Medicinal plants and sustainable animal health: The ethnobotany of Veterinary knowledge in north east of Algeria (Tebessa)

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Abstract

Background: Ethnoveterinary medicine is a key component in the animal healthcare system particularly in semi-arid areas where people have lack of access to modern health services for animals. The current study was undertaken in Tebessa region, North-East of Algeria to document herbal remedies traditionally used in veterinary medicine and assessment of their ethnobotanical value.

Methods: Information was explored by means of 296 structured interviews with local stakeholders (veterinarians, farmers, herbalists and elders). Ethnobotanical indices like Relative Citation Frequency (RFC), Use Value (UV), Fidelity Level (FL), Informant Consensus Factor (ICF) and Family Importance Value (FIV) were prescribed. Similarity analysis between the floras of different studies was performed using Jaccard´s Index (JI).

Results: Sixty plant species of 32 families were reported. The Lamiaceae (FIV = 0.204), Fabaceae (FIV = 0.163) and Asteraceae (FIV = 0.143) families were the most represented, respectively. Good citation rated *A. herba-alba, T. foenum-graecum, T. vulgaris, J.* communis which have been commonly used for antiparasitic and gastrointestinal properties. If high informant consensus (ICF = 0.83 and 0.736) would be interpreted as indicating a commonality of used species on each disease category then the diseases categories treated for most often were digestive and dermatological problems, respectively. Comparative floristic analysis identified a modest level of similarity with the neighbouring Algerian regions (Naama JI = 22.86 %; Laghouat JI = 22.92 %) and poor level of similarity with remote ecosystems in countries like Ethiopia (JI = 6.1 %) or Brazil (JI = 2.8 %).

Conclusion: The study validates that Tebessa harbors a rich and still useful ethnoveterinary heritage with the taxon sample of plants been fairly conserved despite subsequent changes, especially as concern gastrointestinal pathologies. Nevertheless, the relatively low floristic similarity with remote areas underscores the relevance of bioclimatic and cultural factors in the construction of traditional pharmacopoeias. pharmacognostic report in recent years, the importance of this indigenous knowledge has become more apparent as knowledge of medicinal plants used to veterinary medicine. Recording and preservation of these types of indigenous knowledge can be important for protecting cultural heritage and for developing sustainable alternatives to synthetic veterinary drugs.

Keywords: Ethnoveterinary medicine, Jaccard Index, traditional knowledge, livestock health, semi-arid region.

Introduction

Since ancient times, medicinal plants have been used in the treatment of human and animals (Hadjadj and al., 2025). Such traditional vaccination practices which knowledge is often transmitted as oral tradition through the generations, still prevail in many rural areas in the world.Veterinary ethnomedicine involves all the traditional knowledge, practices and beliefs that have existed for centuries among humans with respect to livestock health care especially medicinal plants(Oda and al., 2024). Their investigation is scientifically relevant because they could contribute to the primary animal health and the sustainable livestock production2. Indeed, in remote rural communities, traditional plant remedies are frequently the principle form of veterinary care for livestock operations due to their availability, low price and belief in efficacy and safety(Oda and al., 2024).

The sector of smallholder animals production in developing countries is often confronted with many animal diseases and inadequate access to modern veterinary services(Oda and al., 2024). As veterinary resources are limited, with most of public veterinary infrastructures concentrated in the cities, farmers who live in the periphery turn to local traditional solutions for their animals (Wendimu and al., 2024).This return to the ethnoveterinary approach is also related to the shortcomings of modern conventional medicines; as the excessive use of synthetic antibiotics and antiparasitics has resulted in alarming resistances and chemical residues in animal food products (Balakrishnan and al., 2023). In view of the inefficacy of some industrial veterinary drugs, research on natural alternatives from traditional pharmacopoeia that can replace these products is growing and farmers and researchers are always looking for natural methods to improve animal health (Balakrishnan and al., 2023). New studies also show that these medicinal plants have rich profiles of phytoconstituents based products, can promote the possibility for new effective and safer drugs for veterinary/animal use (Wendimu and al., 2024).

Similarly, in southwest Algeria (North African context) a recent ethnoveterinary survey reported 26 medicinal plants species used by the local nomadic herders that fall within 15 botanical families mostly represented by Lamiaceae and Fabaceae (Oda and al., 2024). Likewise in the steppe zone of Laghouat (Southern Algeria) 58 medicinal plants involved in traditional antiparasitic treatments have been discovered; which reflect that local ethnoveterinary knowledge was still rich enough to manage animal health (Benlarbi and al., 2023). The most commonly referred species in these traditional pharmacopeias are Artemisia herba-alba, Rosmarinus officinalis, Juniperus spp., Punica granatum, and Atriplex halimus indicating the adaptation of the local flora to the livestock health needs (Oda and al., 2024). The Algerian ethnoveterinary medicine may be described as a body of remedies that is both diversified and culturally dependent, but one which favours, above all the use in livestock medecines.

But this tradition of empirical reasoning is now under assault. Socio-cultural changes (urbanization, outmigration of rural populations, schooling) and the absence of formalized teaching to the youth are causing a gradual disappearance of ethnoveterinary knowledge(Benlarbi and al., 2023). Since much of this knowledge is preserved orally and informally, there is a danger that it will be lost if it is not recorded and protected(Oda and al., 2024). Ethnobotanical studies are hence urgently required for documenting and safe guarding traditional knowledge, scientifically assess the efficacy and safety of indigenous practices as well as to explore possible new therapeutic resources in the field of veterinary science(Wendimu and al., 2024).Recent studies carried out in Algeria and elsewhere have demonstrated that recording traditional knowledge is not only important to preserve cultural heritage but also will contribute to a contemporary pharmacopeia as an alternative to new challenge of antiparasitic resistance(Benlarbi and al., 2023). So that the ethnoveterinary surveys represent a first approach for registration of new bioactive molecules and future continuation of this traditional knowledge at a time where only a small number of studies take place on this domain.

The work hereby reported, performed in an extreme eastern Algerian locality (wilaya of Tebessa) is situated within this frame. The aim is to establish the inventory of medicinal plants used in local traditional veterinary medicine, to explain their empirical use and how this traditional veterinary phytotherapy matches with a modern veterinary science, and whether these natural treatments could be viable alternative therapies for usual drugs.

Materials and Methods

Study area

This ethnoveterinary study was carried out in the wilaya of Tebessa situated at the extreme North-East of Algeria, on the Tunisian border (Figure 01). This area is situated in a semi-arid steppe and so has a continental climate, such as cold winters (Belabid and al., 2023), and low average annual rainfall (200–400 mm) that exhibits varying rates. This ecological setting restricts floristic diversity and predispose the stands of higher representation with xerophilic and aromatic species characteristic steppe rangelands, as alfa (*Stipa tenacissima*) or white sage (A*rtemisia herba-alba*), highly valued in folk medicine and livestock feeding practice as well (Benlarbi and al., 2023). In mountainous regions, the forest community is formed by Aleppo pine (*Pinus halepensis*), evergreen oak (*Quercus ilex)* and junipers (*Juniperus spp*.)., which is also helpful for

therapeutic agents delivery. But human (overgrazing, extension of agriculture) and climatic pressures (repeating droughts) are the reasons for the degradation of habitat that contribute towards deterioration in condition (Ahmim and Zalani, 2023). In reply, some reforestation initiatives such as the Green Dam are being carried out to fight desertification and rebalance environment (Boucherit and al., 2025)

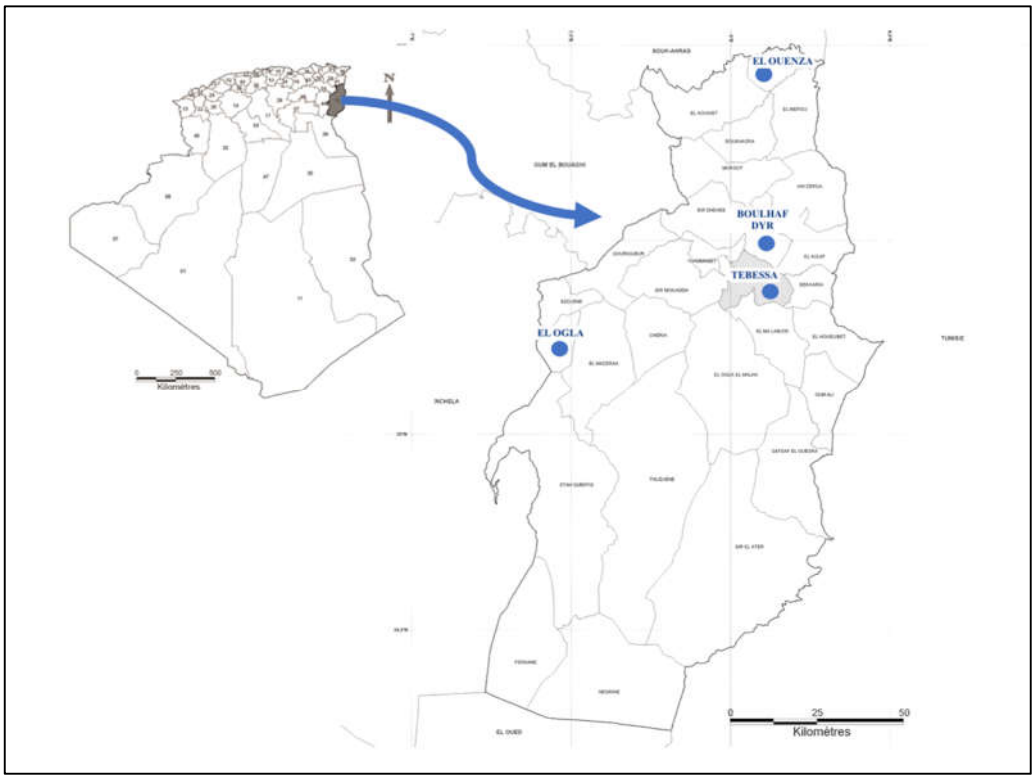

Figure 1. Study area location, Tebessa – Algeria

Socioeconomic setting Tebessa is an agro-pastoral area, and animal husbandry is one of the principal income-generating activities for rural communities. Sheep are the dominant breeding livestock, followed by goats, cattle and camels meat or milk (Hadjadj and al., 2025). These animal production systems are predominantly based on the utilisation of natural rangelands and local plant resources and so spontaneous vegetation is extremely important for herd survival. Under such conditions, animal health is a major concern and the lack of modern veterinary clinics in rural areas accounts for relying on traditional knowledge many times. This knowledge on diverse plants, which have medicinal uses is a strategic resource that would be used to control common morbidities of livestock in order to minimize reliance on synthetic drugs as well as enhancing the sustainability of pastoral systems (Iwaka and al., 2023; Wendimu and al., 2024).

Ethnoveterinary survey

Ethnobotanical survey with ethnoveterinary interest The study was carried out from January to March 2025 in various localities within the province of Tébessa (Tébessa, Boulhef Dyr, El Ouenza and El Ogla) (Figure 01).

The information was gathered through semi-structured interviews with the help of specially designed guidelines following ethnomedical methodological standards (Hankiso and al., 2024). Two hundred informants participated in the survey who were either veterinary doctors, herbalists, farmers, breeders, students or elder people known by their traditional knowledge. The sampling process was reasoned by the choice of key informants, followed by a snow-ball method to recruit new participants according to their recommendation in order to diversify these profiles. Interviews were carried out in the local language (vernacular) following help for illiterate participants.

The questionnaire involved two sections: (i) Sociodemographic, which consiste on age, gender, education level, profession and place of residence and (ii) Ethnoveterinary information that included vernacular names

of medicinal plants; diseases treated; plant part used: Formulation/ method of preparation and administeration and dosage. Both closed and open items were used in the questionnaires to collect both quantitative and qualitative information. Participants were informed about the aim of the trial and their free and informed consent was provided according to ethical rules (Hankiso and al., 2024). The study was approved by the scientific committee in biology department at Tebessa university to ensure that the study comports with scientific rigor.

Every plant cited was observed in situ, photographed and when feasible collected as a voucher specimen. The identification was based on a two-step approach (i) comparison of morphological characters and vernacular names with Reference works on regional flora, along with national registers and identification guides(Ouezel and al., 1062; Chehm, 2006; Zeguerrou and al, 2010), (ii) confirmation by a botanist expert in plant biology. The revised scientific name was confirmed from the World Flora Online, following the guidelines of recent ethnobotanical findings (Hankiso and al., 2024).

Data processing

The data was entered into Microsoft Excel 2021 and processed with Minitab 18 software. Descriptive analyzes allowed for the calculation of frequencies and relative percentages. Several ethnobotanical indices were used to evaluate the relative importance of the species and the degree of consensus among the informants: relative citation frequency (RFC), use value (UV), fidelity level (FL), family importance value (FIV), and informant consensus factor (ICF), Jaccard Index (JI). The definitions, formulas, and interpretations of these indices are summarized in Table 1.

Table 1. Ethnobotanical indices used in the study; ICF, UV, FIV, FL, RFC, JI

Indices	Formula	Interpretation	References
Relative Frequency of Citation (RFC)	RFC = FC / N For each species: count the number of informants who cited it (FC) and divide by the total number of informants (N).	Measures the proportion of informants who know/use a species; higher RFC = cultural salience.	Tardío and Pardo-de-Santayana, 2008
Use Value (UV)	UV = ΣUR / N For each species: sum of all use reports (UR) divided by total informants (N). Each (informant × species × category) = 1 UR.	Assesses the relative importance of a species; higher UV = higher versatility and use frequency.	Tabuti and al., 2003.
Family importance Value (FIV)	FIV = FCF / NS FCF = number of informants citing ≥1 species in the family; NS = number of species in that family.	Evaluates the cultural importance of a family within local ethnopharmacopoeia.	Sreekeesoon and al., (2014)
Fidelity Level (FL)	FL (%) = (N_p / N) × 100 N_p = number of informants citing the species for the same ailment; N = total informants citing the species.	Measures specificity of use of a species for a given ailment; high FL = targeted consensus.	Alexiades, 1996.
Informant Consensus Factor (ICF)	ICF = (NUR − NT) / (NUR − 1) NUR = number of use reports in a disease category; NT = number of species used for that category.	Measures agreement among informants; approaches 1 when consensus is high.	Heinrich and al., 2009
Jaccard Index (JI)	JI = c / (a + b + c) a = species exclusive to area A, b = species exclusive to area B, c = species common to both. Often expressed as %.	Measures floristic similarity between two regions; higher JI = greater overlap in plant species.	Gonzalez-Tejero and al., 2008.

Results and discussion

Description of the surveyed population

Sociodemographics of the participants in the survey of medicinal plants use in veterinary medicine are presented in table 2. A total of 300 questionnaires were distributed and filled by the participants, but only 296 questionnaires that are completely filled were considered for analysis. The ultimate sample is comprised of

veterinarians, herbalists, breeders, students and respected oldsters. The variables studied are: place of birth, gender, age, marital status and level of education that can help evaluating the diversity of profiles and the contribution of socio-cultural factors to the knowledge on ethnoveterinary.

Table 2: sociodemographic profile of the informants

Factors		Nomber of informants	Ppercentage	p
Origin	Urban	156	52.70%	<0.000
	Rural	140	47.30%	
Gender	Mal	184	62.16%	<0.000
	Female	112	37.84%	
Age	<20	14	4.73%	>0.050
	20-40	150	50.68%	
	40-60	78	26.35%	
	>60	54	18.24%	
Family situation	Single	106	35.81%	>0.050
	married	166	56.08%	
	widow	12	4.05%	
	Divorced	12	4.05%	
Educational level	Illiterate	62	20.95%	>0.050
	Primary	36	12.16%	
	Middle	38	12.84%	
	High school	32	10.81%	
	Higher education	128	43.24%	

The survey demonstrates an equal distribution of respondents in urban (53%) and rural (47%) settings with a highly significant difference ($p < 0.001$). This distribution facilitates the comparison between living contexts. Similar results were reported in Laghouat (Algeria), where 65% of the informants lived in urban areas (Benlarbi and al., 2023), whereas in Morocco, Chaachouay and al. (2022) noted a predominance of rural practices.

Men represent 62% of the respondents compared to 38% of women ($p < 0.001$). This trend aligns with the observations of Benlarbi et al. (2023), but contrasts with other contexts where women play a central role, highlighting the cultural influence on the transmission of knowledge (Qari and al., 2023).

The majority of participants are between 20 and 40 years old, which suggests an increasing involvement of young adults in the promotion of traditional medicines. This observation differs from studies where older people were identified as the main holders of knowledge (Benlarbi and al., 2023), and reflects a generational evolution. However, neither marital status nor level of education significantly influences the use of plants ($p > 0.05$). This result aligns with the work of Hadjadj and al. (2025) and confirms that ethnoveterinary knowledge is shared both by the unschooled, who possess empirical knowledge, and by graduates, who are increasingly interested in alternative practices.

Plants surveyed

1.1.Classification of plants:

A list of 60 plant species belonging to 32 botanical families used for veterinary purposes was documented in this study. This subsample of plants and their values for distinctive indices (FL, RFC, UV and FIV) are presented in Table 3.

Table 3. List of plants used for ethnoveterinary purposes.

***De**: Decoction, **In**: Infusion, **Ra**: Raw, Fu; Fumigation, **Po**: Powder, **Na**: Nasal, **Ca**; Cataplasm, **To**: Topical, **Or**: Oral , **Ba ;**Bath, **EEP**; Endo And Ecto Parasitic, **OHP**; Other Health Problems, **GIP**: Gastro-Intestinal Problems, **DP**: Dermatological Problems,**UP**: Urinary Problems, **Resp**: Respiratory Problems,**Rep**; Reproduction Problems, **HP**; Heart Problems,*

Scientific name and family	Local name	Part used	Preparation form	Administration mode	Disease category	Animal treated	Ethnoveterinary uses	RFC %	UV %	FL%	FIV
Amaranthaceae											0.004
Beta vulgaris	السلق Selk	Aerial part	Ra	Or	GIP, HP	Sheep	Food supplement, Anemia	0,7%	0,7%	100	
Amaryllidaceae											0.061
Allium cepa L.	البصل Bsal	Whole plant	Po, In, Ra	Or	ResP, OHP, EEP	Sheep, Cows,Goats, chickens	Influenza, Arthritis, insect bites	2,7%	5,1%	46.7	
Allium sativum L.	الثوم Thoom	Whole plant	Ra, De, Po, In	Or	GIP, ResP	Sheep. Cows, Goats, chickens	Flu.colds , Anorexia	3,4%	4,4%	69.2	
Anacardiaceae											0.013
Rhus coriaria	الدباغة Dbar	Whole plant	De, Po	Or, To	GIP	Sheep Goats chickens	Diarrhea, Abdominal diseases	2,0%	2,0%	100	
Apiaceae											0.009
Pimpinella anisum	اليانسون Yansoon	Flower	De	Or	OHP	Cats	Cough	0,3%	0,7%	50	
Thapsia garganica	الدرياس Derias	Flower	De	To	OHP	Cows	Low milk production	0,7%	0,7%	100	
Apocynaceae											0.004
Nerium oleander L.	الدفلى Dafla	Whole plant	Fu	Na	DP	Bees	Bee wing rot	0,7%	0,7%	100	
Araliaceae											0.002
Panax ginseng	جينسنج الأسيوي Ginsing	Aerial part	De, Po	Or	HP	Sheep	Blood pressure	0,3%	0,3%	100	
Asphodelaceae											0.007
Aloe vera	صبار Sabbar	Aerial part	Oil, Ca,	To	DP	Sheep, Cows, Goats	Skin Ulcers, Burns	1,0%	1,0%	100	
Asteraceae											0.143
Anthemis arvensis	البابونج Baboundj	Flower	De, Po, In, Ra	Or, To	GIP, NP	Sheep, Cows, Goats, Dogs, Cats	Vomiting, inflammation, calming	3,4%	4,1%	83.3	
Artemisia herba-alba asso.	الشيح Chih	Whole plant	De, Po, In, Ca, Ra	Or, To	EEP, GIP, ReP, DP, UP	Sheep, Cows, Goats, chickens	Expel worms, Digestive problems, Gas, Uterus Inflammation, Mastitis, swelling, sores, Urinary tract cleansing	9,5%	12,2%	66.7	
Cynara scolymus	الخرشف Elkhorchef	Aerial part	Ra	Or	GIP	Sheep, Cows, Goats	Digestive problems	1,4%	1,4%	100	
Saussurea costus	القسط الهندي Kast elhindi	Stem	Po	Or	GIP, ResP	Sheep, Cows, Goats	Respiratory and digestive problems,	0,3%	0,7%	50	
Scorzonera undulata Vanl.	القزيح Elgouzih	Whole Plant	Fu	Na	RseP, DP	Sheep, Cows, Goats chickens	Influenza, Smallpox	3,4%	4,1%	66.7	
Brassicaceae											0.020
Anastatica hierochuntica	كف مريم Kaf mariem	Whole plant	Po	Or	ResP	Sheep	Respiratory disease	0,3%	0,3%	100	
Lepidium sativum	حب الرشاد Hab erached	Seed	Po	To	DP	Sheep	Inflammation	2,0%	2,7%	75	
Cactaceae											0.009
Opuntia ficus-indica	التين الشوكي Elhendi	Aerial part	Ra	To	PGI, PD, OHP	Sheep, Cows, Goats, chickens, Dogs, Cats, Horses, Camels, Bees	Malaria, skin diseases, joint pain	0,3%	1,0%	33.3	
Opuntia maxima	الصبار Sabbar	Leaves	Ra	To	PD	Sheep, Cows, Goats, chickens	Skin diseases and burns	0,3%	0,3%	100	
Caryophyllaceae											0.002
Paronychia argentea L.	زهرة الالماسة Zahrat elalmas	Flower, Leaves	Fu, De	Or	DP	Dogs, Cats	Skin diseases	0,3%	0,3%	100	
Cucurbitaceae											0.015
Citrullus Coloocynthis	الحنظل Elhandel	Fruit	Po	To	EEP, DP	Sheep, Cows, Goats, Camels	Insect bite, Scabies	0,7%	1,4%	50	

Cucurbita pepo L.	اليقطين Graa	Seed	Ra	To	DP	Sheep, Cows, Goats, chickens	Wounds	0,7%	0,7%	100	
Ecballium elaterium	فقوس الحمار Fagoos Lhmar	Whole plant	Po, In	Or	OHP	Cows, Goats, chickens	Trauma, Hepatitis	0,3%	0,3%	100	
Cupressaceae											0.069
Eryngium planum	التسكرا الشوكية Teskr chaowki	Flower	De, in	Or	ReP	Cows	Placental retention	0,3%	0,3%	100	
Juniperus communis L.	العرعار Araar	Whole plant	Fu, De, Po, In, Ca	Or, To	GIP, ReP, EEP, DP, OHP	Sheep, Cows, Goats, chickens, Camel	Indigestion, pain, swelling. Diarrhea abortion, insect bite, Scabies Arthritis,fracture	5,4%	10,5%	48.4	
Fabaceae											0.163
Anthyllis vulneraria	عرق الصغير Areg Sghir	Stem	In	Or	GIP	Sheep	Hepatitis	0,3%	0,3%	100	
Ceratonia siliqua L.	الخروب kharoob	Fruit	Ca, Ra	To	GIP, DP	Goats	Diarrhea, External wounds	0,7%	1,0%	66.7	
Glycyrrhiza glabra	عرق السوس Areg Soos	Root	De, Po	Or	GIP	Sheep	Digestives problems	0,3%	0,3%	100	
Lupinu salbus	الترمس termos	Seed	Po,	Or	GIP, DP	Sheep, Cows, Goats	Expel worms, fetal malformations	0,7%	1,0%	66.7	
Medicago sativa	الفصفصة Fasfsa	Whole plant	po	Or	GIP	Sheep, Cows, Goats	Indigestion	1,7%	1,7%	100	
Trigonella foenum-graecum	الحلبة Helba	Aerial part	Oil, De, Po, In, Ca	Or, To	OHP, UP, GIP	Sheep, Cows, Goats, chickens	fractur, Hepatitis, kidney inflammation, Low milk production, Digestive problems	7,4%	20,9%	35.5	
Lamiaceae											0.204
Lavandula officinalis	الخزامى Khzama	Aerial part	Oil, De, Ra	Or	ResP	Chichens	Asthma	2,7%	4,7%	57.1	
Marrubium vulgare	المروبية Maroobia	Whole plant	De, In	Or	GIP, HP	Sheep, Cows, Goats	Abdominal pain, Arterial pressure.	1,4%	2,0%	66.7	
Mentha spicata L	نعناع Naanea	Leaves	De, Ra	Or	GIP	Sheep	Indigestion	2,7%	3,4%	80	
Salvia rosmarinus	اكليل الجبل Lklil	Leaves	De, Po, Ca, Ra	Or, To Ba	DP	Sheep, Cows, Goats, chickens	Inflammation, Wounds	3,4%	4,7%	71.4	
Scutellaria baicalensis	سكوتيلاريا Skootilaria	Flower	De	Or	NP	Dogs, Cats	Neurological problems	0,3%	0,3%	100	
Teucrium polium L.	الخياطة Khayata	Whole plant	Po, Ca	To	DP	Sheep, Cows, Goats, Dogs, Cats	Superficial wounds, Suppurations	4,7%	4,7%	100	
Thymus vulgaris L	الزعتر Zaaitra	Whole plant	Oil, De, Po, Ra	Or	GIP, ResP, HP	Sheep, Cows, Goats, chikens, Dogs, Cats	Diarrhea, swelling, respiratory disease, heart disease, convulsions	6,1%	11,8%	51.4	
Lauraceae											0.004
Cinnamomum verum L.	القرفة karfa	Stem, bark	Po	Or	ResP, PU	Sheep, Cows , Goats	Burns, Adenomatous malformations	0,3%	0,7%	50	
Lythraceae											0.048
Lawsonia inermis L	الحناء Henna	Leaves	Po	Or, To	GIP, ReP	Sheep, Cows, Goats	Diarrhea, Wounds Cleaning uterus	1,4%	2,4%	57.1	
Punica granatum L	الرمان Roman	Seed, Fruit, bark	De, Po, Ra	Or, To	GIP, DP, UP	Sheep, Cows, Goats, chikens	digestion problems, diarrhea, mouth problems	2,7%	5,1%	53.3	
Myrtaceae											0.026
Eucalyptus globulus Labill	الكاليتوس Kalatoo s	Leaves	Fu, De	Na	UP	Sheep, Cows , Goats	Urinary retention, respiratory problem	3,4%	4,1%	83.3	
Nitrariaceae											0.009
Peganum harmala L.	الحرمل Harmel	Seed,	oil Po	Or, To	GIP	Sheep, Cows, Goats	Swelling	1,4%	1,4%	100	

		Leaves									
Oleaceae											0.041
Olea europea L.	الزيتون Zitoon	Fruit, Leaves	Oil, in , Ra	Or, To	HP, Resp OHP	Sheep, Cows, Goats, chickens	Blood pressure, respiratory problems, joint pain	3,4%	6,4%	52.6	
Oscillatoriaceae					≤						0.004
Arthrospira platensis	سبيرولينة Spirulina	Whole plant	Po	Or	GIP	Sheep	Diarrhea, Inflammation	0,3%	0,7%	50	
Papaveraceae											0.002
Papaver rhoeas L.	بوقرعون Boogaroon	Flower	De	Or	ResP	Sheep, Goats	Respiratory problem	0,3%	0,3%	100	
Pinaceae											0.007
Pinus halepensis	الصنوبر Snoober	Root, Bark	Ra	To	ReP	Sheep	Uterus Inflammation	1,0%	1,4%	50	
Poaceae											0.024
Cenchrus ciliaris L.	السبط Spbat	Stem	Ca	Or	GIP	Sheep	Abdominal pain	0,3%	0,3%	100	
Panicum mombassa	البونيكام boonikam	Leaves	Po	Or	EEP	Sheep	Internal worms	0,3%	0,3%	100	
Stipa tenacissima L.	الحلفاء Halfa	Whole plant	Fu, Po, Ca	To	DP, UP	Sheep, Cows, Goats, Chickens	Eye swelling urine retention	1,4%	2,0%	66.7	
Triticum aestivum L	قمح gameh	Seed	Ca, Ra	To	OHP	Sheep, Cows , Goats	Fractur	0,3%	0,3%	100	
Zea mays	الذرى Mastora	Whole plant	Po	Or	OHP, GIP	Cows, chickens	Low milk production Digestive problems.	0,3%	0,7%	50	
Ranunculaceae											0.030
Nigella sativa L	سنوج Sanoodj	Aerial part	De, Po, In	Or	GIP, ResP ReP	Sheep, Cows, Goats, chickens	gas, swelling, Respiratory immune problems, Inflammation.	2,4%	4,7%	100	
Rosaceae											0.004
Malus domestica L	التفاح Tuffah	Leaves	Ra	Or	GIP	Sheep	Indigestion, Antioxidant	0,3%	0,7%	50	
Rutaceae											0.002
Ruta graveolens	الفيجل Fidjel	Leaves	Ra	Or	GIP	Sheep	Swelling	0,3%	0,3%	100	
Solanaceae											0.013
Capsicum annuum L	فلفل حار Felfel har	Whole plant	Po, Fu	Or, To	OHP, ResP	Sheep, Cows, Goats, chickens	low milk production, Influenza.	1,0%	1,7%	40	
Nicotiana tabacum	التبغ Dokhan	Flower	Fu	Or, Na	ResP	Sheep	Cough	0,3%	0,3%	100	
Theaceae											0.028
Camellia sinensis L	الشاي الاخضر Latay	Leaves	In, De	Or	GIP	Sheep, Cows, Goats	Indigestion, swelling	2,4%	4,4%	53.8	
Thymelaeaceae											0.002
Thymelaea hirsuta	لازاز, المتنان Lazaz, Methnan	Leaves	Oil	To	DP	Sheep	Suppurations	0,3%	0,3%	100	
Urticaceae											0.007
Urtica dioica L	قريصة. الحريقة Horrig	Stem, Leaves	De	Or	OHP, UP	Sheep, Cows, Goats	Haemorrhage, Urinary retention	0,7%	1,0%	66.7	
Zingiberaceae											0.022
Zingiber officinale Roscoe	زنجبيل Zandjabil	Root	De, Po, In , Ra	Or	GIP	Sheep, Cows , Goats	Vomiting,Digestive problems, Inflammation	2,4%	3,4%	70	

Taxonomic clasificaction of plants

A total of 32 medicinal plant families were extracted from the records in Table 3. in Tebessa, Fabaceae, Lamiceae and Asteraceae represents the main species of the veterinary local pharmacopeias. The family Lamiaceae has the maximum value (FIV = 0.204) with respect to seven species (Lavandula, Marrubium, Mentha, Salvia, Scutellaria, Teucrium Thymus). It is succeeded by the Fabaceae (FIV = 0.163; 6 species) and Asteraceae (FIV = 0.143; 5 species). More or less intermediate position is held by medium-sized families like Cupressaceae (FIV = 0.069; 2 species) and Lythraceae (FIV = 0.048; 2 species), whereas in most other families the FIV was low (< 0.04) even if they only occurred sporadically. In contrast, at the Aflou site (Algeria), Asteraceae is the top-ranked family for FIV (0.23) followed by Amaryllidaceae (0.188) and Cupressaceae (0.11), Lamiaceae ranks fourth with a lower FIV value of 0.08 despite being the most represented family in terms of number species [9] (Benlarbi et al., 2023). In contrast, the evidence in Naâma (South-Western Algeria), concerning steppe−semi-arid herders practices provides a floristic dominance of Lamiaceae (19% species surveyed) and Fabaceae (12 %), Hadjadj et al., 2025. However, the high rank occupied by Fabaceae in our results, in both FIV order and species number, is also coherent with the agro-pastoral ecosystems of the Maghreb where forage legumes (Medicago, Trigonella) are very common and culturally well known to herders thus increasing the probability of species citation and so FIV. Among the Moroccan Rif, whatever the family considered, the richest families in terms of species counts are (Chaachouay and al., 2022 a): Lamiaceae (9 species), Asteraceae (7) and Fabaceae (6), in accordance with th at determined here for specific richness hierarchy.

The prevalence of Lamiaceae revealed in the present study accords with the Mediterranean pattern often reported, where Lamiaceae and Asteraceae are predominant in traditional pharmacopeias because they have a high intrinsic richness and local abundance of aromatic metabolites (phenolic/terpenic) suitable for veterinary uses (Benlarbi et al., 2023).

Medicinal plants reported

Similar observations have been reported from the region of Aflou (Algeria) where highest RFCs were recorded for a few species (*Artemisia herba-alba* = 1.00; *Allium sativum* = 0.305; *Salvia rosmarinus*= 0.165; *Lavandula officinalis* = 0.165; *Juniperus phoenicea* = 0.125, even though less documented were available and then not mentioned by authors), (Benlarbi and al., 2023). The concordance of the rank between our component sunspots species (Artemisia, Thymus, Juniperus) and those identified in Aflou indicates that a local core group of breeds is stable over time.

Variation may have been due to ecologic or cultural differences, but also the presence of other plants in the locality. plants such as *Artemisia herba-alba, Juniperus communis, Trigonella foenum-graecum* or *Thymus vulgaris* that are rich sources of bioactive compounds: flavonoids, phenolic acids, essential oils and saponins. These compounds have antimicrobial, anti-inflammatory and antiparasitic effects and that is why they are widely used in the treatment of common animal infections such as gastric infection, cutaneous infection and parasitic diseases (Raina et al., 2019; Ibrahim et al., 2023). This underlines that plant species with high activity values for phytochemical content are widely used in traditional veterinary treatments (Table 4). On the other hand, these species referred to alone appear to be less incorporated into current traditional uses despite some known biological activities (antioxidant, immunostimulant, healing…), perhaps because they are not very well known or do not have wide distribution or can only be found in a very restricted area.

Table 4 bBoactive compound and biological activity of recent medicinal plants

Scientific name	Bioactive compositions	Biological activiter	Reference
Artemisia herba-alba Asso.	Phenolicacids-Flavonoids- Sesquiterpene-Lactones Tannins	Antimicrobial -Antiviral- Hepatoprotective Anti-inflammatory	Lambo and al ,2024
Zingiber officinale Roscoe	shogaols, gingerols, paradols, zingerone and zigiberenes	Anti-inflammatory activities, Antidiabetic activities, Antiobesity activities,	Samanta, 2022

		Anticanceractivities, Gastroprotective activities	
Punica granatum L.	Flavon-3-ols/Flavonoids and their glycosides	Antioxidant,Antimicrobial,Anti-inflammatory and anticancer activity	Prakash and Prakash ,2011
Rhus coriaria L.	Ethylacetate	Antimicrobial	Byamukama and al, 2015
Anthémis arvensis	Pdyphenols	antioxidant ,anticancer	Riccobono, and al., 2017
Lawsonia inermis L.	phenolic compounds, flavennids, saponins, proteins, alkaloids, terpenoids quinones, coumarina, xanthones,	Antibacterial,antiparasitic,hepatoprotective	Al-Snafi ,2019
Salvia rosmarinus	triterpenes-tricyclic diterpenes-phenolic acids	anti-inflammatory, antimicrobial and antioxidant	Jeevalatha and al., 2022
Peganum harmala	harmaline and harmine	Antimicrobial ,psychoactive and antimicrobial properties, treat infections	Laudato and Capasso, 2013; Wang and al , 2022
Marrubium vulgare	polyphenols, monoterpenes, diterpenes	antioxidant, antimicrobial, antifungal	Samuel and al, 2023
Scorzonera undulata	methyl hexadecanoate, methyl linolenate, heneicosane	antimicrobial, antifungal	Boussaada and al, 2011
Nigella sativa	pdyphenolsand flavonoids	Antioxidants	Dalli and al, 2021
Teucrium polium L.	flavonoids	Antibacterial	Al-Mutaani and al ,2025
Cenchrus ciliaris L.	phenol, flovonoids, saponins and alkaloids	Antimicrobial	Jabeen and la., 2023
Lavandula stoechas	linalyl acetate (40%), linalool (30%), limonene, β-ocymene, 1,8-cineole, camphor, α-terpineol, borneol, as well as phenolic acids, ursolic acid, coumarins, flavonoids and sterols	antibacterial, antifungal, carminative, antiflatulent, antihistaminic, sedative and antidepressant.	Bayrak , 2017
Thymus vulgaris L.	thymol, p-cymene, γ-terpinene, carvacrol, linalool and borneol	Antioxidant	Nejad et al, 2024
Lepidium sativum	glycoside, alkaloids, phenolic, flavonoids, cardiotonic glycosides, coumarins, glucosinolates, carbohydrates	anti-inflammatory, antioxidant, antimicrobial and antitumoral. anticancer, hepatoprotective and bone-healing activities	Al-Snafi , 2019; Ahmad and al, 2021; Painuli et al, 2022
Allium sativum L.	allicin	Antimicrobial, antifungal improve immune response and treat respiratory infections	Laudato and Capasso, 2013
Trigonella foenum-graecum	Flavonoids	,antioxidants	Yadav and Baquer, 2014
Cynara scolymus	phenoles	Antioxidant	Petropoulos and al, 2018
Stipa tenacissima L.	cellulose and hemicelluloses,	antioxidant and anticancer, antiproliferative against cancerous cell lines, natural food, improving livestock productivity and health without the adverse effects associated with antibiotics	Mehdadi et al 2013; Pasaribu, 2019; Bouchti and al, 2021
Olea europaea L.	phenolics, tocopherols, carotenoids and phospholipids	Antihypertensive, antiviral, anti-inflammatory, hypoglycemic	Talhaoui and al ,2018
Camellia sinensis L.	polyphenols (catechins and epicatechin), theaflavins, flavonol glycosides	Prevention of cardiovascular disease, malignant tumours, digestive disorders, metabolic disorders	Samanta, 2020
Juniperus communis L.	Phenolics ,β-pinene and 1α-pinene terpenoids	urinary tract infections, antibacterial activity anti-inflammatory	Albrecht and Madisch.2022 ; Dumitrescu and al, 2022; Gonçalves and al, 2022
Allium cepa L.	Flavonols	Anticancer, antibiotics, anti-inflammatory, antiplatelet, antidiabetic and cardioprotective agents	Sagar and al, 2021
Nerium oleander.	Dichloromethane (chloroformic, acetonic and diethyl ether)	Anticancer ,Antiparasitic effect	Al-Snafi, 2020

Medicago sativa	flavonoids, saponins and phenolic acids	boost immune response, antimicrobial	Alamgir, 2018; Paciana and Butnariu, 2021
Mentha spicata L.	polyphenols, flavonoids and essential oils	anti-inflammatory, antibacterial and analgesic - cooling agent	Abbas and al, 2022; Chandini and Hegde, 2022
Eucalyptus globulus labill	Phenolic, essential oils	Antioxidant , antiseptic and anti-inflammatory	Ramawat and al, 2009; Singab and al,2011

Plants part used

Analysis of the data in figure 2 reveals that whole plant are frequently used for preparing traditional veterinary formulations, which constitutes 23.31%. The use of leaves is well-controlled, representing 22.97% and indicates specific interests for secondary-rich parts. The flowers are used in 11.81% of the cases stem in 10.47% and aerial parts in 10.81% of the cases. Seeds are also used in 8.11% , followed by bark, fruits and roots, which are little utilized (betwee3,38% and 5.41%).

This indicates that plant parts utilized have specific alternatives. But it is observed that people always use the entire plant or leaf, as they are readily available and easy to prepare, containing rich bioactive compounds. Khan and al., 2018 observed that leaves are usually the most used portion in traditional recipes, which is consistent with our findings. Also, Ariyo and al (2021) mentioned that the highest frequency is because leaves are accessible and they are main site of photosynthesis and for compounds with medicinal benefits. which is of great therapeutic value to them.

The preference for the use of leaves in the prepa- ration of herbal medicines by the healers is likely due to the year- round availability of leaves, and the fact that they are easier to process, collect, store, and handle. Therefore, the leaves are natural food for some animals and they are also eaten for self-medication. Leaves and seeds are the renewable parts of the plant and their collection does not result in fatality (Chaachouay and al., 2022 a).

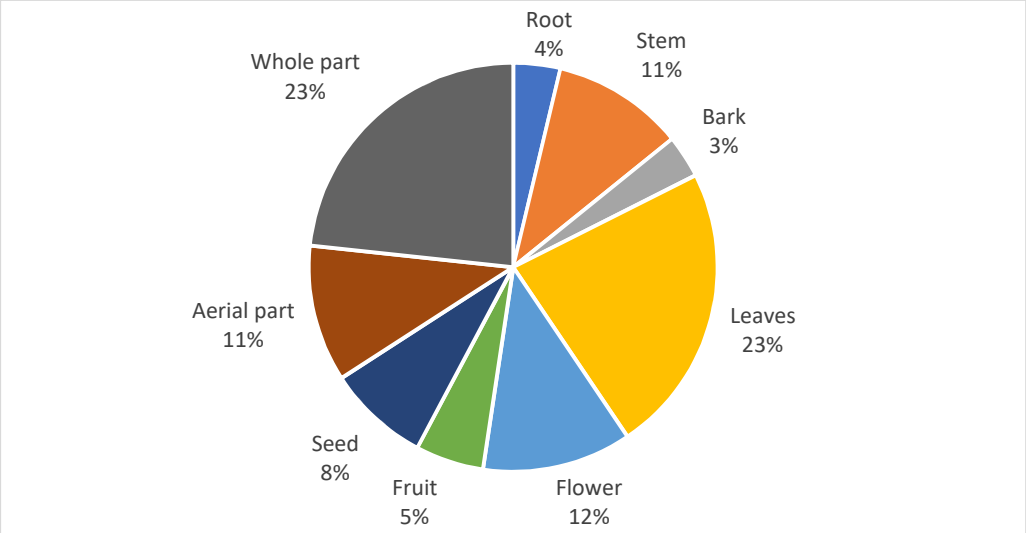

Figure 2. Uses frequencies of plants parts

Method of preparation

The evaluation of the figure 3 data indicate that, powder is most used into veterinary medicine by 26.69 %. Decoction (21.28%) was more frequent followed by raw (18.58%), infusion (13.18%), and cataplasm (8.78%) and Fumigation (7.10%). Vegetable or carrier oils are second in prevalence (4.39%). This distribution has a strong enforced preference for straightforward and time-honored plant processing methods, particularly those that can be artisanally and rapidly prepared without sophisticated gear. This is consistent with this of Chaachouay And Zidane (2021) who reported that decoction is the preferred method of preparation by the plants they studied.

Decoction is frequently selected for its advantages in animal health. It can heat the body, sterilize and take beneficial essences extract of plants. It also enables the elimination or reduction of toxicity of some plant mixtures while conserving many bio-active compounds (Chaachouay and al, 2020). This benefit of decoction makes it a convenient and efficient method, particularly in the rural region where modern medical technology is not too handy.

the results demonstrate that the methods of preparation are due to practical motives and health reasons, and that the most frequent presentations continue to be associated with traditions and local knowledge.

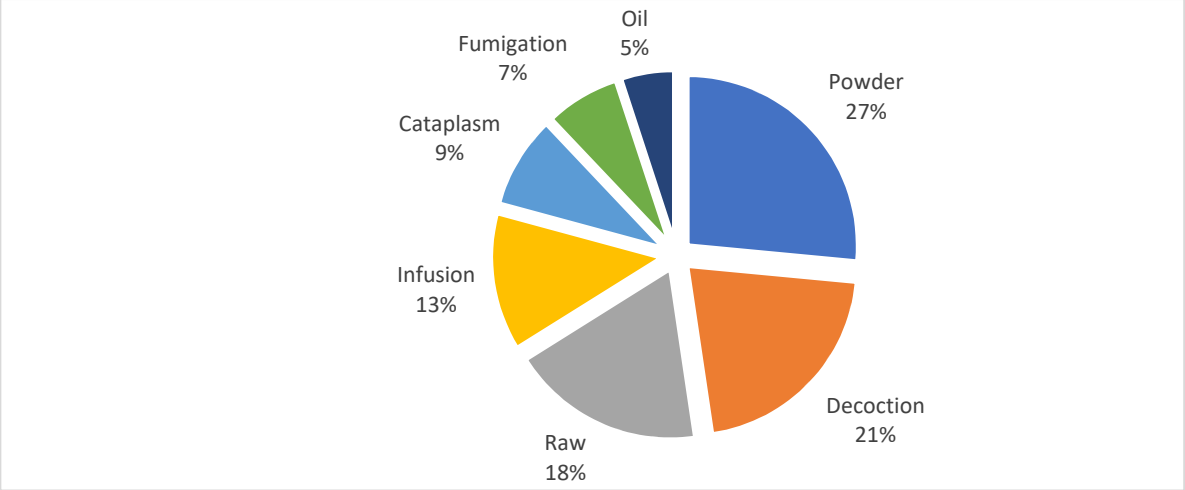

Figure 3. Therapeutic Plant utilization frequencies

Route of administration

Figure 4 shows that oral administration (60.81%) is the main route in veterinary medicine. This tendency suggests that a lot of individuals directly prepare the herbal drugs in powder, decoction, infusion or other forms which they can easily ingest. The topical method is followed with 31.76% , this long figure underlines the role of products used on skin including poultices, ointments and oil massages. Nasal methods (5.07%) and therapeutical baths (2.36%), on the other hand, have very low prevalence interpreting someone who uses them for some health problems or from certain environment only. This distribution indicates strong dependence for simple, straightforward techniques which can be applied conveniently with the very limited facilities found in rural communities. This is supported by the findings of Alu and al (2022) and Benlarbi and al 2023 whose reported oral method of treatment being practiced by respondents. This observation emphasizes the significance of oral route which can help in fast release of drug to target organs and enabling livestock farmers to effectively administer it.

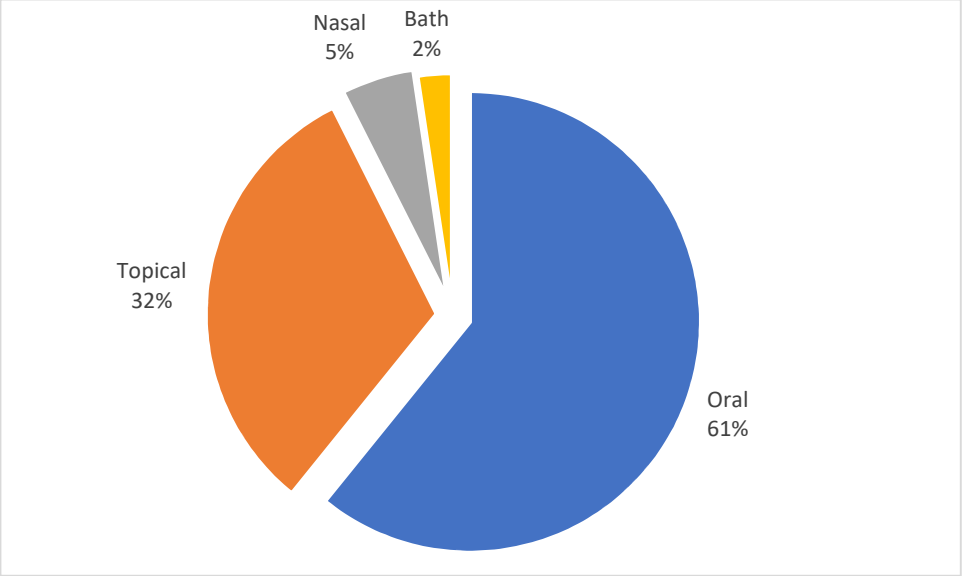

Figure 4. Plants administration mode

Animals treated

The data in Figure 5 reveal that sheep are the animals which received medicinal plants treatment more frequently, with 30.41% percentage of cases, followed by cows (23.65%) and goats (22.97%). For chickens, it is weak (11.49%) and becomes even lower for companion animals like cats or dogs with (4.05%). Tendency to the Uncommon Occurrence of Non-Ruminants For, camelids(2.03%) bees (1.01%)and equine(0.34%)s are very infrequently used; evidencing the fact that ruminants appeared most extensively in relation to ethnopraxis on animal health. These findings are similar to that reported by Chaachouay and al., 2022a. They recalled that small ruminants including sheep were the focus of traditional medicines made from plants in Morocco. The priority for sheep is based on economic importance and susceptibility to certain diseases. This economic dependency makes it imperative to keep them healthy.

But sheep are very sensitive to gastro-intestinal parasites that lead to heavy financial losses (declining productivity, mortality and poor quality in terms of production). To overcome these challenges, interest in medicinal plants that fight worms is growing because they represent a natural and sustainable alternative to chemical drugs, which can lead to resistance in parasites or side effects (Radwan and al.,2021).

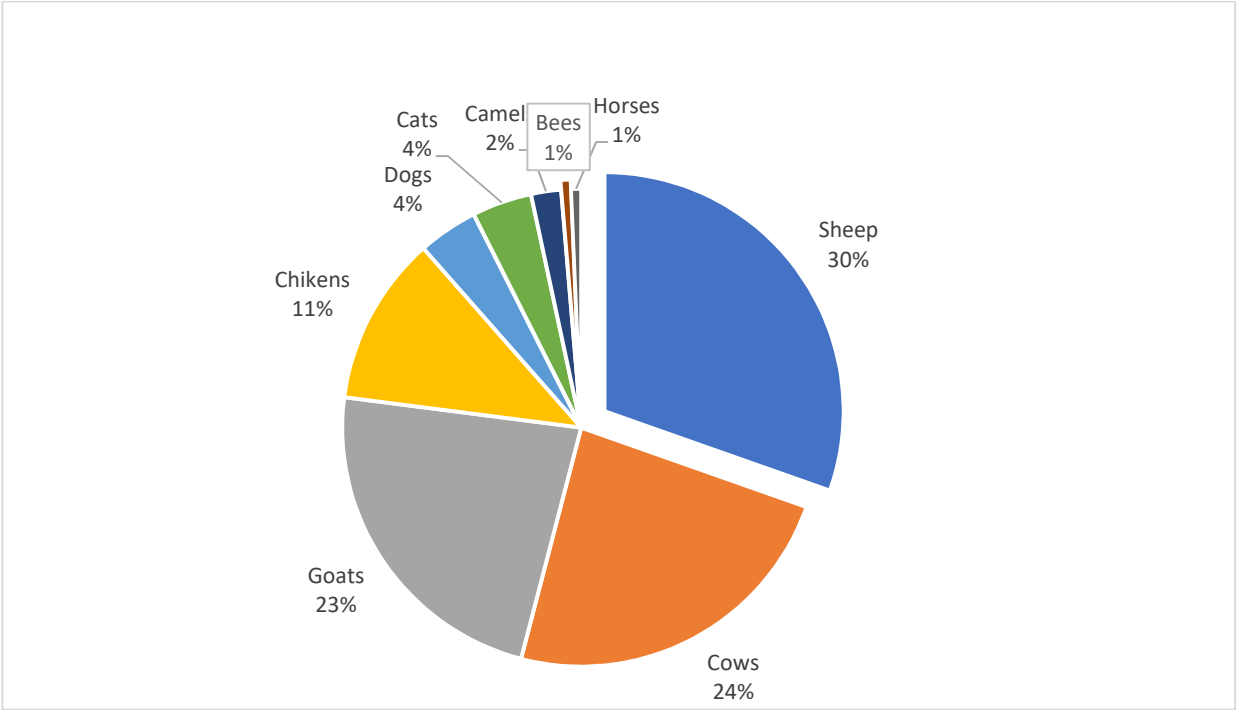

Figure 5. distribution by animal species treated

Ethnoveterinary diseases categories

The distribution of the medicinal plants studied according to the category of traditionally treated pathologies are shown in table 5.

Table 5 : Informant consensus factor values by category

PATHOLOGIY	PLANTS SPECIES AND NUMBER OF USES	NT	NUR	ICF
Exo and endo parasite	*Artemisia herba-alba Asso. (4); Citrullus Coloocynthis (2); Juniperus communis L. (8); Lupinu salbus (2); Panicum mombassa L. (1)*	5	17	0.75
Respiratory problems	*Allium cepa L. (6); Allium sativum L. (9); Camellia sinensisL. (6); Capsicum annuum L. (2); Eryngium planum (1); Eucalyptus globulus labill (10); Lavandula Officinalis L. (6); Nicotiana tabacum (1); Nigella sativa (3); Olea europea L. (10); Papaver rhoeas L. (1); Pimpinella anisum (1); Scorzonera undulata (8); Thymus vulgaris L. (14)*	14	78	0.831
Urinary problems	*Eucalyptus globulus labill (2); Mentha spicata l. (2); Punica granatum L. (1); Stipa tenacissima L. (2); Trigonella foenum-graecum (4); Urtica dioica (2)*	6	13	0.583
Dermatological problems	*Allium cepa L. (2); Aloe vera (3); Artemisia herba-alba Asso. (6); Ceratonia siliqua L. (1); Cinnamomum verum (1); Citrullus Coloocynthis (2); Cucurbita pepo L. (2); Juniperus communis L. (2); Lawsonia inermis L. (4); Lépidium sativum (6); Nerium oleander L. (2); Opuntia ficus-indica (1); Opuntia maxima (1); Paronychia argentea L. (1); Punica granatum L. (6); Salvia rosmarinus (10); Scorzonera undulata (4); Stipa tenacissima L. (4); Teucrium polium L. (14); Thymelaea hirsuta (1)*	20	73	0.736
Gastrointestinal problems	*Anthyllis vulneraria (1); Anthémis arvensis (2); Artemisia herba-alba Asso. (24); Arthrospira platensis (1); Camellia sinensisL. (7); Cenchrus ciliaris L. (1); Ceratonia siliqua L. (2); Cynara scolymus (4); Glycyrrhiza glabra (1); Juniperus communis L. (15); Lavandula Officinalis L. (8); Lawsonia inermis L. (1); Malus domestica (1); Marrubium vulgare (4); Medicago sativa (5); Mentha spicata l. (8); Nigella sativa (7); Opuntia ficus-indica (1); Peganum harmala (4); Pimpinella anisum (1); Punica granatum L. (8); Rhus coriaria L. (6); Rutagraveolens (1); Salvia rosmarinus (4); Saussurea costus (1); Thymus vulgaris L. (18); Trigonella foenum-graecum (22); Zeamays (1); Zingiber officinale Roscoe (7)*	29	166	0.83

Heart problems	*Capsicum annuum L. (2); Marrubium vulgare (2); Olea europea L. (3); Panax ginseng (1); Thymus vulgaris L. (3)*	5	11	0.6
Other health problems	*Allium cepa L. (7); Allium sativum L. (4); Arthrospira platensis (1); Beta vulgaris (2); Capsicum annuum L. (1); Cinnamomum verum (1); Ecballium elaterium (1); Juniperus communis L. (4); Lépidium sativum (2); Malus domestica (1); Nigella sativa (4); Olea europea L. (6); Opuntia ficus-indica (1); Pinus halepensis (2); Thapsia garganica L. (2); Trigonella foenum-graecum (16); Triticum aestivum L. (1); Urtica dioica (1); Zeamays (1); Zingiber officinale Roscoe (3)*	20	61	0.683
Reproductive problems	*Anastatica hierochuntica (1); Artemisia herba-alba Asso. (2); Juniperus communis L. (2); Lawsonia inermis L. (2); Lupinu salbus (1); Pinus halepensis (2); Saussurea costus (1)*	7	11	0.4
Nervous problems	*Eucalyptus globulus (2); Menthaspicata (2); Punicagranatum (1); Stipa tenacissima (2); Trigonellafoenum-graecum (4); Urticadioica (2)*	6	13	0.583

***NUR** ; number of use reports in a disease category; **NT** : number of species used for that category; **ICF:** Informant Consensus Factor*

As shown on table 4, digestive system diseases are the main prevailing problems treated by traditional veterinary medicine in the studied area. Use is made of 29 plant species, with *Artemisia herba-alba, thymus vulgaris L., Trigonella foenum-graecum and Junipersus communis L.* being the most commonly reported. Other health problems are second (20 species), followed by Dermatological problems (20 species)and respiratory problems (14 species). The other diseases are distributed as follows: 7 for reproductive problems, 6 for heart and urinary ailments, and 6 for neurological affections, 5 for heart problems and 5 ecto-endo parasites .

These findings are consistent with Djarmouni's discovery (2023) that digestive disorders are the most popular indication for use of medicinal plants in traditional veterinary medicine and confirm overall that the digestive system is at the heart of animal health and productivity. The prevalence of gastrointestinal disorders may rise due to environmental, dietary, and sociocultural factors that differed between countries.

In addition, several recent investigations have demonstrated that the digestive tract is highly susceptible to phytotherapeutics. Chen and al. (2022) have reported that some bioactive metabolites such as curcumin can maintain the integrity of the intestinal barrier by altering microbiota and generating potentially beneficial secondary metabolites through microbial conversion. These pathways demonstrate the effects of medicinal plants having towards enhancing digestive health and consequently, the generalized welfare state of animals which justifies their leading role in ethnoveterinary literature.

Informant Consensus Factor (ICF)

The study of the Informant Consensus Factor (ICF), which provides information on the homogeneity of knowledge for each category of diseases, noted that digestive, respiratory, parasitic, and dermatological pathologies have high ICFs; 0.83, 0.831, 0.75, and 0.736 respectively, indicating a strong agreement among informants (Table 5).
Iwaka and al. (2023) observed an overall ICF of 0.918 for bovine trypanosomiasis, indicating a strong consensus around a few major species. Similarly, Wendimu and al. (2024) reported an ICF = 1.0 for certain conditions such as symptomatic anthrax or digestive parasitoses, showing that in some contexts, traditional remedies reach a level of perfect consensus. These parallels confirm that ICF is a key indicator for identifying diseases benefiting from shared and collectively validated knowledge.

Fidelity Level (FL)

In your survey (TEbessa), the FL generally range from 33% to 100%. The lower limits are illustrated by *Opuntia ficus-indica* (FL = 33.3%) and *Capsicum annuum* (FL = 40%), while several taxa reach FL = 100%; *Teucrium polium L., Medicago sativa, Peganum harmala L., Glycyrrhiza glabra, Cynara scolymus* (Table 3).

These very high values align with the widely accepted idea that a high FL "discriminates" against plants culturally recognized as reference remedies for a given indication.

Species with intermediate FL (50–85%): recognized utility but more versatile: *Eucalyptus globulus Labill.* (FL = 83.3%). *Mentha spicata L.* (FL = 80 %) . *Salvia rosmarinus* (FL = 71.4%), *Zingiber officinale* (FL = 70%), *Allium sativum L.* (FL = 69.2%), *Artemisia herba alba* (FL = 66.7%) Here, the FL difference mainly reflects the poly-indication (respiratory, dermatological, gastrointestinal, etc.), which mechanically dilutes the proportion of agreement on a single pathology. This hierarchical structure of the FL is typical of rural pharmacopeias where a few "sure remedies" dominate, surrounded by a halo of auxiliary plants.

Wendimu and al. (2024) in Ethiopia also report a FL of 98% for Hordeum vulgare used against bone fractures. Similarly, Sameen and al. (2025) in Pakistan note an FL of over 90% for several anti-diabetic plants, including Rhazya stricta. These results confirm that high FLs reflect perceived effectiveness and marked therapeutic specialization.

Usage Value (UV)

Table 3 allows to present that the highest UV is for some versatile taxa: *Trigonella foenum-graecum* (20.9%); *Artemisia herba-alba Asso* field. (12.2%); *Thymus vulgaris l.* (11.8%); *Juniperus Communis L.* (10.5%);

Pal and al. also reported similar observations. et al (2024) from India with Moringa oleifera whose UV was 0.85, and this may further justify its as being a local "cure-all." In Pakistan, Sameen and al. (2025) reported the highest UV (UV of 0.97) for the same species also demonstrating its central role in traditional pharmacopeia. These comparisons suggest that UV is a reliable proxy of the multipurpose and cultural importance attributed to medicinal plants.

Jaccard index (JI)

Values of JI are generally low to moderate which means that our study area has a low floristic affinities with most of the investigated area (Table 5). Two patterns are apparent: (i) Biogeographical and climatic similarity; higher scores. The greatest JIs are reached with Naâma (22.86%) and Laghouat (22.92%), two Algerian neighbouring areas both subject to Saharan/steppe transects with the same abiotic pressures: aridity, extreme temperatures, poor soils). This ecological convergence leads to a greater conunon flora, in the latter case than in the former more distant ones ((Hadjadji and al., 2025; Benlarbi and al., 2023). And elevation, bioclimate-barrier and floristic differentiation; low similarity. Moroccan areas present low JI (the Rif 11.80% and Middle Atlas 15.38%), in accordance with diverse bioclimatic situations: the Rif is weakly humid Mediterranean while the Middle Atlas comprises mountainous levels with lower temperatures and greater rainfall, driving specific assemblages less shared amongst them (Chaachouay et al., 2022a, b).

Table 5. Comparative analysis of this investigation with other Algerian and international studies.

Previous study area	Total species in previous study	Exclusive to previous study	Exclusive to present study	Common species	Jaccard index (JI)	Reference
Naâma, Algeria (South west)	26	10	44	16	22.86	Hadjadji and al., 2025
Laghouat, Algeria (South)	58	36	38	22	22.92	Benlarbi and al., 2023
Rif, Morocco (North)	300	262	22	38	11.8	Chaachouay and al., 2022a
Zemmour and Zayane, Middle Atlas (Morocco)	150	122	32	28	15.38	Chaachouay and al., 2022b
Omusati and Kunene, Namibia	15	15	60	0	0.0	Eiki and al., 2022

Omogibe and Rift Valley, Ethiopia	78	70	52	8	6.15	Wendimu and al., 2024
Cariri Velho, Brazil	49	46	57	3	2.83	Gonçalves and al., 2025

In the Ethiopian Rift Valley (6.15%) and Namibia (0%), which are ecologically as well as biogeographically extremely dissimilar, therefore floristic intersection is low to absent (Afrotropical[ii]/coastal arid influences/hydro-aridsity/high endemism) (Wendimu et al., 2024; Eiki et al., 2022). Brazil (Cariri Velho) in the Neotropics has the lowest similarity (2.83%), as would be expected between intercontinental plant communities of different biomes (Gonçalves et al., 2025).

This evidence proves that the particular composition of study area is similar to adjacent and climate-similar areas (Naama, Laghouat). In contrast, bioclimatic dissimilarities (mountain versus steppe/arid, maritime effect, tropical against Mediterranean patterns) and geographic isolation result in strong floristic divergence and low JIs. These findings are in accordance with comparisons performed by the regional studies cited (Hadjadji et al., 2025; Benlarbi et al., 2023; Chaachouay et al., 2022a, 202b; Eiki et al., 2022; Wendimu et al.., 2024 Gonçalves and aL, 25).

Conclusion

This study has revealed that the ethnoveterinary legacy in Tebessa is rich and rooted in locals culture where 60 plant species are still utilized as veterinary supplements. The prevalence of Lamiaceae, Fabaceae, and Asteraceae confirms a Mediterranean trend concerning traditional pharmacopoeias; indeed both the high fidelity levels and use values recorded for *Artemisia herba-alba, Trigonella foenum-graecum, and Thymus vulgaris* suggest their consideration as “core remedies” by local communities.

In comparative terms, moderate JI values with the neighbouring Algerian steppe attested that there is a common floristic background, while the low similarity with international surveys suggests how geographical and ecological impediments determine ethnoveterinary repertoires. These findings indicate that ethnoveterinary practices are environmentally accommodating, conditioned by available flora and cultural predilections.

Lastly, the high ICF values of digestive and parasitic diseases highlight priorities in health constraints in small ruminant breeding systems and strategic role of phytotherapy against livestock productivity. The study helps to secure an intangible cultural heritage, through documentation, detection and analysis of the knowledge which is introduced, while a scientific background has been given for potential drug discovery.

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