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Original Article

Ethnobotanical Survey on Antidiabetic Medicinal Plants in Western Algeria: Traditional Knowledge and Public Health Implications

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ABSTRACT

Background: Type 2 diabetes is a global health challenge with significant socio-economic impacts, particularly in Algeria. Medicinal plants offer an affordable and accessible alternative to pharmaceutical treatments. This study aims to survey antidiabetic medicinal plants in western Algeria. **Materials and Methods:** The survey covered several provinces and targeted three respondent categories: herbalists, traditional healers, and phytotherapists. Data were collected through structured questionnaires, capturing information on respondent demographics and medicinal plants used for diabetes treatment. Antidiabetic plants were identified and classified, and their use-values were calculated. **Results:** Among the 200 participants, 90% were herbalists and traditional healers, predominantly aged 40 to 85, who had extensive knowledge of antidiabetic plants due to accumulated experience and the oral transmission of traditional knowledge. Seventy one percent (71%) of respondents were married and often responsible for providing initial therapeutic care for their families. The study identified 90 medicinal plants belonging to 21 families, with *Asteraceae* and *Lamiaceae* being the most represented (10%). Leaves were the most commonly used plant part (42.50%), followed by seeds (15.30%) and fruits (8.21%). Decoction and infusion were the primary preparation methods (31.28% and 46.93%), respectively. Finally, *Trigonella foenum-graecum, Berberis vulgaris, Centaurium erythraea, Artemisia herba-alba Asso, Zygophyllum album* L., *Citrullus colocynthis* (L.), *Olea europaea, Rosmarinus officinalis, Tetraclinis articulata, Cinnamomum verum* and *Ajuga iva* (L.) were the most frequently cited plants, with use values (UV) ranging from 0.245 to 0.09, respectively. **Conclusion:** This study highlights the value of traditional medicinal plants in diabetes management in western Algeria, emphasizing the need for pharmacological studies and dosage standardization to ensure safe and effective use.

Keywords: Ethnobotanical Study, Type 2 Diabetes, Western Algeria, Medicinal Plants, Traditional Knowledge.

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INTRODUCTION

Type 2 diabetes is a metabolic disease characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both.[1] In 2021, the International Diabetes Federation (IDF) estimated that 537 million people aged 20 to 79 worldwide had diabetes and 6.7 million people died from the disease or its complications. By 2030, the number of people with diabetes could reach 643 million, and 783 million by 2045, with about 90% suffering from type 2 diabetes.[2,3]

Current pharmacological treatments include metformin, DPP-4 inhibitors, and GLP-1 receptor agonists, which effectively control blood glucose levels by targeting various aspects of diabetes pathophysiology. Although these medications are effective, they may cause undesirable side effects such as hypoglycemia and gastrointestinal affections.[4] In many countries, particularly emerging ones, pathological forms of diabetes represent a major problem, both epidemiologically and socioeconomically. In Algeria, diabetes management is limits by the inaccessibility of health centers for certain populations and the high cost of treatments.[5]

These limitations have led researchers to explore new molecules and therapies, often as complements to traditional treatments and phytotherapeutic remedies. Numerous studies show the effectiveness of medicinal plants as complementary therapeutic solutions. These studies is based on ancestral knowledge and the

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use of traditional pharmacopoeia, particularly for patients living in regions with limited resources.

In Algeria, the use of plants with preventive and curative properties by diabetic patients is widespread. However, this ancestral knowledge primarily transmitted orally, risks disappearing if not preserved. In this context, ethnobotanical surveys play a key role in collecting and preserving valuable information on the traditional use of medicinal plants.[6]

This study aims to conduct an ethnobotanical survey of medicinal plants with antidiabetic potential in the western region of Algeria, covering both the north and south of this geographic area. This research focuses on identifying and cataloging the plants used by local populations to prevent and treat type 2 diabetes. By preserving this knowledge, it seeks to contribute to the valorization of traditional medicine and potentially inspire new research for the development of accessible and effective complementary treatments.

MATERIALS AND METHODS

Our survey was conducted in the western region of Algeria, specifically within some provinces of the western Algeria. The aim of this study was at first to undertake an ethnobotanical study of medicinal plants used in diabetes treatment, to establish the profiles of informants (age, gender, education level, marital status, socioeconomic level and source of knowledge), to inventory antidiabetic medicinal plants in the studied area, and to class them in a herbarium in another study.

Description of study area

The study area corresponds to the western region of Algeria (Figure 1), covering an area of 940,747 km² and comprising 15 provinces: Aïn Témouchent, El Bayadh, Mascara, Mostaganem, Naâma, Oran, Relizane, Saïda, Sidi Bel Abbès, Tiaret, Tlemcen, Tissemsilt, Bechar, Adrar, and the province of Tindouf. The area is bordered to the north by the Mediterranean Sea, to the east by the provinces of Médéa, Djelfa, Laghouat, Ghardaïa, and Tamanrasset, to the west by Morocco, and to the south by Mauritania and Mali.

Ethnobotanical survey

This study was conducted using a structured questionnaire, intended for three respondent categories: herbalists, traditional healers, and phytotherapists. Data were collected on respondent demographics (age, gender, educational background, family status, and residence in relation to the study area) and on the antidiabetic plants mentioned (vernacular name, type of plant, therapeutic uses, part used, preparation method, collection period, method of use, dosage) Two hundred (200) questionnaire forms were completed in the field over a 3-month period. All mentioned plants were identified by Dr. RIGHI K., a botanist, at the Faculty of Sciences and Natural Life, of Mascara University (Algeria). The collected data were treated by Excel software.

Calculation of utilization frequency

The utilization frequency of cited medicinal plants was calculated using the following formula (8):

$$UV = \frac{U}{N} (1)$$

UV: Utilization value of plants, U: Number of citations per plant, N: Number of informants.

RESULTS

Socio-Demographic Profile of Interviewed Informants

In this study, 200 individuals were interviewed. The majority were herbalists (90%), followed by traditional healers (9%), and phytotherapists (1%) (Figure 2a). In western Algeria, the use of medicinal plants spans across all age groups. The largest age group of users falls between 30 and 40 years (27%), while the lowest rate is observed among those aged 80 to 90 (14%). Younger individuals (20–30 years) are less inclined to use traditional medicine, representing only 9.5% of the respondents (Figure 2b). Traditional medicine is practiced by both men and women; however, men dominate the field, comprising 91.5% of the participants, while women account for only 8.5%. Regarding education level, nearly half (49%) of the informants had only primary education, 33% had completed secondary education, 17% had no formal education, and just 1% held a university degree (Figure 2c). Figure 2d shows that the majority of participants were married (71%), followed by single (22%) and divorced individuals (7%). This suggests a potential link between marital status and reliance on traditional remedies.

Economically, the professions of herbalist and traditional healer are not highly lucrative. Most practitioners (60%) reported having a medium socioeconomic level, 39% a low level, and only 1% (mainly phytotherapists) a high socioeconomic level (Figure 2e). Finally, the transmission of knowledge was predominantly oral: 99% of the respondents stated that their expertise was acquired through experience and ancestral teachings, while only 1% (phytotherapists) received formal training or learned through books (Figure 2f).

Ethnobotanical profile of antidiabetic plant species cited

Collection period

The majority of the identified plants were collected in spring, representing 44%, followed by 31% in summer, 7% in autumn, and only 4% in winter, the lowest percentage (Table 1). Some plants are available year-round, making up 14%, as they can withstand all climatic conditions.

Type of plants

Our data showed that the plants most used in phytotherapy are spontaneous (48%), followed by cultivated plants (33%). Imported plants ranked third with 19% (Table 1).

Used parts of the plants

Eleven plant parts were reported in traditional medicine use, each with specific therapeutic properties. These parts include leaves, seeds, fruits, stems, aerial parts, flowers, and roots, among others. The survey revealed that leaves are the most frequently used plant part, accounting for 42.50%, followed by seeds (15.30%), fruits (8.21%), aerial parts (8.20%), flowers (7.21%), and roots (6.11%) (Table 2). Less commonly used parts—bark, bulbs, rhizomes, stems, and pericarp—represent a combined total of 10.36%.

Preparation methods

Various preparation methods were employed depending on the intended use. For diabetes treatment, infusion (46.93%) was the most commonly used method, followed by decoction (31.28%). Other preparation methods, including powder, raw use, chewing, external application, and juice, accounted for a combined percentage of 21.79% (Table 2).

Dosage used

The majority of reported medicinal plants are used without precise dosage measurements. About 61% are administered by handfuls, 24% by spoonful, 11% by pinches, and only 4% are used with precise doses measured in grams (Table 2).

Use of medicinal plants according to botanical family

According to Table 1, a total of 90 medicinal plants were documented in the western region of Algeria, distributed across 42 families. Two families were predominant: *Asteraceae* and *Lamiaceae* (10% each, with 11 species). These were followed by Apiaceae and Fabaceae (7%, with 6 species each). The remaining families were represented by lower percentages, typically 1 to 3 species per family.

Distribution of plants according to frequency of use

Table 3 shows the plants classified by number of citations and frequency of use. The ethnobotanical index known as Use Value (UV), which measures the relative importance of antidiabetic plant species based on informant consensus, showed that *Trigonella foenum-graecum, Berberis vulgaris*, and *Centaurium erythraea* had the highest UV scores. This highlights their frequent use and broad therapeutic potential within traditional medicine for managing diabetes.

DISCUSSION

The ethnobotanical survey conducted among the population of the western region of Algeria revealed a significant diversity in practices related to species, parts used, preparation dosages, and modes of use. It also provided a wealth of information regarding respondents, such as age group, gender, marital status, and education level. This study, aimed at inventorying antidiabetic medicinal plants in western Algeria, underscores the critical importance of this plant heritage in traditional pharmacopoeia, particularly for the treatment of diabetes (Table 2). A total of 90 antidiabetic plant species were identified, belonging to 42 families, listed alphabetically. For each plant, the following information was provided: scientific name, family, French name, vernacular name, harvest period, plant origin, parts used, and preparation methods adopted by the local population (Table 1,2).

Our results show that older people hold a deep knowledge of medicinal plants, acquired through experience and the transfer of ancestral wisdom. Indeed, the survey indicated that their knowledge primarily stems from personal experience and traditional teachings, rather than formal education. Similar results have been reported in other regions of Algeria, such as Sidi Bel Abbès and Tiaret, where traditional knowledge is mainly preserved among the older generations.[9,10]

A significant number of women practice traditional medicine, although their numbers as herbalists are more limited. This explains the involvement of women in phytotherapeutic treatments and the preparation of plant-based remedies, not only for themselves but also for their families.[11,12] In fact, married individuals are responsible for providing primary care within the family, in line with other ethnobotanical studies showing similar usage rates. Moreover, most practitioners come from moderate socio-economic backgrounds, reflecting a desire to help others rather than seeking financial gain. These trends are also reported in multi-regional ethnobotanical surveys, highlighting the crucial role of women in preserving the therapeutic legacy of Algerian households.[13]

This ethnobotanical study reveals that the most used antidiabetic plants are those that are spontaneous. This is due to the easy access to these plants and their cost or availability year-round. The survey showed that the most commonly used part is the foliage (leaves). The high frequency of leaf use can be explained by their central role in photosynthetic processes and their richness in secondary bioactive metabolites. Indeed, leaves are primary sites for synthesizing compounds such as alkaloids, flavonoids, terpenoids, phenolics, and essential oils,[14] which possess significant pharmacological activities, including antibacterial, antioxidant, anti-inflammatory, anticancer, and immunomodulatory effects. Additionally, leaves are among the most accessible plant organs, making them practical for harvesting and use in traditional medicine.[15] Furthermore, harvesting leaves from a tree or shrub

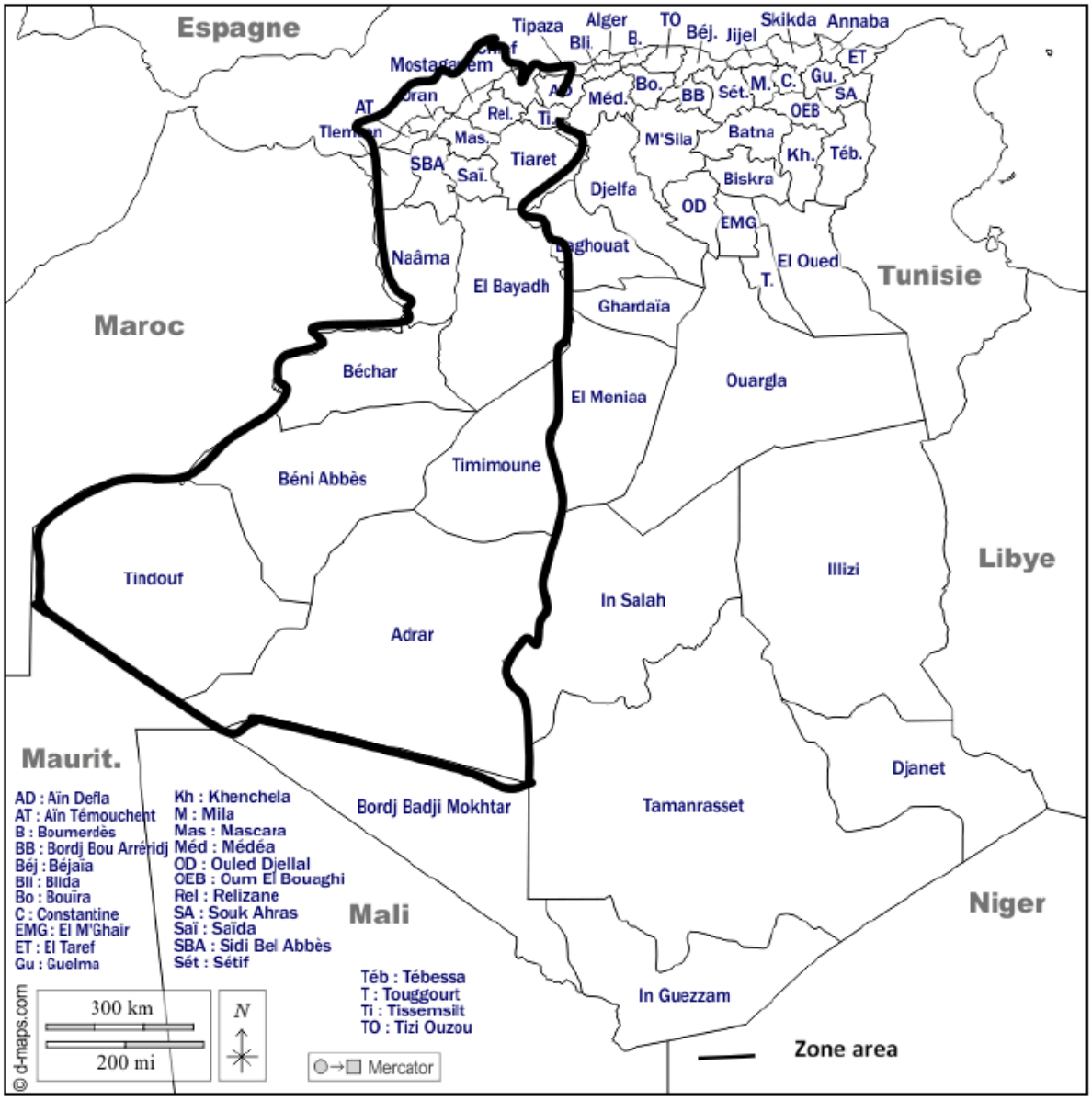

Figure 1: Localization of study area (in Algerian western region).[7]

does not significantly affect its survival,[16] unlike the extraction of underground parts or bark, which can result in the death of the tree.[17]

The importance of fruits lies in their concentration of bitter, sweet, or aromatic substances, as well as pigments that give them characteristic colorations. The use of flowers is related to their richness in essential oils. Similarly, roots and seeds are valued for their high content of sugars and vitamins.[18] These observations corroborate recent findings on endemic desert plants in Algeria, emphasizing the pharmacological richness of various plant parts, particularly those adapted to harsh environmental conditions.[19]

The optimal use of a plant would be one that preserves all of its properties while allowing for the extraction and assimilation of its active ingredients. Infusion was noted for its ability to retain active constituents of plants, while decoction serves to heat the body and disinfect the plant, mitigating the toxic effects of certain remedies. However, it can also destroy some active compounds of the species used. Furthermore, medicinal plants can have undesirable effects if administered incorrectly. Therefore, alternative medicine should be practiced with caution and within specific parameters and measures. Recent studies show that infusion techniques are effective in extracting vitamins and volatile oils from leaves and flowers, while decoction is essential for harder plant parts, such as roots and barks.[20] For example, *Zygophyllum geslini*, a Saharan species traditionally used for diabetes, has demonstrated strong antidiabetic activity both *in vitro* and *in vivo*, whether prepared by infusion or by polysaccharide extracts.[21,22] These results support its therapeutic potential and justify its continued use by traditional practitioners.

Dosage remains arbitrary, which can lead to undesirable effects in some cases, as the proverb states: "No substance is poison by itself; it is the dose that makes the poison".[23-27] In Algeria, this issue is exacerbated by the lack of regulation and standardization of plant-based preparations, which often results in inappropriate combinations or interactions between herbs and medications, as reported in ethnopharmacological studies.[28] Our study, along with others, indicates that the absence of formal education in traditional knowledge in developing countries is a contributing factor to the weakening of indigenous knowledge, as there is no way to document and pass it on to the next generation. Moreover, most contemporary healthcare professionals in Africa significantly downplay the contribution of traditional medicine within the healthcare system. However, scientists from developed countries are relentlessly seeking solutions in medicinal plants to treat both ancient and emerging diseases, including viral diseases. All these factors may lead to the loss of this valuable and useful knowledge, accumulated over generations.[29]

The quantitative ethnobotanical index of Use Value (UV), which reflects the relative importance of antidiabetic plant species according to informants' consensus, revealed that *Trigonella*

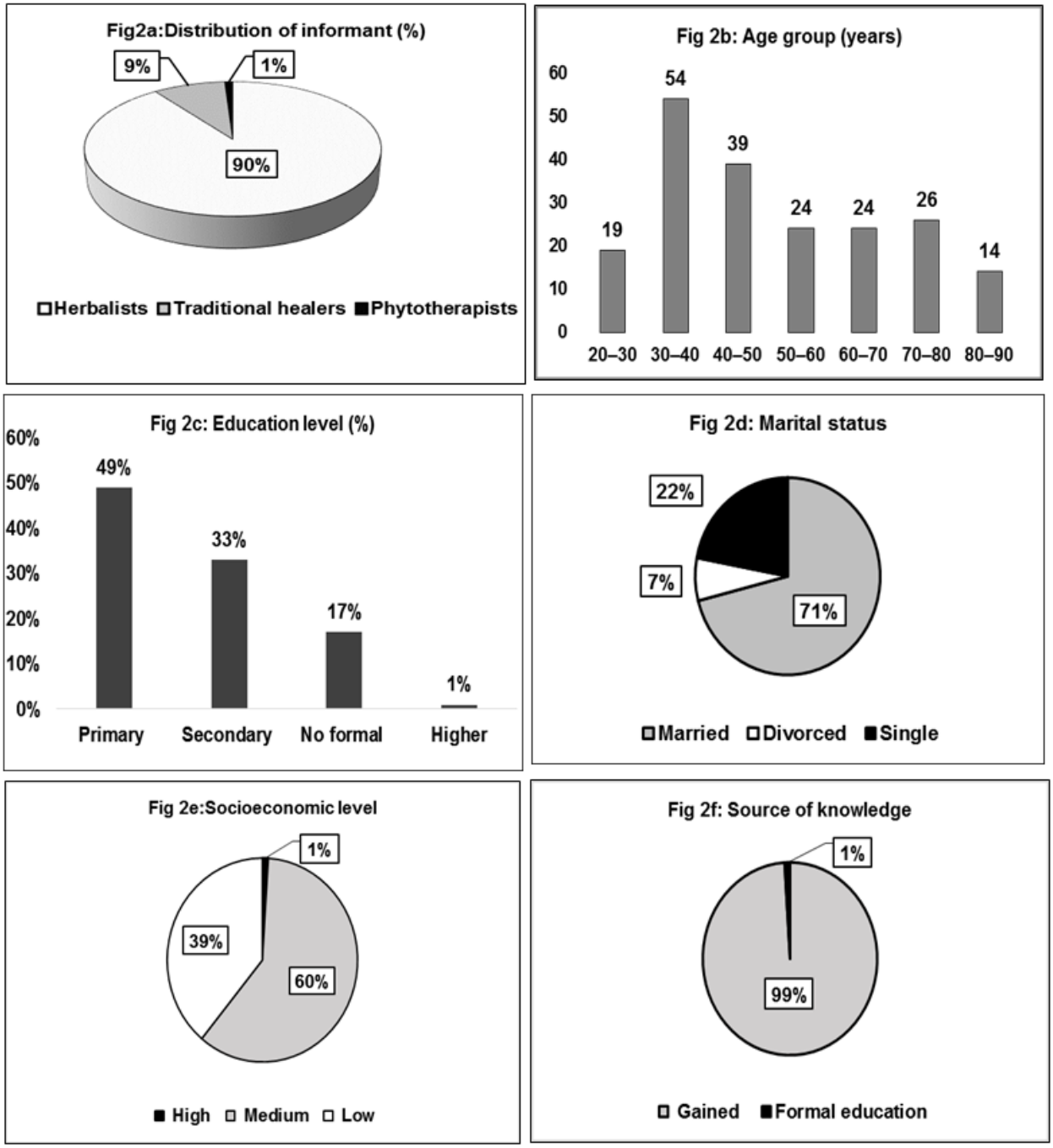

Figure 2: Socio-demographic profile of interviewed informants.

Table 1: List of antidiabetic plants identified in the western region of Algeria, classification according to Quezel P and Santa S (1962-1963).

Family	Scientific name	French name	Vernacular name	Harvest period	Origin	Harvest location
Acacias	*Acacia senegal* L.	Gomme arabique	Samr el arabi	Summer	Imported	/
Anacardiaceae	Pistacia lentiscus	Lentisque	darow	Spring	Spontaneous	Mascara
Apiaceae	*Ammodaucus leucotrichus*	Cumin du Sahara	Nassoufa	Spring	Spontaneous	Bechar
	Apium graveolens L.	Céleri	Krafess	Spring	Cultivated	Mascara
	Carum cuminum L.	Cumin	Kamoune	Annual	Imported	/
	Dorema ammoniacum	Doréma	Fessoukh	Summer	Imported	/
	Ferula assafoetida	Ase fétide	Hantit	Spring	Imported	/
	Foeniculum dulce	Fenouil	Besbas	Spring	Spontaneous	Mascara
Aristolochiaceae	*Aristolochia longa*	Aristoloc-he longue	Berostom	Spring	Spontaneous	Mascara
Asteraceae	*Anvillea radiata*	Anvillea	Nougd	Spring	Spontaneous	Bechar
	Artemisia absinthium L.	Absinthe	Chiba	Spring	Spontaneous	Oran
	Artemisia campestris	Armoise champêtre	Allal	Summer	Spontaneous	Bechar
	Artemisia herba-alba Asso	Armoise blanche	Chih	Spring	Spontaneous	Mascara
	Cotula cinerea	Cotula	Gartoufa	Spring	Spontaneous	Adrar
	Cynara scolymus L.	Artichaut	Kharchouf	Autumn	Cultivated	Mascara
	Dittrichia viscosa (L.) *Greuter*	Inule visqueuse	Magram-âne	Spring	Spontaneous	Mascara
	Matricaria chamomilla L.	Camomille sauvage	Babounidj	Spring	Spontaneous	Mascara
	Othonna cheirifolia	Othonne	Rass el hnache	Spring	Spontaneous	El Bayadh
	Saussurea costus	costus indien	Quiste el hindi	Spring	Imported	/
	Taraxacum officinalis	Pissenlit	Handeba	Spring	Spontaneous	Mascara
Berberidaceae	*Berberis vulgaris* L.	Épine-vinette	Arq ghriss	Spring	Imported	/
Brassicaceae	*Eruca sativa*	Roquette	Jarjir	Annual	Spontaneous	Tlemcen
	Lepidium sativum L.	Cresson alénois	Hab err-chad	Annual	Imported	/
	Raphanus sativus L.	Radis	Machti	Summer	Cultivated	Oran
Burseraceae	*Boswellia carterii*	Oliban	Loubane	Autumn	Cultivated	Oran
	Commiphora myrrha	Myrrhe	Elmorra	Summer	Imported	/
Capparaceae	*Capparis spinosa* L.	Câprier	Kebbar	Spring	Spontaneous	Bechar
Chenopodiaceae	*Arthrophytum scoparium*	Saligne à balaibalai	Remth	Autumn	Spontaneous	Bechar
	Atriplex halimus L.	Pourpier de mer	El gtaf	Spring	Spontaneous	Mascara
Cucurbitaceae	*Citrullus colocynthis* L.	Coloquinte	Handal	Summer	Spontaneous	Bechar
Cupressaceae	*Tetraclinis articulata.*	Thuya de Berbérie	Araâr	Annual	Cultivated	Mascara
Ephedraceae	*Ephedra alata*	Ephédra	Alinda	Annual	Spontaneous	Adrar
Equisetaceae	*Equisetum ramosissimum*	Prêle rameuse	Danb el khile	Summer	Spontaneous	Bechar

Fabaceae	*Cassia angustifolia*	Sené	Sana makia	Spring	Imported	/
	Ceratonia Siliqua	Caroubier	Kharoube	Summer	Cultivated	Mascara
	Glycyrrhiza glabra L.	Réglisse	Arqsouss	Summer	Cultivated	Tlemcen
	Lupinus albus L.	Lupin blanc	Termas mor	Autumn	Spontaneous	Djelfa
	Retama raetam	Retam	R'tum	Winter	Spontaneous	Bechar
	Trigonella foenum-graecum L.	Fenugrec	Halba	Summer	Cultivated	Mostaganem
Gentianaceae	*Centaurium erythraea*	Petite centaurée	Merrâret lehnech	Spring	Spontaneous	Oran
Geraniaceae	*Geranium rosat*	Geranium	Geranium	Spring	Cultivated	Mascara
	Geranium robertianum L.	Géranium herbe à robert	Laatarcha	Summer	Spontaneous	Tlemcen
Globulariaceae	*Globularia alypum* L.	Globulaire	Tasselgha	Spring	Spontaneous	Mascara
Gramineae	*Avena sativa*	Avoine	Choufane	Summer	Cultivated	Mascara
	Hordeum vulgare	Orge	Zraa	Summer	Cultivated	Mascara
	Stipa tenacissima L.	Alfa	EL Halfa	Summer	Spontaneous	Mascara
Juglandaceae	*Juglans regia*	Noyer	El jouz	Spring	Imported	/
Lamiaceae	*Ajuga iva* (L.)	Ivette musquée	Chendgoura	Spring	Spontaneous	Mascara
	Lavandula dentata L.	Lavande dentée	Halhal	Spring	Spontaneous	Mascara
	Lavandula stoechas L.	Lavande papillon	Khzama	Spring	Spontaneous	Mascara
	Marrubium vulgare L.	Marrube blanc	Marrîwa	Spring	Spontaneous	Mascara
	Mentha pulegium L.	Menthe pouliot	Fliou	Spring	Spontaneous	Mascara
	Thymus algeriensis	Thym	Zâtar	Spring	Spontaneous	Mascara
	Origanum majorana L.	Marjolainene	Bardakouche	Summer	Spontaneous	Tlemcen
	Rosmarinus officinalis L.	Romarin	Iklil eljabel	Spring	Spontaneous	Mascara
	Salvia officinalis L.	*Sauge officinale*	Marmia	Spring	Cultivated	Mascara
	Satureja calamintha ssp. *nepeta*	Sarriette	Napta	Spring	Spontaneous	Mascara
	Teucrium polium L.	Germandrée blanc	Khayata	Summer	Spontaneous	Mascara
Lauraceae	*Cinnamomum cassia* Lour	Cannelle	El Karfa	Spring	Imported	/
	Laurus nobilis L.	Laurier	Rand	Annual	Cultivated	/
Liliaceae	*Allium cepa* L.*Allium sativum L.*	Onion	Elbesale	Annual	Cultivated	Mascara
	Allium sativum L.	Ail	Toum	Spring	Cultivated	Mascara
Linaceae	*Linum usitatissimum*	Lin	Zariat el katane	Summer	Cultivated	/
Lythraceae	*Lawsonia inermis* L.	Henné	Hanna	Summer	Cultivated	Adrar
	Punica granatum L.	Grenadier	Rommane	Summer	Cultivated	Mascara
Malvaceae	*Hibiscus sabdariffa*	Oseille de Guinée	Karkadia	Spring	Cultivated	Tlemcen
	Malva sylvestris	Mauve à feuille	Khobize	Spring	Spontaneous	Mascara
Moraceae	*Ficus carica* L.	Figuier	Houra	Summer	Cultivated	Mascara
Moringaceae	*Moringa oleifera*	Moringa	Moringa	Annual	Imported	/

Myrtaceae	*Eucalyptus globulus* Labill.	Eucalyptus	Kalitouss	Summer	Cultivated	Mascara
	Myrtus communis L.	Myrte commun	Raihane	Summer	Cultivated	/
	Syzigium aromaticum	Giroflier	Qrûnfûl	Summer	Cultivated	/
Oleaceae	*Olea europaea* L.	Olivier	Zitoun	Annual	Cultivated	Mascara
Pedaliaceae	*Sesamum indicum* L.	Sésame	Jenjlen	Annual	Cultivated	/
Renunculaceae	*Nigella sativa* L.	Nigelle	El haba Sawda	Summer	Imported	/
Rhamnaceae	*Ziziphus lotus* (L.)	Jujubier sauvage	Sadra	Summer	Spontaneous	Mascara
Rosaceae	*Crataegus laevigata*	Aubépine	Zaârour	Spring	Spontaneous	Tlemcen
	Prunus dulcis	Amandier amer	Louz mur	Winter	Cultivated	Mascara
	Prunus persica	Pêcher	Khokh	Spring	Cultivated	Mascara
Rutaceae	*Ruta montana* L.	Rue	Fidjel	Spring	Spontaneous	Mascara
	Citrus xlimon	Citronier	Leimoun	Winter	Cultivated	Mascara
Selaginellaceae	*Selaginella lepidophylla*	Rose de Jéricho	Kaf maryam	Summer	Spontaneous	Adrar
Thymelaeaceae	*Daphne gnidium* L.	Garou	Lazaz	Spring	Spontaneous	Oran
Urticaceae	*Urtica dioica* L.	Ortie	Hourrigue	Spring	Spontaneous	Mascara
Verbenaceae	*Aloysia citrodora*	Verveine	Louiza	Spring	Cultivated	Mascara
Xanthorhoeaceae	*Aloe vera*	Aloe vera	Sabar	Annual	Spontaneous	Mascara
Zingiberaceae	*Curcuma longa*	Curcuma	Korkoum	Summer	Imported	/
	Zingiber officinale Roscoe	Gingembre	Zenjabil, Skingebir	Summer	Imported	/
Zygophyllaceae	*Peganum harmala* L.	Harmal	Harmel	Summer	Spontaneous	Adrar
	Zygophyllum album	Zygophylle	Aggaya	Annual	Spontaneous	Adrar

foenum-graecum, Berberis vulgaris, and *Centaurium erythraea* had the highest UVs in our database. These values indicate their great therapeutic versatility and frequent use in traditional pharmacopoeia as antidiabetic agents. Our results align with other ethnobotanical studies conducted in Algeria, particularly in the regions of Tlemcen, El Bayadh, and Oran,[13] where these plants also show high UVs. This consistency in data suggests a strong cultural consensus and reinforces the pharmacological relevance of these species in treating metabolic and digestive disorders.

Furthermore, several taxa from the *Lamiaceae* and *Asteraceae* families, including *Rosmarinus officinalis, Ajuga iva*, and *Artemisia herba-alba*, also showed significant UVs in our study. This corroborates findings from other regional surveys and supports the hypothesis that these plant families are central components of Algerian ethnomedicine due to their rich phytochemical profiles and broad spectrum of biological activities.

The convergence of high Use Values across different studies highlights the robustness of traditional knowledge systems and provides a solid foundation for the selection of priority species for future phytopharmaceutical, pharmacological, and conservation research. In contrast, species with lower UVs, such as *Myrtus communis* (0.04) and *Punica granatum* (0.01) (Table 3), suggest limited recognition, infrequent use, or low recommendation in traditional practices. This may reflect a lack of widespread knowledge of their antidiabetic applications, but does not imply that these plants lack potential medicinal value.

A comparative analysis between our results (Table 3) and previous ethnobotanical studies conducted in Algeria, such as those by Kouidri *et al.*,[30] in Northwestern Algeria and Lakhdari Aissa *et al.*,[31] in the Sidi Bel Abbès region, reveals both convergences and divergences in the traditional use of medicinal plants for managing diabetes. In all studies, *Olea europaea* and *Berberis vulgaris* appear as frequently cited species, suggesting a robust consensus on their therapeutic potential and widespread recognition within various communities. This interregional consistency strengthens the case for prioritizing these plants in future pharmacological and phytopharmaceutical research.

However, notable regional differences are observed. In our study, species such as *Trigonella foenum-graecum, Artemisia herba-alba,* and *Ajuga iva* showed high UVs, indicating their important role in local medicinal practices. In contrast, these plants were either less frequently cited or absent in the studies by Kouidri *et al.*, and Lakhdari, where species such as *Zygophyllum geslini, Erythraea centaurium,* and *Citrullus colocynthis* were the most frequently mentioned. These differences may reflect variations in floristic availability, the transmission of socio-cultural knowledge, and ecological adaptation across different Algerian regions. These

Table 2: Distribution of medicinal plants according to the used part and method of preparation.

Family	Scientific Name	French Name	Vernacular name	Used part	Preparation mode
Acacias	*Acacia senegal* L.	gomme arabique	Samgh el arabi	Gum	Mastication
Anacardiaceae	*Pistacia lentiscus*	Lentisque	darow	Leaves	Infusion
Apiaceae	*Ammodaucus leucotrichus*	Cumin du Sahara	Nassoufa	Leaves seeds	Infusion, Decoction
	Apium graveolens L.	Céleri	Krafess	seedsaerial parts	Infusion
	Carum cuminum L.	Cumin	Kamoune	seeds	Infusion, Powder
	Dorema ammoniacum	Doréma	Fessoukh	Gum	Powder
	Ferula assafoetida	Ase fétide	Hantit	Resin	/
	Foeniculum dulce DC	Fenouil	Besbas	Aerial parts	Infusion
Aristolochiaceae	*Aristolochia longa*	Aristoloche longue	Berostom	Root	Powder
Asteraceae	*Anvillea radiata*	Anvillea	Nougd	Leaves	Infusion
	Artemisia absinthium L.	Absinthe	Chiba	Aerial parts	Infusion
	Artemisia campestris	Armoise champêtre	Allal	Leaves	Decoction
	Artemisia herba-alba Asso	Armoise blanche	Chih	Aerial parts	Infusion, Raw
	Cotula cinerea	Cotula	Gartoufa	Leaves	Infusion
	Cynara scolymus L.	Artichaut	Kharchouf	Leaves	Raw
	Dittrichia viscosa (L.) *Greuter*	Inule visqueuse	Magramâne	Leaves	Infusion
	Matricaria chamomilla L.	Camomille sauvage	Babounidj	Leaves	Infusion
	Othonna cheirifolia	Othonne	Rass el hnache	Leaves	Infusion
	Saussurea costus	costus indien	Quiste el hindi	Bark	Powder in water
	Taraxacum officinalis	Pissenlit	Handeba	Flowers	Infusion
Berberidaceae	*Berberis vulgaris* L.	Épine-vinette	Arq ghriss	Bark	Decoction, powder as tablets
Brassicaceae	*Eruca sativa*	Roquette	Jarjir	Leaves	Infusion
	Lepidium sativum L.	Cresson alénois	Hab err-chad	Seeds	Infusion
	Raphanus sativus L.	Radis	Machti	Seeds	Infusion, Decoction
Burseraceae	*Boswellia carterii*	Oliban	Loubane	Gum	Mastication
	Commiphora myrrha	Myrrhe	Elmorra	Gum	Mastication
Capparaceae	*Capparis spinosa* L.	Câprier	Kebbar	Leaves	Infusion
	Arthrophytum scoparium	Saligne à balai	Remth	Aerial parts	Decoction, Infusion
	Atriplex halimus L.	Pourpier de mer	El gtaf	Leaves	Infusion
Cucurbitaceae	*Citrullus colocynthis* L.	Coloquinte	Handal	Seeds, Fruits	Raw
Cupressaceae	*Tetraclinis articulata.*	Thuya de Berbérie	Araâr	Leaves	Infusion, Powder (1 coffee spoon in cup of water)
Ephedraceae	*Ephedra alata*	Ephédra	Alinda	Aerial parts	Decoction
Equisetaceae	*Equisetum ramosissimum*	Prêle rameuse	Danb el khile	Stems	Decoction

Fabaceae	*Cassia angustifolia*	Sené	Sana makia	Leaves	Infusion
	Ceratonia Siliqua	Caroubier	Kharoube	Seeds	Raw
	Glycyrrhiza glabra L.	Réglisse	Arqsouss	Bark Root	Mastication Decoction
	Lupinus albus L.	Lupin blanc	Termas mor	Seeds	Decoction
	Retama raetam	Retam	R'tum	Leaves	Decoction
	Trigonella foenum-graecum L.	Fenugrec	Halba	Seeds	Decoction, Infusion
Gentianaceae	*Centaurium erythraea*	Petite centaurée	Merrâret lehnech	Leaves	Infusion
Geraniaceae	*Geranium rosat*	Geranium	Geranium	Leaves	Infusion
	Geranium robertianum L.	Géranium herbe à robert	Laatarcha	Leaves flowers	Infusion
Globulariaceae	*Globularia alypum* L.	Globulaire	Tasselgha	Leaves	Infusion
Gramineae	*Avena sativa*	Avoine	Choufane	Seeds	Infusion
	Hordeum vulgare	Orge	Zraa	Seeds	Decoction
	Stipa tenacissima L.	Alfa	EL Halfa	Aerial parts	Decoction
Juglandaceae	*Juglans regia*	Noyer	El jouz	Leaves	Infusion
Lamiaceae	*Ajuga iva* (L.)	Ivette musquée	Chendgoura	Aerial parts	Infusion
	Lavandula dentata L.	Lavande dentée	Halhal	Aerial parts	Infusion
	Lavandula stoechas L.	Lavande papillon	Khzama	Leaves	Infusion
	Marrubium vulgare L.	Marrube blanc	Marrîwa	Aerial parts	Infusion
	Mentha pulegium L.	Menthe pouliot	Fliou	Aerial parts	Infusion
	Thymus algeriensis	Thym	Zâtar	Leaves	Infusion
	Origanum majorana L.	Marjolaine	Bardakouche	Leaves flowers	Infusion
	Rosmarinus officinalis L.	Romarin	Iklil eljabel	Leaves	Infusion
	Salvia officinalis L.	Sauge officinale	Marmia	Leaves	Decoction
	Satureja calamintha ssp. *Nepeta*	Sarriette	Napta	Leaves	Decoction
	Teucrium polium L.	Germandrée blanc	Khayata	Leaves	Decoction, Infusion
Lauraceae	*Cinnamomum Cassia* Lour	Cannelle	El Karfa	Bark	Powder (as spice), Decoction
	Laurus nobilis L.	Laurier	Rand	Leaves	Decoction
Liliaceae	*Allium cepa* L.*Allium sativum L.*	Onion	Elbesale	Bulb	Raw
	Allium sativum L.	Ail	Toum	Bulb	Raw
Linaceae	*Linum usitatissimum*	Lin	Zariat el katane	Seeds	Decoction
Lythraceae	*Lawsonia inermis* L.	Henné	Hanna	Leaves	Decoction
	Punica granatum L.	Grenadier	Rommane	Pericarp	Decoction
Malvaceae	*Hibiscus sabdariffa*	Oseille de Guinée	Karkadia	Leaves	Infusion
	Malva sylvestris	Mauve à feuille	Khobize	Leaves	Decoction
Moraceae	*Ficus carica* L.	Figuier	Houra	Fruits	Raw
Moringaceae	*Moringa oleifera*	Moringa	Moringa	Leaves, Seeds	Infusion

Myrtaceae	*Eucalyptus globulus* Labill.	Eucalyptus	Kalitouss	Leaves	Decoction
	Myrtus communis L.	Myrte commun	Raihane	Leaves	Decoction, Powder
	Syzigium aromaticum	Giroflier	Qrûnfûl	Leaves, Fruits	Decoction
Oleaceae	*Olea europaea* L.	Olivier	Zitoun	Leaves, Fruits	Decoction, Infusion Raw
Pedaliaceae	*Sesamum indicum* L.	Sésame	Jenjlen	Seeds	Infusion
Renunculaceae	*Nigella sativa* L.	Nigelle	El haba Sawda	Seeds	Powder, Infusion Decoction
Rhamnaceae	*Ziziphus lotus* (L.)	Jujubier sauvage	Sedra	Leaves Fruits	Decoction, Powder Raw
Rosaceae	*Crataegus laevigata*	Aubépine	Zaârour	Fruits	Decoction
	Prunus dulcis	Amandier amère	Louz mur	Fruits	Raw
	Prunus persica	Pêcher	Khokh	Leaves	Decoction, Powder of leaves with honey
Rutaceae	*Ruta montana* L.	Rue	Fidjel	Leaves	Infusion
	Citrus xlimon	Citronier	Leimoun	Leaves	Juice
Selaginellaceae	*Selaginella lepidophylla*	Rose de Jéricho	Kaf maryam	Leaves	Infusion
Thymelaeaceae	*Daphne gnidium* L.	Garou	Lazaz	Leaves	Infusion
Urticaceae	*Urtica dioica* L.	Ortie	Hourrigue	Leaves	Infusion
Verbenaceae	*Aloysia citrodora*	Verveine	Louiza	Leaves	Infusion
Xanthorhoeaceae	*Aloe vera*	Aloe vera	Sabar	Leaves	Juice
Zingiberaceae	*Curcuma longa*	Curcuma	Korkoum	Rhizom	Powder as spice, Decoction
	Zingiber officinale Roscoe	Gingembre	Zenjabil, Skingebir	Rhizom	Powder as spice, Decoction
Zygophyllaceae	*Peganum harmala* L.	Harmal	Harmel	Seeds	Infusion
	Zygophyllum album L.	Zygophyllum	Aggaya	Leaves	Infusion

Table 3: **Classification of plants by number of citations and frequency of uses.**

Scientific name	French name	Vernacular name	Family	U[a]	UV[b]
Trigonella foenum-graecum	Fenugrec	Halba	Fabaceae	49	0.245
Berberis vulgaris	Epine-vinette	Arq ghris	Berberidaceae	32	0.160
Centaurium erythrea	Petit centaurée commune	Mararet lahnech	Gentianaceae	29	0.145
Artemisia herba-alba Asso	Armoise blanche	Chih	Asteraceae	27	0.135
Zygophyllum album L.	Zygophyllum	Aggaya	Zygophyllaceae	21	0.105
Citrullus colocynthis (L.)	Coloquinte	Handal	Cucurbitaceae	21	0.105
Olea europaea	Olivier	Awrak zeitoun	Oleaceae	20	0.100
Rosmarinus officinalis	Romarin	Yazir el bel / Iklil el jabal	Lamiaceae	18	0.090
Tetraclinis articulata	Thuya de Berbérie	Aaraar	Cupressaceae	18	0.090
Cinnamomum verum	Cannelle	karfa	Lauraceae	18	0.090
Ajuga iva (L.)	Ivette musquee	Chandgoura	Lamiaceae	18	0.090
Lupinus albus	Lupin blanc	Ttarmas el mor	Fabaceae	17	0.085
Lavandula dentata L.	Lavande dentée	Halhal	Lamiaceae	15	0.075
Salvia officinalis	Sauge officinale	Mamia	Lamiaceae	14	0.070

Nigella sativa	Nigelle	El haba sawda	Renonculaceae	14	0.070
Arthrophytum scoparium	Saligne à balai	Ramth	Chenopodiaceae	11	0.055
Boswellia carterii	Oliban	Loban	Burseraceae	11	0.055
Atriplex halimus L.	Pourpier de mer	Gtaf	Chenopodiaceae	9	0.045
Marrubium vulgare L.	Marrube blanc	Marriwa	Lamiaceae	9	0.045
Myrtus communis L.	Myrte commun	Reihan	Myrtaceae	8	0.040
Globularia alypum	Globulaire buissonnante	Tasselgha	globulariaceae	8	0.040
Anvillea radiata coss.	Anvillea	Nogd	Asteraceae	7	0.035
Pistacia lentiscus	Lentisque	darow	Anacardiaceae	6	0.030
Ziziphus lotus (L.)	Jujubier	Sadra	Rhamnaceae	6	0.030
Stipa tenacissima L.	Alfa	Halfa	Gramineae	6	0.030
Commiphora myrrha	Myrrhe	El morra	Burseraceae	5	0.025
Artemisia campestris L.	Armoise champêtre	Allel	Asteraceae	5	0.025
Zingiber officinale	Gingembre	Zanjabil	Zingiberaceae	5	0.025
Urtica dioica L.	Ortie	Horig	Urticaceae	5	0.025
Ephedra alata	Ephedra	Aalanda	Ephedraceae	5	0.025
Aristolochia longa	Aristoloche longue	Brostome	Aristolochiaceae	4	0.020
Allium sativum L.	Ail	Thoum	Liliaceae	4	0.020
Mentha pulegium	Menthe pouliot	Fluo	Lamiaceae	4	0.020
Hibiscus sabdariffa	Oseille de guinée	Karkadia	Malvaceae	4	0.020
Teucrium poleum L.	Germandrée blanc	Khyata	Lamiaceae	4	0.020
Thymus algeriensis	Thym	Zaatar	Lamiaceae	4	0.020
Eucalyptus globulus	Eucalyptus	Kalitous	Myrtaceae	4	0.020
Matricaria chamomilla L.	Camomille sauvage	Babounidj	Asteraceae	4	0.020
Prunus dulcis	Amande amère	Louz el mor	Rosaceae	3	0.015
Punica granatum L.	Grenadier	Roman	Lythracées	3	0.015
Lepidium sativum L.	Resson alenoise	Hab err-chad	Brassicaceae	3	0.015
Foeniculum dulce DC.	Fenouil	Besbes	Apiaceae	3	0.015
Ficus carica L.	Figuier	Horra	Moraceae	3	0.015
Prunus persica	Pêcher	khoukh	Rosaceae	3	0.015
Capparis spinosa L.	Câprier	Kebbar	Capparidaceae	3	0.015
Ceratonia Siliqua	Caroubier	Kharoub	Fabaceae	3	0.015
Allium cepa	Oignons	Bsal	Liliaceae	2	0.010
Peganum harmala	Harmal	Harmal	Zygophyllaceae	2	0.010
Ammodaucus leucotrichus	Cumin du Sahara	Nassoufa	Apiaceae	2	0.010
Aloe vera	Aloé vera	Sebar	Xanthorrhoéaceae	2	0.010
Othonna cheirifolia	Othonne	Ras el hnech	Asteraceae	2	0.010
Linum usitatissimum	Lin	Zariaat el ketan	Linaceae	2	0.010
Moringa oleifera	Moringa	Mouringa	Moringaceae	2	0.010
Ruta montana L.	Rue	Fijel	Rutaceae	2	0.010
Laurus nobilis	Laurier	Rand	Lauraceae	2	0.010
Syzygium aromaticum L.	Clou de girofle	Qrûnfûl	Myrtaceae	2	0.010
Mentha rotundifolia	Menthe à feuilles rondes	Thamarsat	Lamiaceae	1	0.005
Retama raetam	Retam	Rtam	Fabaceae	1	0.005

Cotula cinerea	Cotula	Gartoufa	Asteraceae	1	0.005
Cuminum Cyminum	Cumin	Kamoun	Apiaceae	1	0.005
Juglans regia	Noyer	Chajret el djaouz	Juglandaceae	1	0.005
Apium graveolens	Céleri	Krafes	Apiaceae	1	0.005
Equisetum maxitum Lamk.	Prêles	Danab el kheil	Equisetaceae	1	0.005
Curcuma longa	Curcuma	Korkom	Zingiberaceae	1	0.005
Malva sylvestris	Mauve à feuilles	Khobiz	Malvaceae	1	0.005
Avena sativa	Avoine	Choufen	Graminaceae	1	0.005
Taraxacum officinalis	Pissenlit	Handeba	Asteraceae	1	0.005
Eruca sativa	Roquette	Jarjir	Brassicaceae	1	0.005
Lawsonia inermis L.	Henné	Hanna	Lythraceae	1	0.005
Citrus xlimon	Citronnier	Leimoun	Rutaceae	1	0.005
Saussurea costus	Saussurea costus	Quiste el hindi	Asteraceae	1	0.005
Acacia senegal (L.)	Gomme arabique	Samgh el arabi	Acacias	1	0.005
Ferula assa- foetida	Ase fétide	hantit	Apiaceae	1	0.005
Cynara cardunculus L.	Cardon	Khorchaf	Asteraceae	1	0.005
Geranium robertianum L.	Géranium	Géranium	Geraniaceae	1	0.005
Aloysia citrodora	Verveine	louiza	Verbenaceae	1	0.005
Geranium robertianum L	Herbe a robert	Laatarcha	Geraniaceae	1	0.005
Glycyrrhiza glabra L.	Réglisse	Arqsouss	Febaceae	1	0.005
Lavandula augustifolia	Lavande papillon	Khzama	Lamiaceae	1	0.005
Origanum majorana L.	Marjolaine	Bardakouche	Lamiaceae	1	0.005
Crataegus laevigata	Aubépine	Zaarour	Rosaceae	1	0.005
Sesamum indicum L.	Sésame	Jeljlen	Pedaliaceae	1	0.005
Dittrichia viscosa (L.) Greuter	Inule visqueuse	Megramen	Asteraceae	1	0.005
Daphne gnidium L.	Garou	Lezez	Thymelaeaceae	1	0.005
Raphanus sativus L.	Radis	Mechethi	⁋ Brassicaceae	1	0.005
Dorema ammoniacum	Dorema ammoniacum	Fessoukh	Apiaceae	1	0.005
Hordeum vulgare	Orge	Zraa	Graminaceae	1	0.005
Cassia angustifolia	Séné	Sana makia	Fabaceae	1	0.005

[a]U: Number of citations per plant, [b]UV: Utilization value of plants.

results highlight the diversity of traditional medicinal systems in Algeria and the need for further research into the pharmacological properties of these plants to validate and harness their full therapeutic potential.

CONCLUSION

The ethnobotanical study conducted has underscored the significant role of traditional phytotherapy in the western region of Algeria. Insights obtained from the survey and field-based floristic analysis have enabled us to identify a diverse plant species. Leaves were the most commonly used plant part, and infusion was the predominant preparation method. The study has demonstrated that this region possessed a rich spontaneous flora of medicinal plants, offering considerable potential for scientific research in pharmacology. Conducting clinical trials on these traditional remedies could provide critical evidence of their efficacy and safety. Additionally, this ethnobotanical research pave the way for isolating new bioactive molecules from these aromatic and medicinal plants traditionally used in this area, in order to prepare a new galenic formulations. These formulations could offer preventive care for individuals predisposed to diabetes and treatment for diabetic patients.

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ABREVIATIONS

UV: Utilization value of plants; **U:** Number of citations per plant; **N:** Number of informants.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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SUMMARY

This ethnobotanical survey was conducted in western Algeria using structured questionnaires administered to 200 informants, including herbalists, traditional healers, and phytotherapists. Data were collected on informant profiles and traditional antidiabetic plant usage. Ninety plant species belonging to 42 families were identified, with *Asteraceae* and *Lamiaceae* being the most cited. The most frequently used parts were leaves, and the common preparation methods were infusion and decoction. *Trigonella foenum-graecum*, *Berberis vulgaris*, and *Centaurium erythraea* had the highest use values, indicating their importance in traditional diabetes management. This study underlines the richness of local ethnobotanical knowledge and the need for further scientific validation.

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