Ethnobotanical study of the therapeutic plants of the Beni Haoua region in the wilaya of Chlef (Algeria)

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Research

Abstract

Background: The aim of this study is to identify the use of medicinal plants and to highlight the ethnobotanical knowledge of the inhabitants of Beni Haoua, located to the north-east of Chlef (Algeria).

Methods: Ethnomedical data were collected from 100 local informants via semi-structured questionnaires and face-to-face interviews between 2022 and 2023.
The main information collected concerned useful plant names, harvested plant parts, preparation methods, categories of use and the various diseases treated. Statistical processing of the data was carried out using Microsoft Excel 2016 for Windows and XLstate 2024.For a quantitative analysis we used the following indices (IFC), (UV) and (RFC).

Results: This study found that there were more women herbalists than men. Younger practitioners (aged 20-30) seem to be more associated with higher levels of education. The above experiment shows that the local population uses 54 plants belonging to 28 botanical families. The most frequently used families are Lamiaceae (20%), Asteraceae (13%) and Apiaceae (7%). The most frequently cited species are *Mentha spicata* L. (0.042), followed by *Eucalyptus globulus* Labill (0.038). Leaves, fruits and aerial parts were the most commonly used parts, oral administration is the most widely used, with infusion and decoction being the most common techniques. Most disease categories have a high informant consensus factor (IFC) of between (0.91) and (0.94).

Conclusions: The primary objective of this study was to gain a better understanding of the ethnobotanical heritage of the Beni Haoua population. The study revealed a rich diversity of medicinal plants, demonstrating the deep bond between the local population and their natural environment. This study lays the foundations for future interdisciplinary collaborations between ethnobotanists, pharmacologists and healthcare professionals.

Keywords: Medicinal plant, Ethnobotany, Beni Haoua area, Chlef, Algeria

Background

Traditional medicine is a set of medical procedures, methods, knowledge and beliefs that include the use of plants, minerals, animal parts, and spiritual therapies, as well as manual exercises, and techniques, alone or in combination, to treat, diagnose and prevent disease or preserve health. According to the WHO (World Health Organization), 80% of people in many poor

countries, particularly in rural areas, depend on traditional medicine. Currently, despite advances in pharmacology, the use of medicinal plants for therapeutic purposes is quite common in underdeveloped countries that do not have access to a modern health system (Tabuti *et al.* 2003). 3183 plant species make up the diversity of plant taxa in Algeria, offering a significant opportunity for targeted biological chemical screening based on customary uses (Taïbi *et al.* 2020a).

Materials and Methods

Beni Haoua is a coastal region and forms the eastern part of the Dahra mountains in the wilaya of Chlef, Algeria. Known for its natural beauty, notably its beaches and mountainous forests. The region is surrounded by diverse vegetation, including medicinal plants, which local inhabitants use in traditional medicine. The surrounding forests are rich in plant biodiversity used in alternative medicine to treat illness and improve health. (Fig. 1). The region experiences moderate winters and hot, muggy summers due to its Mediterranean climate.

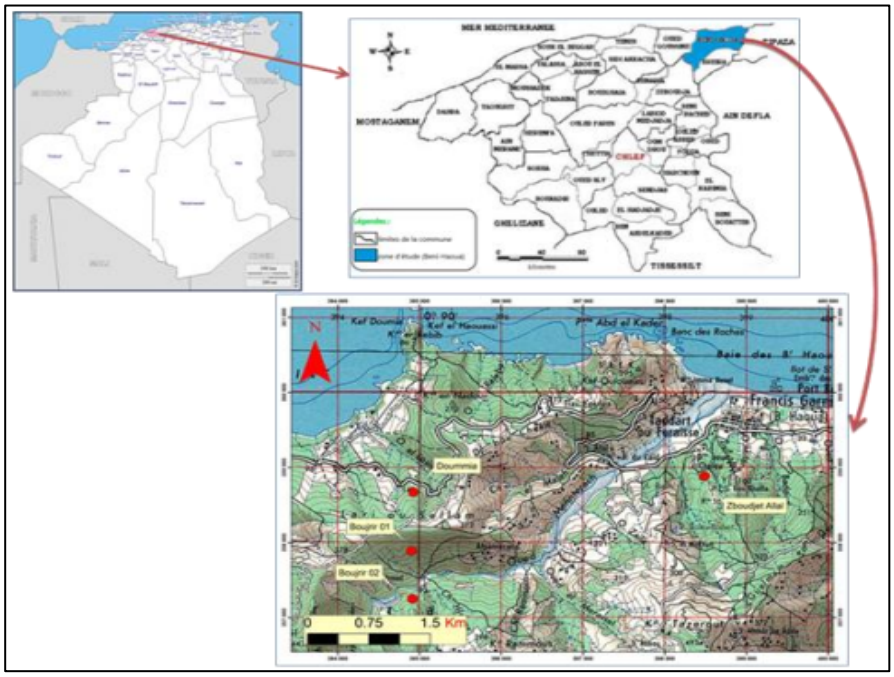

Figure 1. The location of the search area. (Beni Haoua,)

The population was surveyed between 2020 and 2023 with a random sample of 100 people. Residents were interviewed using semi-structured interviews to gather as much data as possible. We collected all possible information on the subject of each interview, including the level of education, age and sex of the informant, the name of the plant, the method of administration and preparation, and the symptoms treated. We previously used various articles (Quezel & Santa 1962-1963; Dobignard & Chatelain 2010-2013) to define the scientific name at the species level. Statistical processing of the data was carried out using Microsoft Excel 2016 for Windows and XLstate 2024.

To calculate the relative frequency of citation (RFC) for each species, we used the formula quoted by Tardío & Pardode Santayana (2008).

$$RFC=FC/N$$

FC represents how often informants mention the species' use, and N represents the total number of surveys.

To calculate the use value (UV) we use the formula recommended by Phillips *et al.* (1994).

$$UV=Ui/N$$

Ui: the number of uses cited by participant i and n: the total number of participants surveyed.
Informant consensus factor (ICF) used as indicated by Trotter & Logan (1986).

$$ICF= (Nur-Nt)/(Nur-1)$$

Nur: the number of times a particular category p of condition has been mentioned,

Nt: The specified number of plants to be used in the treatment of that specific condition is p.

The study of biological resources used in traditional medicine by the local communities is necessary for the conservation of the local flora and the traditional knowledge, in this context, the ethnobotanical study undertaken aims to identify, to create a database of medicinal plants and to collect all the information about the therapeutic uses practiced by the population Beni Haoua.

Results and Discussion

Respondents' sociodemographic information

Table 1. Demographic information of the individuals interviewed

Demographic properties		**Number of informants**		
		Female	Male	Percentages
Age	20-30	6	7	13
	30-40	9	5	14
	40-50	10	14	24
	50-60	15	9	24
	>60	12	7	19
Study level	Illiterate	28	18	36
	Primary	6	15	21
	Secondary	10	8	18
	University	8	5	13
Life type	Rural area	52	48	100%

The current study found that there were more women herbalists than men. 52% of female and 48% of males (Fig. 2). The women were the ones who inherit the oral transmission of ethnomedicine knowledge within the family. As stated by Meddour *et al.* (2020). According to Mattalia *et al.* (2020) the cause is the direct transmission of conventional medical information and treatment modalities within families, particularly between mothers and daughters. It has recently been shown that women communicate their knowledge of medicinal plants more than males do and that their knowledge is more varied (Dif *et al.* 2022, Da Costa *et al.* 2021).

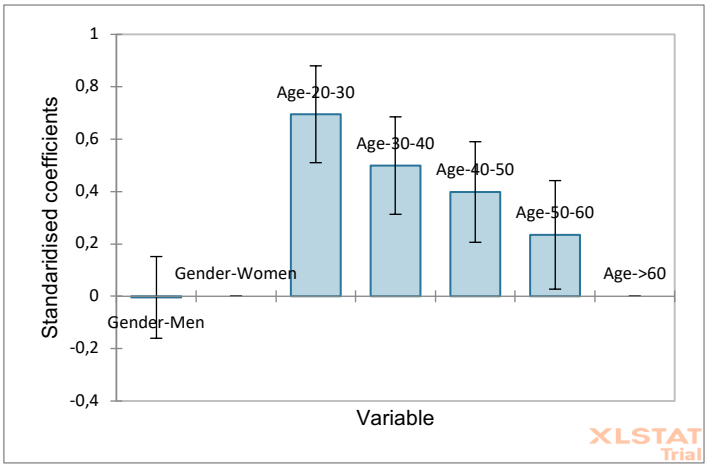

Figure 2. Education level / standardized coefficients (int.de conf.95%)

Women appeared to have slightly positive standardized coefficients for level of education, while for men these coefficients were negative. The 20-30 age group showed a higher coefficient than the others, while the (50-60) and over-60 age groups have the lowest coefficients. The results show significant differences in the level of education according to the sex and age of the participants. Women tended to have a higher level of education than men, which could influence their knowledge and use of plants. In addition, young adults (20-30) show the highest coefficients, suggesting that they have better access to education. Conversely, people aged over 60 appeared to have a lower level of education, which may limit their ability to access formal information on plant use. Demographic factors, such as age and gender, play a crucial role in the transmission and acquisition of ethnobotanical knowledge within the population studied. As men are primarily responsible for all family

needs, they are forced to leave school early and prefer to look for work to support themselves and their families. The low level of education of the population in this region is also due to the distance of schools from population centers and the difficulty of getting to them due to the region's mountainous terrain, Djahafi *et al.* (2021) reported comparable results in Tiaret, in north-west Algeria.

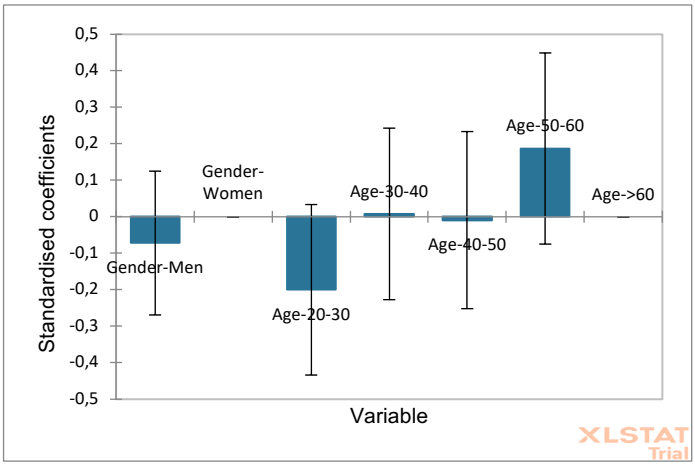

Figure 3. Frequency of use /Month/ standardized coefficients (int.de conf.95%)

Men showed a negative standardized coefficient, indicating a lower frequency of plant use per month than women, who show a positive but low coefficient; the confidence interval for women is wide, suggesting greater variability in their response. People aged 50-60 had a higher positive coefficient than other age groups, indicating that they use plants more frequently per month than other age groups. 30- to 40-year-olds showed a negative standardized coefficient, indicating lower frequency of use. Individuals aged (40-50) have a slightly negative coefficient, suggesting moderate plant use, but with considerable variability. Research has also shown that older generations use plants more effectively than younger ones, Djekoun *et al.* (2022) in Algeria and Benamar *et al.* (2023) in Morocco. This clearly demonstrates the long experience of the region's inhabitants in the use of medicinal plants.

Floristic diversity

Overall 54 plants from 53 genera and 36 families have reportedly been employed to treat and manage various illnesses. The research region's ethnobotanical survey revealed that the Lamiaceae (20%), Asteraceae (13%), and Apiaceae (7%), are the families with the highest representation. (Fig.4). These results are comparable to those of another ethnobotanical study carried out by Benaiche *et al.* (2019) in Oran, Soudani *et al.* (2024) in Tiaret and Belhaj *et al.* (2021) in Morocco. The Lamiaceae, Asteraceae, and Apiaceae families contain most of the therapeutic plants used in the Mediterranean area (María de Cortes & Javier 2016).

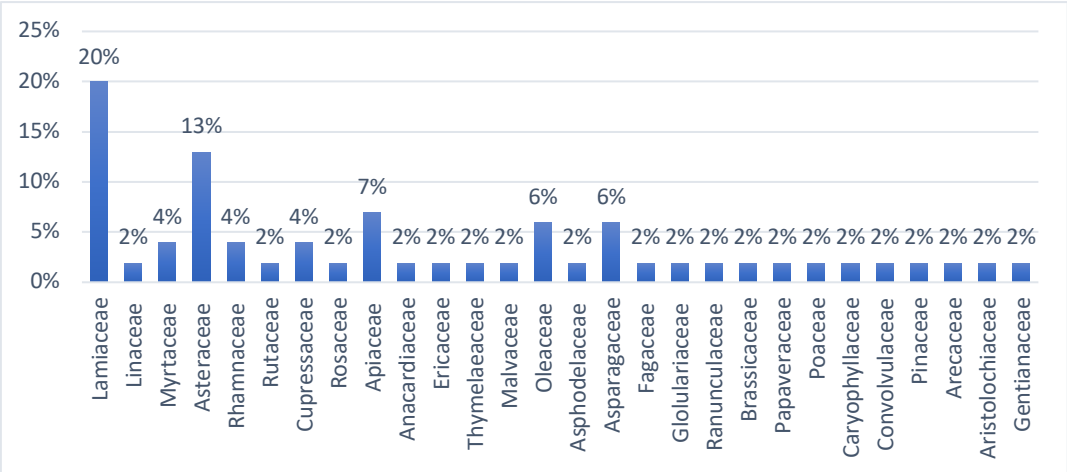

Figure 4. Frequency of botanical families

Table 2. Medicinal species used by the population locale of Beni Haoua

Family	Species Voucher numbers	Arabic name	Organe used	Therapeutic uses	Preparation method	Administration mode
Anacardiaceae	*Pistacia lentiscus* L. PL-1782	الضرو	Leaves, Aerial part Whole plant	Constipation, acne, diabetes, ear and stomach pain	Infusion, Raw	Oral
Apiaceae	*Daucus carota* L. DC-1923	الزرودية	Fruit	Gingivitis, liver disease.	Decoction	Oral
	Ammi visnaga (L) Lam AV-1991	السنارية	Fruit	Gum disease.	Decoction	Oral
	Foeniculum vulgare Mill FV-1963	البسباس	Seeds	Colic, stomach spasms, flatulence.	Infusion	Oral
	Ammoides verticilata (Desf) Briq. AP-0008	النوخة	Aerial part	Flu, fever, diarrhea, headache.	Decoction Infusion	Oral
Arecaceae	*Chamaerops humilis* L. CH-0449	الدوم	Fruits	Influenza, prostate enlargement, hair loss, hypertension, cholesterol, hemorrhoids	Raw Decoction	Oral Topical
Aristolochiaceae	*Aristolochia rotunda* L. AR-0719	برسطم	Roots, leaves	Cancer, diarrhoea, jaundice, kidney and bladder, infections, rheumatism	Powder Infusion	Topical Oral
Asparagaceae	*Muscari comosum* (L.) Mill. MC-0569		Bulb	Diuretic	Decoction	Oral
	Urginea maritima (L) Baker UM-0517	بصلة الديب فرعونة	Bulb	Cardiac disorders, pulmonary disorders.	Infusion	Oral
	Asparagus acutifolius L. *AA-0525*	لسكوم	Bark, stem, roots	Loss of appetite, lumbago, kidney failure, cardiac	Decoction Infusion	Oral
Asphodelaceae	*Asphodelus microcarpus* (Parl) AM-0020	البرواق	Bulb	Skin problems, scabies	Infusion	Oral
Asteraceae	*Matricaria chamomilla* (L.) Bernh. MC- 2826	بابونج	Stem leaves, Flowers	Lightening hair and skin, restless.	Infusion, Decoction	external
	Inula viscosa L. IV-2910	مقرمان	Leaves	Infections, sores and lesions.	Cataplasm	external

	Bellis sylvestris Cirillo BS-2825	الرزايمة	Flowers	Eczema, insomnia, indigestion	Infusion	external
	Anacyclus clavatus (Desf) Pers AC-2680	البابونج	Flowers	Stomach upset.	Infusion	Oral
	Echinops spinosus L. ES-2897	تاسكرة	Leaves	Hypertension, dysmenorrhoea	Infusion	Oral
	Silybum marianum (L) Gaertn SM-2913	شوك الحمير	Seeds, leaves	Anorexia, diabetes, liver diseases, spleen diseases	Infusion/ decoction	Oral
	Sonchus oleraceus SO-0012	التفاف	Leaves, stem	Warts	Cooked	Oral
Brassicaceae	*Sinapis nigra* (L.) W.D.J.Koch SA-1189	الخردل	Seeds	Rheumatism	Décoction Powder	Topical
Caryophyllaceae	*Spergulari arubra* (L.) SA-0066	فتات لحجر	Aerial part	Renal and urinary problems, vesicular lithalsas	Infusion	Oral
Convolvulaceae	*Convolvulus arvensis* l. AC-1256	اللواي	Stem	Asthma, depression, swelling of the corporation.	Infusion	Oral
Cupressaceae	*Juniperus oxycedrus* L. JO-0048	التاقا	Leaves	Rheumatism, flu	Decoction	Oral
	Tetraclinus articulate (Vahl) Mast TA-0096	العرعار	Leaves, fruits, stem.	Cough, flu, lung inflammation, rheumatism	Decoction/ Infusion	Oral
Ericaceae	*Arbutus unedo* L. AU-2097	اللنج	Fruits	Diarrhea, blood circulation problems	Raw	Oral
Fagaceae	*Quercus ilex* L. QI-0657	البلوط / الدباغ	Roots Leaves	Urinary illnesses, stomach aches, colon Varicose vein	Decoction.	Oral
Gentianaceae	*Centaurium erythraea* (Biv.)Rouy GE-2233	مرارة الحنش	Aerial part	Lack of appetite, abdominal, skin	Decoction	Oral
Glolulariaceae	*Globularia alypum* L. GA-2568	تاسلغا	Leaves	Antidiabetics, antirheumatic digestive disorders	Infusion	Oral
Lamiaceae	*Lavandula stoechas* L. LS-2333	الخزامى/ الحليحلة	Leaves Flowers	Venereal diseases, colon, heartburn, diarrhoea, kidney disease.	Infusion/ decoction	Oral

	Rosmarinus officinalis L. RO-2314	اكليل الجبل يازير	Leaves	Diabetes, cough, rheumatism, colon	Infusion	Oral
	Origanum vulgare L. OV-2420	الزعتر	Bark, aerial part	Pneumonia, flu, cough wounds, Diabetes	Infusion inhalation Cataplasm Powder	Oral/nasal Topical
	Salvia pratensis L. SO-2316	الميرامية	Leaves	Hair loss, Asthma, liver disease, menstrual problems	Decoction	Topical Oral
	Melissa officinalis L. MO-2412	المرساط	Aerial part	Lung disease, headache, abdominal cramps, fever, menstrual pain, Stress	Infusion	Oral
	Marrubium vulgare MV-2415	مريوة	Aerial part	Sterility in women, back pain, anti-lice	Cataplasm Decoction	Vapour Topical
	Ajuga iva L. AI-2213	شندقورة	Whole plant	Colds, digestive disorders, fever, hemorrhoids, hypertension, diarrhea, stress, rheumatism, infertility women	Decoction Infusion Powder	Oral
	Mentha pulegium L. MP-2286	فليو - النعناع	Stem, Leaves	Inflammation, vomiting, stress, chest illnesses	Infusion, Decoction	Oral
	Teucrium polium L. TP-2336	جعيدة	Leaves	Headache, colon, venereal diseases.	Infusion	Oral
	Mentha spicata L. MS-2284	النعناع	Whole plant	Spasms, jaundice, rheumatism.	Decoction	Oral
	Satureja calamintha (L.) Scheele SC-20035	النابطة	Stem, leaves	Fever, gastric	Infusion, Decoction	Oral
Linaceae	*Linum usitatissimum* L. LU-1006	زريعة الكتان	Seeds	Colon, cholesterol, ulcer, hair loss, blood circulation problems, seasonal allergies, gastric	Powder	Oral
Malvaceae	*Malva sylvestris* l. MS-1819	الخبيز البقول	Leaves, stem	Digestive system problems	Cooked	Oral
Myrtaceae	*Myrtus communis* L. MG-1856	الريحان	Leaves, Fruit, Whole plant	Eye diseases, strengthening and black hair, gingivitis,	Raw, Infusion, Decoction	Oral

				repulsive odors of the mouth, cough, diarrhea, headache		
	Eucalyptus globulus Labill EG-1859	الكالتوس	Leaves	Cold, fever, asthma.	Infusion	Oral
Oleaceae	*Olea europaea* L. OE-2157	الزيتون	Leaves, fruits, oil	Diabetes, cough cholesterol, cold, hypertension, tooth pain, gum pain, mouth ulcers and bad breath, muscle spasm.	Infusion Oil	Oral Topical
	Phillyrea angustifolia L. PA-2175	زيتون/ الزرود	Leaves	Eye herpes in animals	Powder	Topical
	Phillyrea latifolia L. PL-2174	الكتم	Roots, leaves	Fever, gallbladder	Decoction/ infusion	Oral
Papaveraceae	*Papaver rhoeas* L. PR-1008	بن نعمان	Flowers	Otalgia, diarrhea, vomiting, gastrointestinal disorders	Maceration	oral
Pinaceae	*Pinus halepensis* Mill PH-0055	زقوقو	Stems,Resin	Hémorragies , paies et lésions,	Décoction Cataplasm	Oral
Poaceae	*Ampelodesmos mauritanicus* (Poir.) T AM-0228	الديس	Leaves	Allergy diseases	Infusion Decoction	Oral
Ranunculaceae	*Nigella sativa* L. NA-0970	السانوج	seeds	Diabetes,headache, seasonal allergies, neurological, problems	Decoction Infusion powder	Oral
Rhamnaceae	*Rhamnus alaternus* L. RA-1796	مليلس	Bark, leaves, fruits.	Jaundice, good tonic for the liver and spleen , constipation	Infusion	Oral
	Zizyphus lotus (L) Lam ZL-1802	السدرة	Leaves, fruits, bark.	Sleep disorders, anemia, cancer, pertussis, cholesterol, diarrhea, hepatitis, gastric problems, anorexia, Inflammation of the skin, skin scabbing, exorcism Hair loss	Infusion/raw Powder	Oral Topical

Rosaceae	*Rubus ulmifolius* Schott RU-1277	التوت البري	Aerial part, Flowers	Type 2 diabetes, inflammation of the uterus, skin disease	Infusion, Decoction	Oral
Rutaceae	*Ruta chalepensis* L. RC-1726	الفيجل	Aerial part	Hypertension, venereal diseases, coughs, colds, flu, diabetes, articular pain.	Infusion Powder Cataplasm	Oral Topical
Thymelaeaceae	*Daphne gnidium* l. DG-1837	لزاز	Leaves, bark	Hair loss, constipation, diuretic	Decoction	Topical

Relative frequency of citation (RFC)

The relative frequency of citations for the 54 species documented by the participants ranged from 0.004 to 0.042. The highest value was recorded for *Mentha spicata* L. (0.042), followed by *Eucalyptus globulus* Labill (0.038), *Origanum vulgare* L. *Mentha pulegium* L. (0.032 for each) and *Salvia pratensis* L. (0.030).

The wide therapeutic use of these species is the result of long experience accumulated and passed down from one generation to the next. These results are in line with Meddour *et al.* (2022) and Mahendran *et al.* (2021).

Use value (UV) of species

The species with the highest use values (UV) were *Mentha spicata* L. (UV=035), *Eucalyptus globulus* Labill. (UV=0.32), *Lavandula stoechas* L. (0.31) and *Origanum vulgare* L. (UV=0.26). These results indicate that these species have many uses in the Beni Haoua community compared with other species like *Sonchus oleraceus* (0.004), *Matricaria chamomilla* (L) (0.005) Bernh, and *Ammi visnaga* (L) Lam (0.006). Within the context of disease control, spearmint essential oils have been applied in many different contexts, such as fighting insect pests and plant illnesses. Not just in traditional medicine but also in cosmetics and culinary according to Singh & Pandey (2018).

Lavandula. stoechas is used in the Mediterranean region for cosmetic purposes, in traditional dinners and in fruit and vegetable dishes. It is also used to prepare herbal teas (Msaada, *et al.* 2012, Zuzarte, *et al.* 2013). The essential oils and extracts of *L. stoechas* have attracted the interest of numerous researchers who have evaluated its antibacterial (Ez zoubi *et al.* 2017), antifungal, insecticidal, antileishmanial (Bouyahya *et al.* 1017), antioxidant (Messaoud *et al.* 2012) and anti-inflammatory (Benabdelkader *et al.* 2011) qualities. However, other possible pharmacological effects of this oil have yet to be determined.

India, Italy, Japan, and several African nations are among the nations that use *Eucalyptus globu*lus as a traditional medicinal according to Guarrera (1999) and Dhakad (2018). For medicinal, aromatic, and cosmetic purposes, eucalyptus essential oils are particularly important (Dhakad *et al.* 2018). The medicinal benefits of *Eucalyptus* essential oils have been the subject of a few clinical investigations. Various pharmacological versions of essential oils are frequently utilized for aromatherapy and inhalation (Dhakad 2018). Evaluation of *Eucalyptus* biological characteristics and therapeutic effects is necessary.

According to Zolfeghari *et al.* (2012), Khodayari *et al.* (2013), *Origanum vulgare* L. has important and beneficial traditional medicinal properties that can be used to treat a range of illnesses and conditions affecting different organs of the body.

Informant consensus factor (ICF)

Most disease categories had a high informant consensus factor (IFC), between (0.91) and (0.94): neurological diseases (0.94), dermatological and digestive diseases (0.93 for each), respiratory diseases and genitourinary diseases (0.91 for each). This indicates a well-established tradition and strong collective knowledge. These results are in line with those obtained by Djahra *et al.* (2023), Hedidi *et al.* (2024) in Algeria,. These results show that the region's inhabitants rely heavily on medicinal plants, as they obtain them directly from nature, in his work Miara *et al.* (2019) hypothesizes that lifestyle is likely to be the cause of the highest ICF for digestive diseases.

Table 3. Values of the informant consensus factor for category ailments.

Ailment category	Diseases	Nur	Nt	ICF
Respiratory diseases	Chest infections, fever, cough, asthma, bronchitis, flu, allergy, sore throat, pertussis, angina, hypothyroidism, lung ailments,	120	10	0.91
Dermatological diseases	Skin problems, Fungal infections, Burns, Hair loss, Wounds, Anti lice, seasonal allergies, Lightening skin, Eczema, Warts, Inflammation of the skin, scabies.	60	5	0.93
Digestive diseases	Hemorrhoids, stomatitis, ulcer and pain, dyspepsia, colic, gas in the intestines, constipation, colitis, parasites, hydatid cyst, biliary issues, toothache, colon, aerocolia, heartburn, vomiting, jaundice, gastric ulcer, gingivitis, mouth inflammation, disagreeable odours, loss of appetite, intestinal worms, indigestion, stomach spasms, and flatulence.	210	14	0.93

Genito-urinary diseases	Menstrual cramps, ureter stones, kidney infections, urethral and urinary tract disorders, cystitis, venereal illnesses, postpartum infections, gynecological issues, and sexual impotence. intestinal parasites, kidney stones, irritation of the uterus, diuretic, antiseptic, and antibacterial agents.	100	9	0.91
Neurological diseases	Depression, anxiety, headaches, dizziness, migraines, sleeplessness, dementia, stress, and restlessness problems of sleep, exorcism, neurological issues, shield the brain against Alzheimer's. spasm of the muscles.	85	4	0.94
Osteo-articular diseases	Back pain, arthritis, inflammation, rheumatism, headache,	120	7	0.93
Cardio-vascular diseases	cholesterol and cardiac issues with blood circulation, hypertension, Heart arrhythmia, atherosclerosis, varicose vein, vasodilator, and heart attack	16	8	0.53
Cancer	Cancer, tumors.	7	3	0.66

Components, administration routes, and preparation techniques

Aerial portion, fruit, flowers, whole plants, seeds, root, pericarp, leaves, stem, bark, bulb and resin were among the twelve plant components plant components used by the population.

The population uses leaves the most (32%), followed by fruits, aerial parts (11% each), stems (10%), flowers (9%), seeds and bark (6% each), the entire plant and roots (5%each), bulb (4%), and resin (1%). Our findings are comparable to those of Deramchia *et al.* (2022) in Saida, Hamel *et al.* (2018) in northern Algeria.

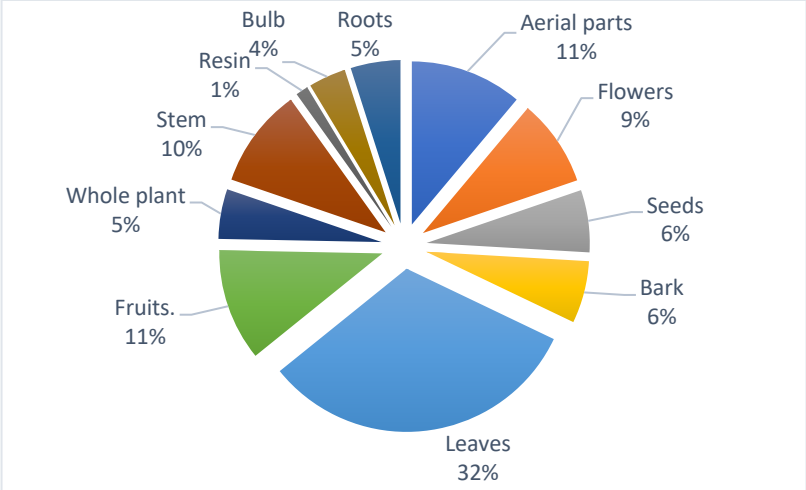

Figure 5. Plant parts used in traditional medicine

Several preparation techniques, including decoction, infusion, maceration, cooking, inhalation, oil, cataplasm, powder and raw, were employed to make the drug's administration easier. (Fig.6). The most popular preparation method is an infusion (41%), followed by decoction (32%), powdered plant (11%), cataplasm (6%), raw plant (5%), cooked plant (2%) inhalation, maceration, and oil (1% each) (Fig.7). Because it was accessible to all, this way of utilization (infusion and decoction) was the easiest (Hema & Fawzi 2012). The reason for the infusion and decoction is that they enable the extraction of the most active ingredients and mitigate or eliminate the harmful effects of herbal remedies (Benaiche *et al.* 2019, Salhi *et al.* 2010). Studies by Bouasla & Bouasla, (2017), Shah *et al.* (2019) revealed similar results with consumption strategies.

Various administration strategies were employed for medicinal plants (Fig.7). Oral administration accounted for 76% of all administration routes in the research area, with topical (16%), external (5%) vapor (2%) and nasal (1%). This confirms the results of previous research carried out in Relizen by Hadj Ali *et al.* (2022), in Mascara by Benarba *et al.* (2015).

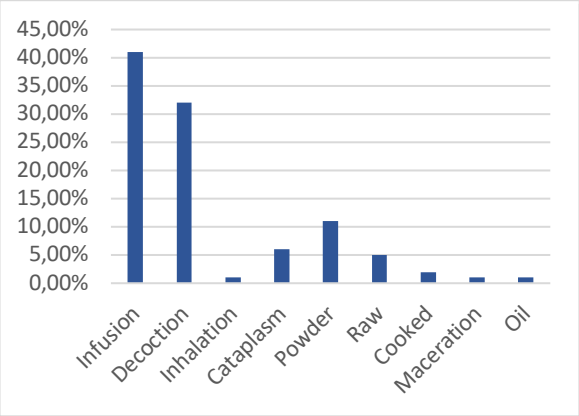

Figure 6. Modes of preparation

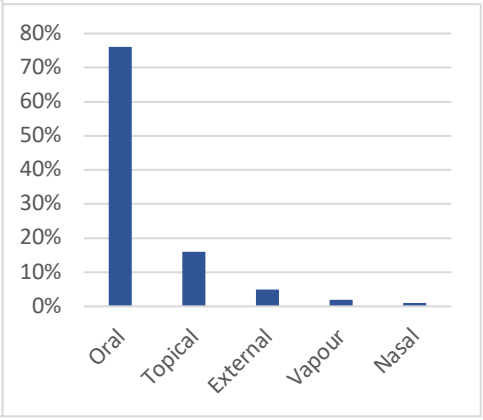

Figure 7. Modes of administration

Conclusion

The results highlight the importance of demographic factors in plant use practices, showing that men use plants less frequently than women, although variability among women is greater in this community. The 50-60 age group stands out for its more frequent use of plants. Plant use varies according to gender and age, with higher frequency among women and older individuals, which may reflect a stronger transmission of knowledge among older people, or a more pronounced use of plants in contexts specific to these age groups.

It appears that women have a higher level of education than men, which may indicate that women have a greater understanding of, or access to, plant use as a result of their education. Individuals aged (20-30) tend to have a higher level of education and therefore probably greater access to modern ethnobotanical knowledge.

It's interesting to note that out of the 28 families in which we found 54 plants with therapeutic potential, the most significant are the Lamiaceae, Asteraceae, and Apiaceae, families, with a rate of 40%. The most frequently used components are the leaves, the most popular technique of preparation is infusion, decoction comes next of the herbal medicines advised, 76% are to be taken orally, while 16% are to be applied topically. The high informant consensus factor (0.91-0.94) means that the therapeutic properties of these plants are widely recognized and valued within the community, the species with the highest use values (UV) were *Mentha spicata* L. followed by, *Eucalyptus globulus* LabillL. *Lavandula stoechas* L. and *Origanum vulgare* L.

The preliminary ethnobotanical data are a valuable source for researchers working with medicinal plants. Our data can guide further research into the discovery of new plant-based medicines and molecules. In addition, this study has recorded valuable information about medicinal taxa has been recorded for future generations. It is possible to support the indigenous components of traditional herbal medicine in these rural areas by preserving their cultural knowledge**.**

Declarations

Ethics approval and consent to participate: Before beginning the ethnobotanical study, we obtained verbal consent from all participants.
Consent for publication: Not applicable.
Availability of data and materials: The data featured in this manuscript can be obtained from the corresponding author.
Competing interests: It is stated by the author that they do not possess any conflicting interests.
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Author contributions: Fatima Belhacini identified the plant species, directed the ethnobotanical survey, processed the data and wrote the final manuscript, Djamel Anteur produced the location map, he was also involved in the management of the ethnic survey and Zohra Rahim prepared the questionnaire.
All authors have read and approved the final manuscript.

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