grazing wastelands, riverbanks, and rocky outcrops, in order to logically record the spatial distribution of medicinal plants. Quadrat sampling was randomly used to determine the abundance of the important medicinal taxa in particular micro-habitats. A sample of 75 informants was drawn with preference to those who were recognized by the community to have specialized botanical knowledge. The sample size of the informant's cohort was 45 males and 30 females, who were aged 35-80 years. The village head (Sarpanch) was contacted first to gain trust and then referrals to individuals who were especially knowledgeable were to be made. The interviews were carried out in the local Hadoti dialect to make sure that there was accurate communication and were later transcribed and translated.

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue III March 2026

Plant Collection and Identification

Field walks were made alongside the informants to collect specimens and record the natural habitat, where *in-*

situ discussions on taxonomy, ecological preferences, and harvesting methods were made. The initial recognition was based on the Plant Net iOS application (Phumthum et al., 2018), as a quick guide; but it was not the only criterion to confirm it. Special procedure of verification included taking of leaf, flower, fruit, and bark photos to ensure the achievement of scores of 80-percent confidence score in the application. The definitive identification was done by samples being processed according to conventional taxonomic measures and cross-matching with official regional flora, such as the Flora of the Indian Desert (Bhandari, 1990) and Flora of Rajasthan (Shetty and Singh, 1987).

Data Validation and Ethical Considerations

To make sure that the data is reliable, data validation was done. Medicinal claims by individual informants were triangulated with other persons to come up with consensus. A qualitative consensus factor was identified, uses that received the support of at least three of the independent informants were considered highly reliable. Local uses were compared with the published pharmacological data by comparing literature reviews. Meeting with community leaders to provide initial findings and address misinterpretations was conducted in the form of a feedback workshop. Ethical considerations followed in the study were in compliance with the ethical provisions of the International Society of Ethnobiology (Ojha et al., 2020) and Nagoya Protocol on Access and Benefit Sharing. All participants were verbally granted the prior informed consent after the purpose of the research was explained to them using their native language. Specifically, the participants were told that the study was to accomplish academic documentation and conservation, and that any commercial use of their knowledge will require independent legal agreements, taking into consideration their intellectual property rights.

RESULTS

Demographic Profile of Informants

The demographic analysis of the 75 informants showed the concentration of the ethnobotanical knowledge among the older people, as well as the occupational groups. Age distribution indicated that 35% of total informants were aged between 56-65 years and 25% were aged between 66-80 years with 46-55 years bracket taking up 25%. The youngest age group where the respondents were 35-45 years old was only 15%. This dispersion means that there is a generational erosion of knowledge. The gender analysis revealed different areas of experience: 60% of men were more knowledgeable about veterinary plants, snakebites remedies, and species that need to be intensive harvested in forests (roots, bark). Women, who made 40%, were the masters of a pediatric, gastrointestinal, and nutritional remedies, which were related to the homesteads and agricultural fields. Occupational diversity also had an impact on knowledge patterns. Farmers (45%) exhibited a large amount of knowledge about agricultural weeds and flora associated with crops. The species and ethnoterritory plants that depended on grazing animals in wild landscapes were found in herder populations (25%). Vaid's or traditional healers (15%) provided highly specific formulations which frequently consisted of multi-plant complexes. The other 15% were made up of labourers and housewives who usually had general knowledge on common household remedies. The levels of education were also different with the majority of the informants being illiterate or having primary education which highlights how the acquired knowledge was passed on by experience and orally instead of through schooling.

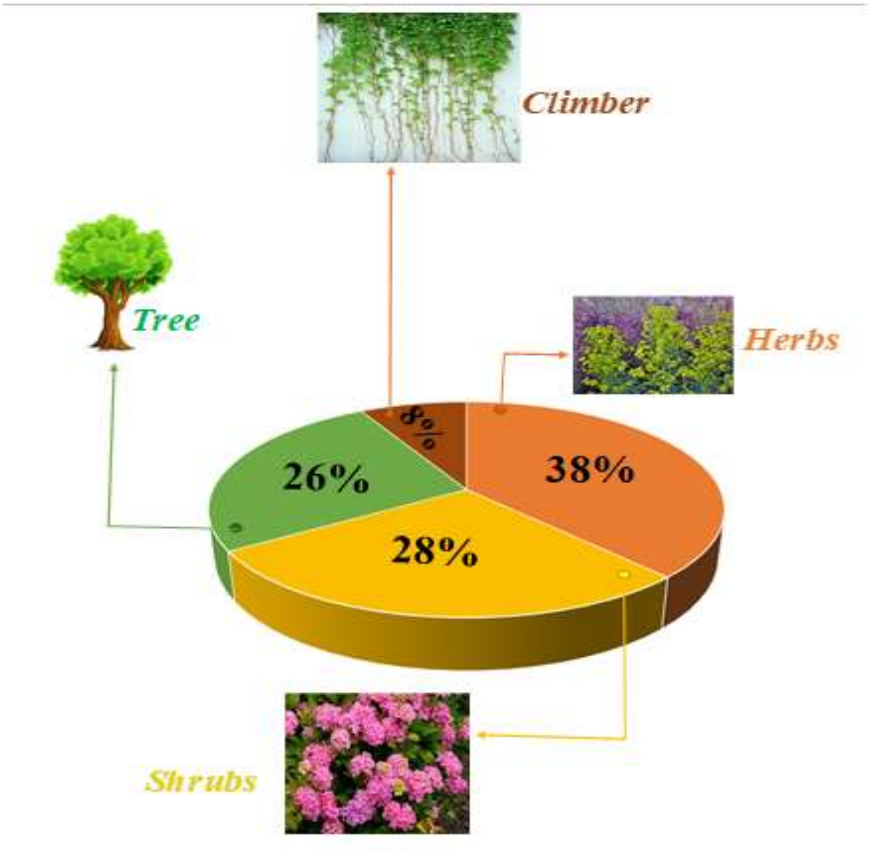
Medicinal Plant Diversity

The survey led to documentation of 53 different medicinal plant taxa distributed in 28 botanical families. The taxonomic dominance was particularly strong in the clan of Fabaceae (10 species, or 18.8% of all). This dominance has consequences to the ecology, because legumes have natural nitrogen-fixing abilities that are mediated by root nodulation, and thus grow in xeric soils with lack of nitrogen, becoming a staple of the local flora. Their high levels of tannin and gum also contribute to their increased therapeutic possibilities and make

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue III March 2026

Fabaceae one of the main pillars of the pharmacopoeia of the community. The Asteraceae trio (with 7 species, 13.2%) was second only to Fabaceae, and followed those of Fabaceae, is characteristic of hardy, opportunistic weeds colonising disturbed habitats surpassingly vigorously. The most prevalent family is Euphorbiaceous with 5 species (9.4%) which has a well-known potential of latex and is known to have a wide range of bioactive compounds. Other families such as Malvaceae, Poaceae and Lamiaceae contributed 4 species each and this fits well in illustrating the wider botanical diversity that is enclosed in this region. Plant habit analysis showed that the major source of medicine was herbs (38%), followed by shrubs (28%), trees (26%) and climbers (8%). This allocation coincides with the monsoon reliance of the community, in which the herbaceous biomass is the most during and immediately after the rains. On this basis, herbs are most commonly collected between July and October, but arboreal ones, especially bark or gum and root, will yield a more constant and annual supply, especially in the dry summer seasons. Some of the rare and ecologically significant species were also found during the investigation. *Canascora diffusa*, a fragile herb nesting between the cracks of ancient archeological walls, and *Blastania garcinii*, a climber used with the purpose of jaundice, are examples of local biodiversity, which is closely related to particular micro-habitats. Their preservation therefore requires more academic focus.

Clear tabular representation of your plant habit analysis:		
S. No.	Plant Habit	Percentage (%)
1	Herbs	38%
2	Shrubs	28%
3	Trees	26%
4	Climbers	8%
Total	—	100%



Plant habit analysis into a pie chart

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue III March 2026

Analysis of Parts Used and Preparation Methods

A careful examination of the use of plant parts reveals that there is an underlying scientific explanation of ethnobotanical decision-making. Leaves were the most commonly harvested part, with 35% of all remedies, or remedies which is also a sustainable practice since leaf harvesting rarely poses a threat to the parent plant. Leaves are often highly metabolically active and contain large amounts of alkaloids, essential oils and other bioactive minerals. The second most common type of whole herbaceous plant (20%) includes plants like *Euphorbia hirta* and *Eclipta alba*. Although this practice is therapeutically effective, it has conservation issues since annuals need to set their seeds successfully. The vehement, but more devastating, categories of utilisation include the bark (13%) and roots (9%); harvesting of trees like *Acacia catechu* and harvesting of roots like *Withania somnifera*, need careful stewardship. The 10% (seasonally specific) and the 8% (potency-critical) seeds and gum/latex will be used in special or seasonal use. The process of making these preparations by the curers of Alaniya demonstrates a highly advanced understanding of the art of extraction chemistry and dosage regulation. The most common ones are known as decoctions (Kadha), most of which are used on the inedible parts of plants like roots and bark (40%). The process is effective in solubilising glycosides, tannins and other water-soluble principles by boiling in aqueous media. Pastes (30%) are commonly used in dermatologic disease, fresh foliage or seeds are crushed into a liquid medium, most commonly water, milk or oil to form a poultice that maintains contact with the skin. The preparations are 15 percent in powders (Churna), which are obtained by drying and reducing to fine particles the seeds or roots, in this way facilitated to be stored long and to be dosed strictly. Juice extraction (Swaras) (10%) is used in succulent herbs including *Aloe vera* and *Tridax procumbens* where it provides a high dosage of active ingredients in a concentrated dose form. Raw eating (5%) is restricted to fruit species such as *Aegle marmelos* and *Emblica officinalis* as they are palatable and high-quality nutrient sources.

Table 1: Ethnobotanical inventory of medicinal plants in Alaniya Village, Kota District(Rajasthan*)*

Sr.No	Scientific Name	Family	Local Name	Habit	Parts Used	Medicinal Uses
1	Abelmoschus moschatus Medic.	Malvaceae	Jangli-Bhindi	Shrub	Root	Paste For Wounds
2	Abrus precatorius L.	Fabaceae	Chirmathi	Climber	Seeds/Leaves	Cough & Cold
3	Abutilon indicum (L.) Sweet	Malvaceae	Kanghi	Shrub	Leaves/Seeds	Dysentery, Urinary Tract Infections
4	Acacia catechu (L.f.) Willd.	Fabaceae	Khair	Tree	Heartwood	Childbirth Recovery, Asthma
5	Acacia leucophloea (Roxb.) Willd.	Fabaceae	Roonjhro	Tree	Bark	Acute Diarrhea, Fever, Snakebite Antidote
6	Acacia nilotica (L.) Delile	Fabaceae	Babul	Tree	Gum/ Bark	Dysentery, Antimicrobial

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue III March 2026

7	Acacia senegal (L.) Willd.	Fabaceae	Kumtio	Tree	Gum	Burns, Typhoid Fever
8	Achyranthes aspera L.	Amaranthaceae	Appamarg	Herb	Whole Plant	Kidney Stones, Piles, Asthma, Snakebite
9	Adhatoda vasica Nees	Acanthaceae	Adusa	Shrub	Leaves	Asthma, Vomiting
10	Aegle marmelos (L.) Corr.	Rutaceae	Belpathar	Tree	Fruit/ Leaves	Chronic Dysentery, Diabetes Management.
11	Ageratum conyzoides L.	Asteraceae	Bhakumbar	Herb	Leaves	Cuts (Coagulant), Burns, Uterine Disorders
12	Albizia lebbeck (L.) Benth.	Fabaceae	Siras	Tree	Bark	Skin Ulcers, Eye Flu
13	Aloe vera (L.) Burm.f.	Asphodelaceae	Gwarpatha	Herb	Leaf Gel	Thermal Burns, Skin Irritations
14	Alstonia scholaris (L.) R. Br.	Apocynaceae	Sapt-Parna	Tree	Bark	Chronic Asthma
15	Amaranthus viridis L.	Amaranthaceae	Chaulai	Herb	Whole Plant	Diabetes, Dysentery
16	Ammannia baccifera L.	Lythraceae	Agni Buti	Herb	Leaves	Skin Diseases, Abdominal Pain, Arthritis
17	Anogeissus latifolia (Roxb.) Bedd.	Combretaceae	Dhokda	Tree	Bark/ Gum	Cough, Scorpion Sting, Snakebite
18	Argemone mexicana L.	Papaveraceae	Satyanashi	Herb	Flowers/Roots	Whooping Cough, Constipation, Skin Diseases
19	Azadirachta indica A. Juss.	Meliaceae	Neem	Tree	Leaves/ Oil	Skin Infections, Contraceptive

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue III March 2026

20	Balanites aegyptiaca (L.) Delile	Balanitaceae	Hingotia	Tree	Fruit	Skin Diseases, Traditional Contraceptive
21	Bauhinia variegata L.	Fabaceae	Kachnar	Tree	Bark/ Flowers	Intestinal Worms, Snakebite
22	Blastania garcinii (Burm.f.) Cog.	Cucurbitaceae	Bhaglingi	Climber	Leaves	Specific Remedy For Jaundice
23	Blumea lacera (Burm.f.) DC.	Asteraceae	Jangli Mooli	Herb	Whole Plant	Blood Purification.
24	Boerhavia diffusa L.	Nyctaginaceae	Punarnava	Herb	Roots	Renal Disorders, Urinary Flushing, Insomnia
25	Butea monosperma (Lam.) Taub.	Fabaceae	Palash	Tree	Gum/ Bark	Dysentery, Gout
26	Calotropis procera (Ait.) R.Br.	Apocynaceae	Aak	Shrub	Root/ Flowers	Asthma, Boils, Scorpion Sting
27	Canscora diffusa (Vahl) R.Br.	Gentianaceae	Kilwar	Herb	Whole Plant	Memory Enhancement.
28	Capparis decidua (Forsk.) Edgew.	Capparaceae	Kair	Shrub	Bark	Asthma, Toothache, Cough.
29	Cassia fistula L.	Fabaceae	Amaltas	Tree	Fruit Pulp	Constipation, Antiseptic
30	Cassia tora L.	Fabaceae	Pawadia	Herb	Leaves	Joint Pain.
31	Catharanthus roseus (L.) G.Don	Apocynaceae	Sadabahar	Herb	Whole Plant	Stomach Ache, Muscle Pain
32	Cenchrus ciliaris L.	Poaceae	Anjan	Grass	Whole Plant	Body Pain, Menstrual Regulation
33	Cocculus hirsutus (L.) Diels	Menispermaceae	Faridbuti	Climber	Leaves/ Roots	Gastric Inflammation

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue III March 2026

34	Cynodon dactylon (L.) Pers.	Poaceae	Doob	Grass	Whole Plant	Laxative, Body Coolant
35	Datura metel L.	Solanaceae	Dhatura	Shrub	Seeds/ Leaves	Neurological Spasms, Pain Management
36	Delonix regia (Boj.) Raf.	Fabaceae	Gulmohar	Tree	Bark/ Flowers	Constipation, Inflammation
37	Eclipta alba (L.) Hassk.	Asteraceae	Bhringraj	Herb	Whole Plant	Liver Tonic (Jaundice), Hair Growth
38	Emblica officinalis Gaertn.	Euphorbiaceae	Amla	Tree	Fruit	Immunity Booster, Digestion
39	Euphorbia hirta L.	Euphorbiaceae	Dudhi	Herb	Whole Plant	Dysentery, Jaundice, Digestive Failure
40	Euphorbia tirucalli L.	Euphorbiaceae	Thor	Shrub	Latex	Warts, Dermal Lesions (Topical Only)
41	Evolvulus alsinoides (L.) L.	Convolvulaceae	Vishnukrantha	Herb	Whole Plant	Memory Loss
42	Ficus benghalensis L.	Moraceae	Bargad	Tree	Bark/ Latex	Ulcers, Vaginal Complaints
43	Ficus religiosa L.	Moraceae	Peepal	Tree	Bark/ Leaves	Skin Complexion, Vomiting, Nausea
44	Indigofera linnaei Ali	Fabaceae	Neel	Herb	Whole Plant	Wound Healing
45	Jatropha curcas L.	Euphorbiaceae	Ratanjot	Shrub	Seeds/ Latex	Purgative
46	Lantana camara L.	Verbenaceae	Lantana	Shrub	Leaves	High Blood Pressure
47	Lawsonia inermis L.	Lythraceae	Mehandi	Shrub	Leaves	Fungal Infections.

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue III March 2026

48	Leucas cephalotes (Roth) Spreng.	Lamiaceae	Goma	Herb	Whole Plant	Jaundice, Cough, Cold
49	Ocimum sanctum L.	Lamiaceae	Tulsi	Herb	Leaves	Malaria
50	Phyllanthus niruri L.	Euphorbiaceae	Bhumi Amla	Herb	Whole Plant	Jaundice, Urinary Disorders
51	Solanum surattense Burm.f.	Solanaceae	Kantkari	Herb	Root/ Fruit	Cough, Asthma, Fever
52	Tridax procumbens L.	Asteraceae	Dhaman	Herb	Leaf Juice	Wound Healing (Coagulant), Antiseptic
53	Withania somnifera (L.) Dunal	Solanaceae	Ashwagandha	Shrub	Roots	General Tonic, Stress, Arthritis

Routes of Administration and Ailment Categories

Pathway of administration changes depending on the pathology. Oral intake is the most common (55%), which takes care of systemic disorders such as fever, GI problems, and respiratory infections. Topical (35%) is normal when used on the cutaneous lesion, wound, and arthritic pain. Nasal inhalation (5%) - through Datura smoke or steam - is local respiratory action. There are ocular (3%) and aural (2%) modalities, which entail smearing fresh juice or a medicated oil on the eyes or ears as a way of fighting localised infections. The plants that were surveyed were classified according to the ailments that they alleviate and this will show the disease burden in this community. Gastrointestinal disorders (28%) including dysentery, diarrhoea, constipation and jaundice were the most commonly mentioned group reflecting the high rates of waterborne diseases. Such dependence on *Acacia nilotica, Aegle marmelos* and *Phyllanthus niruri* highlight community adaptive therapeutic approaches. The next were dermatological diseases (22%) which were treated with *Cassia tora* (ringworm) and *Azadirachta indica* (general purpose infections). There was respiratory pathology (18%), such as asthma and bronchitis, which was treated using effective bronchodilators such as *Adhatoda vasica*. Skeletal-muscular complaints (rheumatism) (12%) were treated with anti-inflammatory drugs such as *Withania somnifera*. There were other categories such as the urinary disorders (8%), gynecological (6%), and neurological (4%).

Novel Ethnomedicinal Findings and Use Value

This survey has revealed a number of new and significant claims of ethnomedicine which should be supported through scientific validation. One especially noticeable finding is the use of *Canscora diffusa*, a small herb, which is limited to the cracks of old stone walls, and which is specifically used to treat neuroprotection, cognitive enhancement, and to treat the amelioration of brain fog in the elderly. It has a membership to a specialised environment, as well as its therapeutic use, which is a remarkable aspect of local knowledge. A second interesting point is that the *Blastania garcinii* leaves are used exclusively to treat jaundice, which is hardly mentioned in the wider ethnobotanical literature. The treatment is done by healers who prepare a particular filtered hepatic juice of leaves that are given in the morning purportedly to get a quick recovery. Also the *Acacia nilotica* used in decoction of the bark as a palliative care agent in immunocompromised, including HIV-positive patients, has been recently incorporated by a few practitioners, allegedly curing opportunistic illnesses such as chronic diarrhoea. Despite the high toxicity levels, the cytotoxic use of the seeds of *Jatropha curcas* has been reported

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue III March 2026

against external tumours and other malignant growths and hence the dual nature of toxicity and therapeutic value. The level of consensus and Use Values (UV) was calculated on such species as *Azadirachta indica* (UV 0.92), *Acacia nilotica* (UV 0.88), and *Ocimum sanctum* (UV 0.85) and testified to their essential status and popularity as a part of the local healthcare repertoire.

DISCUSSION

The current work clarifies the ethnobotanical richness of the Alaniya Village, Kota, thus providing a more detailed approach to sophisticated plant-people relations as being distinctive of the Hadoti region. The floristic analysis reveals the strong preponderance of the Fabaceae, which is in line with the current ecological facts of the region. Historically leguminous species have been the pioneers in dry ecosystems; they fix nitrogen allowing them to colonize soils that are deficient in nutrients as is the case of Rajasthan (Bhandari, 1990; Singh,1998). The ecological urgency of these taxa is also chemically supported by the medicinal pre-eminence of these groups. An example of such is *Acacia* and *Butea* which are sources of secondary metabolites including tannins and polyphenols, which serve as herbivore deterrents and on the other hand, they are used in medicine as an excellent astringent, antimicrobial, and anti-inflammatory agent (Meena and Rao, 2010). This hypothesis of an ecological apparency therefore implies that plants that occur most plentifully are exploited preferentially provided that they contain bioactive chemistry. This structure is further confirmed by the dominance of Asteraceae and Euphorbiaceous. The cosmopolitan species in the Asteraceae including *Tridax procumbens* and *Eclipta alba* are abundant in secondary metabolites, including sesquiterpene lactones; thus, their ubiquity makes them reliable in emergency wound care and bleeding management. Euphorbiaceous are exemplified by *Euphorbia* and *Jatropha*: the latex of these genera is unpredictably harmful and medicinally, when used in controlled doses, effective in the treatment of cutaneous lesions and purgation internally. The identification of regional patterns and the emphasis on local peculiarities are the results of comparative analyses with the adjacent regions. The results match the researches conducted in the Nanta Forest area (Malav et al., 2023) and Shekhawat (Katewa and Galav, 2005), on common taxa, but the local use of *Canscora diffusa* in archaeological settings seems to be unique to Alaniya, which is likely due to the existence of specific historical ruins. Many of the documented uses are well provided by phytochemical correlations. The presence of high tannin concentration and anti-enteric pathogenic activity of *Acacia nilotica* bark against dysentery are approved by modern research, supporting the extensive use of the therapy (Amadou et al., 2020; Thakur et al., 2018). Similarly, *Phyllanthus niruri* has been used around the world to treat jaundice; as it contains lignans like Phyllanthus and hypophyllum that are found to exhibit hepatoprotective and antiviral properties against the Hepatitis B virus (Du et al., 2018). The bronchodilator action of vasicine obtained from *Adhatoda vasica* also supports the use in the conventional management of asthma. Taken together, these biochemical positive confirmations imply that the trial-and-error approach, which is inherent to the traditional medicine, has over the centuries served to filter the flora in relation to bioactive agents.

An important aspect of this study is that there is a gender specialization of ethnobotanical knowledge. Women became the main providers of domestic health, nutrition and pediatric services: their skill in the use of available herbs in common diseases forms a home garden pharmacopeia in crucial roles of health care in the day-to-day management of health. Male practitioners on the other hand were specialized in veterinary medicine, snakebite anti-dotes and harvesting of forest species. There are serious implications of this dichotomy to conservation efforts and benefit-sharing models, which require interventions that both acknowledge and enable both gender roles to conserve the entire body of knowledge.

Economically, a number of the species that are recorded have significant commercial potential. First, *Azadirachta indica* (Neem) is an existing international commodity but value addition is still circumscribed locally. *Withania somnifera* (Ashwagandha) and *Aloe vera* are crops, which have a high demand, which can potentially be grown on the marginal lands of Alaniya as an alternative source of livelihood to traditional farming. To encourage the conservation of the arboreal resources, community-based businesses that specialize in sustainable harvesting and primary processing of fruits like *Emblica officinalis* (Amla) can be created.

Nevertheless, the dangers to the knowledge ecosystems as well as biodiversity are extreme and fast gaining pace. The most apparent threat is habitat loss; urban sprawl of the urban footprints of Kota city into the Ladpura tehsil area is transforming scrublands into residential colonies (Trivedi and Nargas, 2000). The intensive mining and

quarrying practices are destroying the rocky habitats, which species like *Capparis decidua*. Owing to growing populations of livestock, overgrazing prevents the regeneration of palatable herbaceous flora. Sand mining and agricultural encroachment are two menaces of the riparian corridor of the Alaniya River, a threat to hydrophilic medicinal plants. At the same time, the cultural home of this knowledge is disappearing. This turmoil of young people moving to towns to get jobs forms a physical and intellectual gap between conventional ways (Jain et al., 2004; Katewa and Arora, 1997). Also, the replacement of vernacular plant names and related folklore by standardized Hindi in the educational institutions only adds to marginalizing local dialect to standardized Hindi.

A complex conservation plan is required to prevent these threats. The need to preserve something should always be considered first; the preservation of remaining sacred groves (Orans and Deovans) should be strengthened by legalizing them as Community Conserved Areas. Participatory mapping through the application of GPS technology can be used to establish important habitats of rare taxa like *Canscora diffusa*. Such *ex-situ* conservation programs as the provision of ethnobotanical gardens in the local schools and at the University of Kota would be used as educational and genetic repositories (Singh, 1998). On the policy front, there is a need to implement the Biological Diversity Act, 2002 in the village level. The presence of Biodiversity Management Committees (BMCs) in Alaniya Village together with a People's Biodiversity Register (PBR) would formally record this knowledge, prevent biopiracy of the knowledge, and generate community benefits in case of any commercial exploitation.

The study has certain limitations. Dependence on oral histories also creates possible recall bias and the seasonal temporal range of the survey can have left short-term winter or summer flora out. The lack of direct phytochemical studies limits the ability to establish the chemical foundation of new assertions even with regard to *Blastania garcinii*. Pharmacological confirmation of these particular local assertions, toxicity evaluations of powerful classes of organisms and the production of agrigenomic approaches in the growth of threatened medicine plants ought to be given a priority in future research (Katewa et al., 2003; Nidavani et al., 2014).

CONCLUSION

This ethnobotanical survey conducted in the Alaniya Village records 53 medicinal plant species that are the mainstay in the primary healthcare system by the Bhil, Meena, and Gurjar communities. This site makes the Hadoti area a geographically significant source of Phyto diversity and traditional knowledge, thus, providing an urgent geographic gap in the ethnobotanical map of Rajasthan (Bhandari, 1990; 1998). The cooccurring preponderance of Fabaceae and the sophisticated use of some parts of plants to target particular disorders, especially the gastrointestinal or dermatological conditions, is an indication of a highly evolved, adaptive pharmacopeia, which has developed due to the region-specific environmental stressors and health demands (Malav et al., 2023; Meena, 2011). The revelations shed light that this biocultural heritage is under a two-fold threat of extinction of biological and also erosion of culture. Over harvesting and subsequent depletion of some species like the *Withania somnifera* and lack of generational knowledge is also a parallel tragedy that needs to be addressed urgently (Jain and Jain, 2016). It is not only conservation of flora; conservation is the protection of a cultural self and the strength of native individuals. The recorded knowledge provides sustainable development opportunities, food security, and affordable healthcare, although they are to be appropriately stewarded. It is time now to go a step further to go beyond documentation to active protection and revitalisation. Empowering Biodiversity Management Committees, implementing the mechanisms of Access and Benefit-Sharing, and incorporating the traditional knowledge into the official curricula are the necessary policy measures. Research in the future ought to shift onto pharmacological validation and value-chain development in order to make this knowledge economically feasible to local stakeholders (Pareek & Trivedi, 2011). Finally, the continued existence of the ethnobotanical tradition of Alaniya is a social justice issue, a respect of intellectual contributions of the indigenous population, and a desire to have this precious knowledge preserved to the benefit of future generations.

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