

Ethnobotanical Survey of Medicinal Plants from El M'Ghair (Algeria) Used in the Treatment of Nephrolithiasis, Cirrhosis, Anemia, Leukemia, Psoriasis and Eczema

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History

- Submission Date: 26-06-2026;
- Review completed: 18-08-2026;
- Accepted Date: 31-08-2026.

DOI : 10.5530/pj.2026.18.152

Article Available online

<http://www.phcogj.com/v18/i3>

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ABSTRACT

Introduction: Traditional medicinal plants are widely used to treat chronic and dermatological diseases; however, ethnobotanical information from the El M'Ghair region of the Algerian Sahara remains scarce. To the best of our knowledge, no comprehensive ethnobotanical survey has previously documented the medicinal plants traditionally used in this region for the treatment of nephrolithiasis, liver cirrhosis, anemia, leukemia, psoriasis, and eczema. Therefore, this study aimed to document these medicinal plants and compare their traditional uses with the available scientific evidence. **Materials and Methods:** An ethnobotanical survey was conducted in the El M'Ghair region and involved face-to-face interviews with herbalists and traditional healers regarding the medicinal plants used to treat the mentioned diseases.

Results: The majority of herbal practitioners interviewed were men, predominantly over the age of 30. A total of 39 medicinal plant species were reported for treating these diseases. According to the survey, *Spergularia rubra* and *Hordeum vulgare* were most frequently recommended for nephrolithiasis, while *Cichorium intybus*, *Matricaria chamomilla*, and *Curcuma longa* were commonly used for liver cirrhosis. For anemia, *Ceratonia siliqua* and *Lens culinaris* were widely cited. Plants such as *Matricaria chamomilla*, *Aloe vera*, and *Curcuma longa* were used to alleviate symptoms of eczema and psoriasis. Additionally, some plants were noted for their effects on other diseases, such as *Ephedra alata* for cancer treatment.

Conclusion: The inventory of medicinal plant species reported in this study demonstrates the richness of traditional knowledge in the Sahara region. Some species, particularly those without prior pharmacological documentation, may serve as promising candidates for future drug discovery.

Keywords: Diseases, Ethnobotanical Study, M'Ghair, herbal remedies, Sahara region.

INTRODUCTION

Throughout the centuries, human traditions have developed the knowledge and use of natural products, particularly those of plant origin, with the aim of alleviating suffering and improving health¹. Traditional medicine, especially herbal medicine, has long demonstrated its effectiveness and undeniable health benefits. Medicinal plants have been used across all civilizations worldwide as a fundamental source of treatment².

For thousands of years, plants and plant-based preparations were the primary remedies for a wide range of ailments. Their popularity remained strong until the rise of modern scientific medicine in the late 19th century, which led to a decline in the use of herbal remedies due to the discovery and development of synthetic drugs. However, since the 1970s, interest in plant-based therapies has resurged significantly, largely due to the side effects associated with synthetic pharmaceuticals³.

Medicinal plants have been used in Algeria for centuries to treat different ailments. Although Algeria is one of the richest Arab countries with 3164 plant species. In South of Algeria, the Sahara, one of the world-largest deserts, local populations still rely on traditional healers for their health care⁴.

Despite numerous ethnobotanical surveys conducted in Algeria, ethnobotanical information from the El M'Ghair region remains scarce. To

the best of our knowledge, no comprehensive ethnobotanical study has documented the medicinal plants traditionally used in this Saharan region for the treatment of nephrolithiasis, liver cirrhosis, anemia, leukemia, psoriasis, and eczema. El M'Ghair was selected because traditional herbal medicine remains widely practiced by the local population, while its ethnomedicinal knowledge has received limited scientific attention. Therefore, this study contributes new ethnobotanical data by documenting traditional medicinal practices and comparing them with the available pharmacological evidence.

MATERIALS AND METHODS

Presentation of the Study Area

The study was conducted in El M'Ghair, a wilaya located in the eastern part of Algeria (coordinates approximately 33.94°N, 5.85°E) (Figure 1). The region lies within the northern part of the Sahara Desert and is characterized by an arid to semi-arid climate, with extremely hot summers, mild winters, and low and irregular annual rainfall, typically less than 100 mm. Temperature extremes can range from above 45 °C in summer to near freezing in winter nights. The region is bordered to the north by Biskra Province, to the east by El Oued Province and Touggourt Province, to the west by Ouled Djellal Province, and to the south by Ouargla Province and Touggourt Province. El M'Ghair is predominantly a flat desert plain interspersed with oases, which play a crucial role in sustaining local agriculture and

Cite this article: Khaoula Z, Samar M. Ethnobotanical Survey of Medicinal Plants from El M'Ghair (Algeria) Used in the Treatment of Nephrolithiasis, Cirrhosis, Anemia, Leukemia, Psoriasis and Eczema. Pharmacogn J. 2026;18 (3): 330-338.

settlements. The soil in the area is generally sandy and saline, which limits cultivation to areas with irrigation or naturally fertile oasis zones^{5,6}.

Ethnobotanical Data Collection Methodology

Ethnobotanical Data Collection

Ethnobotanical data were collected between March and May 2022 through face-to-face interviews with approximately 40 local herbal vendors and traditional medicine practitioners in El M'Ghair region, El Oued Province, Algeria. Participants were selected using purposive sampling to include individuals with extensive experience in the preparation, sale, and traditional use of medicinal plants. Interviews were conducted in herbal shops by trained researchers using structured questionnaires administered according to a standardized interview protocol to ensure consistency in data collection.

The questionnaire was specifically designed for the objectives of the present study and underwent expert review and validation prior to field implementation to ensure its clarity, relevance, and content validity. It collected information on respondents' demographic characteristics, the vernacular and scientific names of medicinal plants, plant parts used, methods of preparation and administration, and their traditional therapeutic applications.

To enhance data reliability and minimize recall bias, only practitioners with substantial professional experience in traditional herbal medicine were included. Respondents were asked to report remedies that they routinely prescribed or prepared in their daily practice, and the information obtained was cross-checked across interviews. Only plant-use reports that were consistently documented by multiple independent informants were retained for subsequent analyses. Because individual participants could provide information on more than one disease category, a total of 223 completed questionnaires were obtained. All data were entered into Microsoft Excel 2007 for coding, organization, and subsequent statistical analysis.

Plant Identification and Authentication

The medicinal plants cited by the respondents were botanically identified by comparing the collected plant materials with authenticated reference specimens and standard taxonomic literature. Scientific names were verified and updated according to current botanical nomenclature using recognized taxonomic references. Plant identification was further confirmed through comparison with authenticated reference samples to ensure taxonomic accuracy. However, voucher specimens were not deposited in a public herbarium, as the study was designed as an ethnobotanical survey based on interviews with traditional herbal practitioners.

RESULTS AND DISCUSSION

A total of 223 completed survey forms were collected during the ethnobotanical survey conducted in the province of El M'Ghair, involving forty local herbalists and phytotherapists. The informants ranged in age from 20 to 55 years and included 11 women and 29 men. At the conclusion of the survey, 39 medicinal plant species were identified as being used in the treatment of various diseases, including nephrolithiasis, liver cirrhosis, anemia, leukemia, psoriasis, and eczema.

Distribution of Respondents by Gender

The survey results indicate that both women and men are engaged in traditional medicine, with a notable predominance of male respondents (Figure 2). Among the medicinal plant users surveyed, 27% were women and 73% were men. This disparity may reflect the broader transmission of phytotherapeutic knowledge among men in the region.

The higher proportion of male respondents is likely linked to the commercial nature of traditional medicine. In local markets, most herbal shops are owned and operated by men, whereas women often practice from home, making them less visible and harder to reach without prior connections.

Distribution of Respondents by Educational Level

Based on the data collected in the province of El M'Ghair, the majority of herbalists and medicinal plant practitioners surveyed had attained a secondary level of education, accounting for 43% of respondents (Figure 3). Respondents with a university-level education represented 27%. This suggests a growing interest among educated individuals in traditional medicine, possibly influenced by access to documentation and media sources that promote awareness of its potential therapeutic value.

In contrast, illiterate respondents and those with only a primary education constituted smaller proportions, estimated at 10% each. These groups rely primarily on oral transmission of traditional therapeutic knowledge passed down through generations, which often serves as their main source of information.

Age Distribution of Respondents

The practice of medicinal plant-based therapy in the El M'Ghair region is observed across all age groups. A slight predominance was noted among respondents aged 30–40 years, who represented 37.5% of the total (Figure 4), followed by the 40–50 age group at 35%. The 20–30 age group accounted for 15%, while respondents aged 60 and above represented 12.5%.

The higher representation of individuals over 30 years of age may reflect their greater exposure to traditional knowledge, often passed down through generations, particularly during times when access to modern healthcare was limited. In contrast, the lower proportion among younger respondents may indicate a reduced reliance on traditional medicine in favor of modern therapeutic approaches.

Distribution of Medicinal Plants According to the Diseases Treated

Frequency of Use of Plants for the Treatment of Nephrolithiasis

A total of twelve medicinal plants were reported by herbalists and phytotherapists as being used in the treatment of nephrolithiasis (Table 1). Among them, *Spergularia rubra*, *Hordeum vulgare*, and *Zea mays*, *Citrus limon* were the most frequently recommended species (Figure 5).

Our findings are generally consistent with those reported by Helali et al. (2025)⁷ in Tlemcen Province (northwestern Algeria), who documented 32 medicinal plant species belonging to 20 botanical families traditionally used for the management of urolithiasis. Notably, *Hordeum vulgare*, *Citrus limon*, and *Petroselinum crispum* were among the most frequently cited species in both studies, suggesting a broad consensus in Algerian traditional medicine regarding their use for urinary stone management.

The scientific evidence supporting these medicinal plants varies according to the level of investigation. *Apium graveolens* has demonstrated antiurolithiatic activity in experimental animal models. Nainggolan et al. (2018)⁸ reported that the ethyl acetate fraction of *A. graveolens* reduced serum urea and creatinine levels in rats with ethylene glycol-induced nephrolithiasis, suggesting a protective effect against renal injury. Similarly, *Ocimum basilicum* has shown antiurolithiatic potential in rats⁹. In addition, *Hordeum vulgare* seed extract has exhibited inhibitory activity against kidney stone formation *in vitro* studies¹⁰.

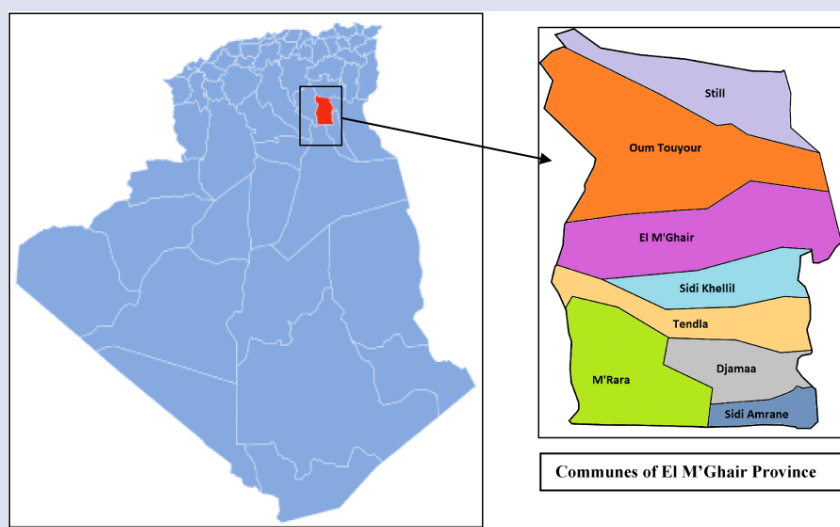


Figure 1. Geographical location of El M'Ghair

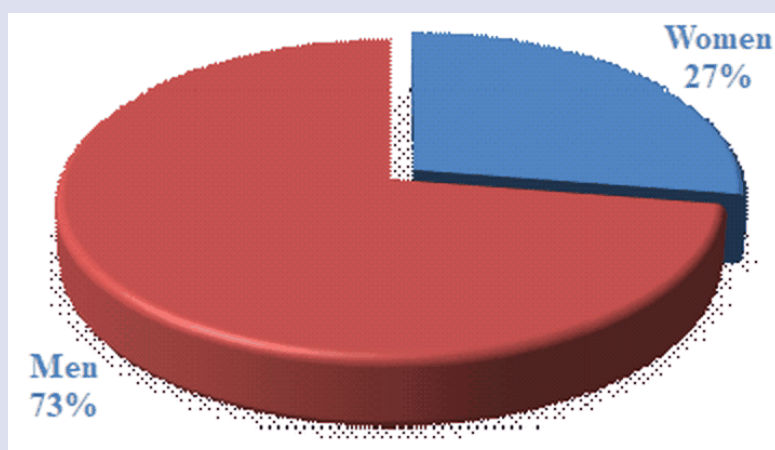


Figure 2. Distribution of respondents by gender

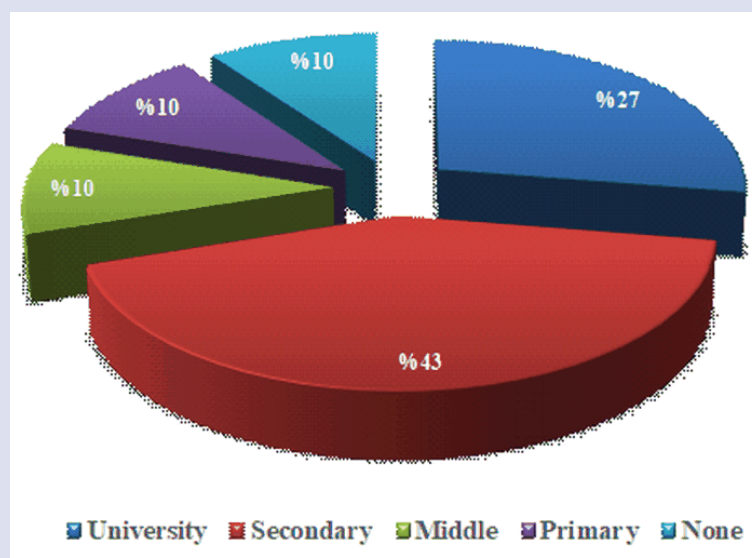


Figure 3. Distribution of respondents according to educational level

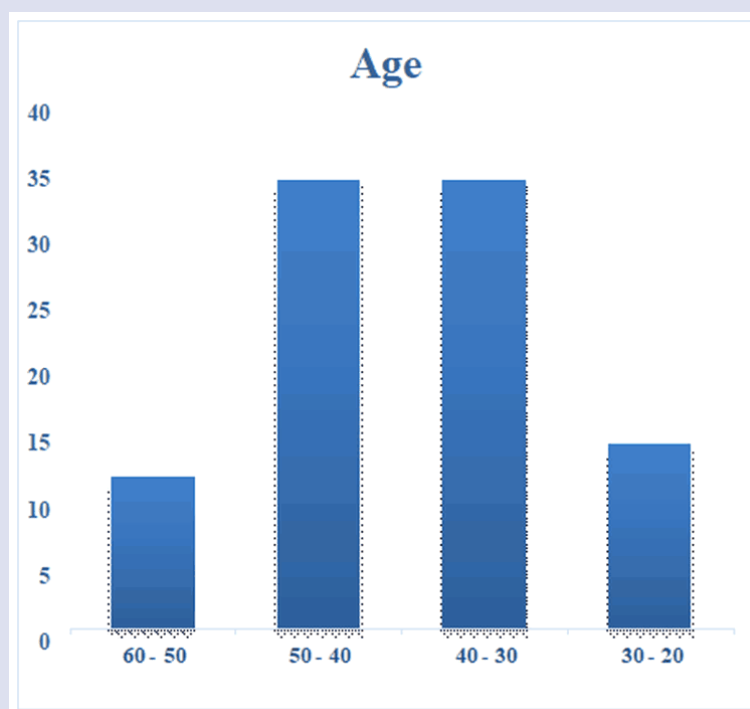


Figure 4. Distribution of respondents by age

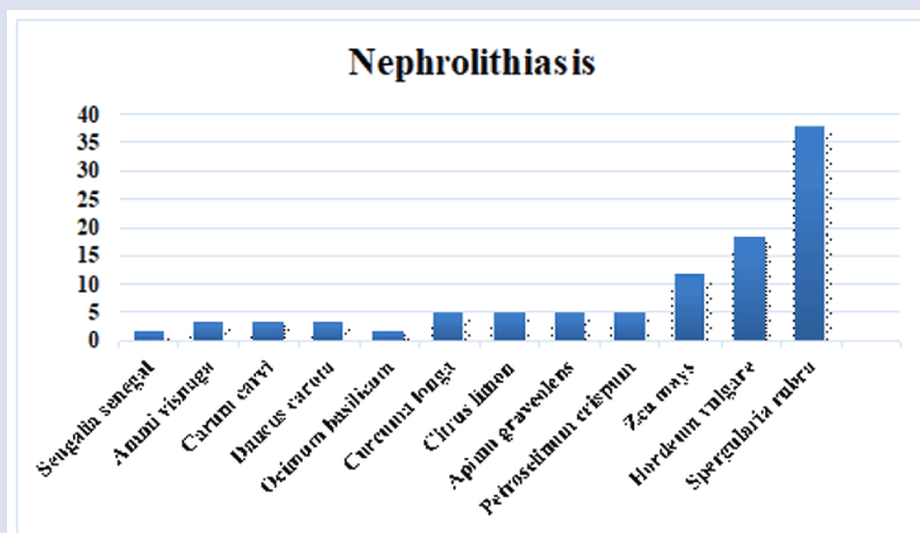


Figure 5. Frequency of use of plants for the treatment of nephrolithiasis.

Zea mays (corn silk) has a long history of traditional use for the management of urinary disorders, including nephrolithiasis. Experimental studies by Shamkhy et al. (2012)¹¹ suggest that corn silk tea may facilitate stone passage by promoting smooth muscle contraction and increasing urine output rather than directly dissolving kidney stones.

Other commonly cited species, such as *Spergularia rubra*, have been reported to possess antioxidant¹² and diuretic activities¹³. However, their specific antiurolithiatic effects have not yet been evaluated in vitro or in vivo studies.

Frequency of Use of Plants for the Treatment of Liver Cirrhosis

Therapists recommended **nine** medicinal plants for the treatment of liver cirrhosis (Table 2). The most frequently cited plants are *Cichorium intybus*, *Matricaria chamomilla*, and *Curcuma longa* (Figure 6).

Several experimental animal studies have validated the therapeutic effects of *Curcuma longa*, *Zingiber officinale*, *Cichorium intybus*, and *Nigella sativa* in the treatment of liver cirrhosis^{14,15,16,17}.

Other studies have reported that *Matricaria chamomilla* and *Rheum palmatum* possess antioxidant and hepatoprotective properties^{18,19}.

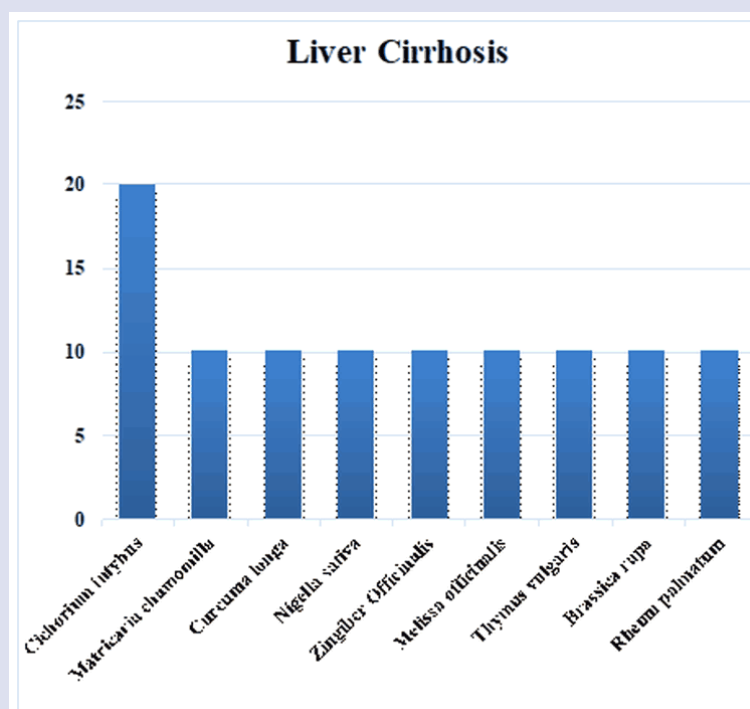


Figure 6. Frequency of use of plants for the treatment of liver cirrhosis.

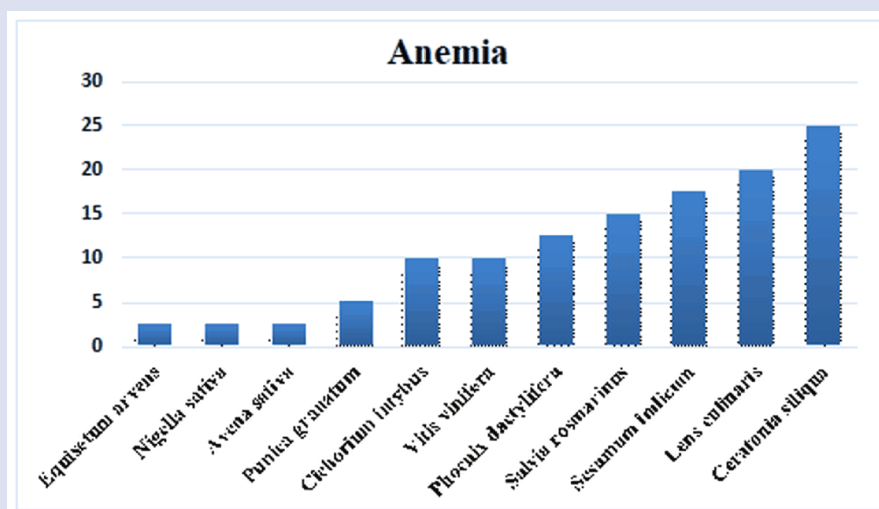


Figure 7. Frequency of use of plants for the treatment of anemia.

The traditional use of medicinal plants for liver cirrhosis in El M'Ghair is in agreement with previous ethnobotanical studies conducted in Algeria²⁰ and neighboring Morocco²¹. Similar plant species have been reported for the management of liver diseases, indicating that traditional knowledge related to hepatoprotective plants is widely shared across North Africa. This consistency may be attributed to the common floristic composition, similar environmental conditions, and long-standing cultural exchange among these regions.

Frequency of Use of Plants for the Treatment of Anemia

A comparison of recommended medicinal plants in the province of El M'Ghair shows that *Ceratonia siliqua*, *Lens culinaris*, *Sesamum indicum*, and *Salvia rosmarinus* are commonly used for the treatment of anemia (Table3, Figure 7). The effectiveness of some of these plants

has been evaluated in various studies, extracts of *Ceratonia siliqua* and sesame seeds and oils have been shown to increase blood parameters, including hemoglobin levels^{22,23}.

Anemia is commonly caused by deficiencies in vitamins, zinc, or iron²⁴. While *Lens culinaris* seeds and *Salvia rosmarinus* extracts are valuable sources of energy, minerals, vitamins, and antioxidant compounds^{25,26}. Although these nutritional and bioactive properties may support their traditional use against anemia, further experimental and clinical studies are needed to confirm their therapeutic efficacy and elucidate their underlying mechanisms of action.

The medicinal plants reported for the treatment of anemia in El M'Ghair showed partial agreement with those documented in a Moroccan ethnobotanical survey. Among the recorded species, *Lens culinaris*

Table 1. Medicinal plants recommended by herbalists and phytotherapists for the treatment of nephrolithiasis

Common Name	Scientific Name	Part used	Preparation method
Toothpick Plant / Khella	<i>Ammi visnaga</i>	Graines	Décoction
Celery	<i>Apium graveolens</i>	Leaves	Infusion
Caraway	<i>Carum carvi</i>	Seeds	Tisane
Lemon	<i>Citrus limon</i>	Fruit	Juice
Carrot	<i>Daucus carota</i>	Seeds	Raw
Barley	<i>Hordeum vulgare</i>	Seeds	Decoction
Basil	<i>Ocimum basilicum</i>	Leaves	Infusion
Parsley	<i>Petroselinum crispum</i>	Leaves	Infusion
Gum Arabic Tree	<i>Sengalia senegal</i>	Bark	Raw
Red Sandspurry	<i>Spergularia rubra</i>	Stem and leaves	Decoction
Maize / Corn	<i>Zea mays</i>	Silk	Infusion
Turmeric	<i>Curcuma longa</i>	Rhizome	Raw

Table 2. Medicinal plants recommended by herbalists and phytotherapists for the treatment of liver cirrhosis

Common Name	Scientific Name	Part used	Preparation method
Turmeric	<i>Curcuma longa</i>	Rhizome	Raw
Turnip (Red Turnip)	<i>Brassica rapa</i>	Bulb	Infusion
Common Chicory	<i>Cichorium intybus</i>	Rhizome and Leaves	Raw
Chamomile	<i>Matricaria chamomilla</i>	Flowers	Maceration
Lemon Balm	<i>Melissa officinalis</i>	Leaves	Infusion
Black Cumin	<i>Nigella sativa</i>	Seeds	Raw
Rhubarb	<i>Rheum palmatum</i>	Root	Raw
Thyme	<i>Thymus vulgaris</i>	Leaves	Infusion
Ginger	<i>Zingiber Officinale</i>	Root	Raw

Table 3. Medicinal plants recommended by herbalists and phytotherapists in the treatment of anemia

Common Name	Scientific Name	Part used	Preparation method
Oat	<i>Avena sativa</i>	Seeds	Raw
Carob Tree	<i>Ceratonia siliqua</i>	Fruits	Raw
Common Chicory	<i>Cichorium intybus</i>	Rhizome and Leaves	Raw
Horsetail (Field Horsetail)	<i>Equisetum arvens</i>	Stem	Infusion
Lentil (Red Lentil)	<i>Lens culinaris</i>	Seeds	Raw
Date Palm	<i>Phoenix dactylifera</i>	Fruits	Decoction
Pomegranate	<i>Punica granatum</i>	Fruits	Raw
Sesame	<i>Sesamum indicum</i>	Seeds	Raw
Black Cumin	<i>Nigella sativa</i>	Seeds	Infusion
Rosemary	<i>Salvia rosmarinus</i>	Leaves	Decoction

Table 4. Medicinal plants recommended by herbalists and phytotherapists for the treatment of leukemia

Common Name	Scientific Name	Part used	Preparation method
Black Cumin	<i>Nigella sativa</i>	Seeds	Raw
Rosemary	<i>Salvia rosmarinus</i>	Leaves	Infusion
Agarwood	<i>Aquilaria malaccensis</i>	Bark	Infusion
Saltbush	<i>Atriplex halimus</i>	Leaves	Infusion
Turmeric	<i>Curcuma longa</i>	Rhizome	Raw
Ephedra / Joint-pine	<i>Ephedra alata</i>	Flowers and Seeds	Infusion
Indian Costus	<i>Saussurea costus</i>	Rhizome	Infusion
Fenugreek	<i>Trigonella foenum-graecum</i>	Seeds	Raw

Table 5. Medicinal plants recommended by herbalists and phytotherapists for the treatment of psoriasis and eczema

Common Name	Scientific Name	Part used	Preparation method
Aloe Vera	<i>Aloe Vera</i>	Leaves	Raw
Turmeric	<i>Curcuma longa</i>	Rhizome	Raw
Common Juniper	<i>Juniperus communi</i>	Fruits	Herbal Tea
Chamomile	<i>Matricaria chamomilla</i>	Flowers	Infusion
Black Cumin	<i>Nigella sativa</i>	Seeds	Oil
Olive Tree	<i>Olea europaea</i>	Fruits	Oil
Mastic Tree / Lentisk	<i>Pistacia lentiscus</i>	Fruits	Oil
Pomegranate	<i>Punica granatum</i>	Fruits (peel)	Raw
Red Sandspurry	<i>Spergularia rubra</i>	Stem and Leaves	Infusion
Fenugreek	<i>Trigonella foenum-graecum</i>	Seeds	Poultice

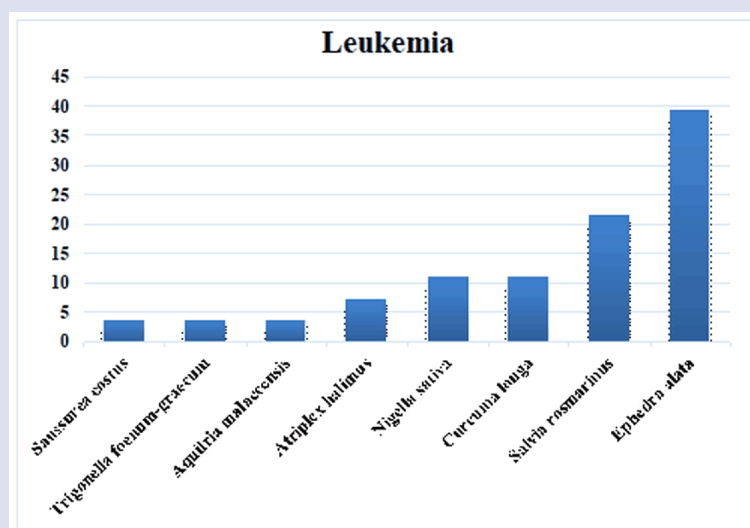


Figure 8. Frequency of use of plants for the treatment of leukemia.

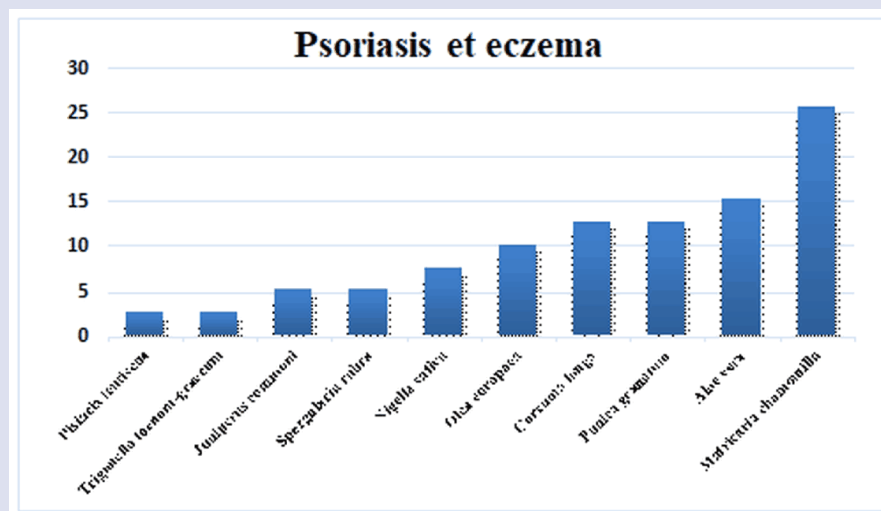


Figure 9. Frequency of use of plants for the treatment of Psoriasis and Eczema.

was commonly cited in both studies for the management of anemia, reflecting its recognized traditional importance²⁷. The differences observed in the remaining species are likely related to variations in local plant diversity and regional ethnomedicinal traditions.

Frequency of Use of Herbs for the Treatment of Leukemia

A total of eight medicinal herbs are recommended by herbalists and phytotherapists for the treatment of leukemia (Table 4). The most commonly recommended herbs include *Ephedra alata*, *Salvia rosmarinus*, *Curcuma longa*, and *Nigella sativa* (Figure 8). The effectiveness of some of these herbs in treating leukemia has been demonstrated in various experimental studies.

Two notable studies are highlighted. The first demonstrated that *Curcuma longa* extract exhibited promising anti-leukemic activity against chronic myeloid leukemia cells²⁸. The second showed that *Nigella sativa* extract induces programmed cell death (apoptosis) in leukemia cells²⁹. Additionally, other studies have confirmed that *Ephedra* extract exhibits anticancer activity against other types of cancer³⁰, and similar anticancer effects have also been observed for *Salvia rosmarinus*^{31,32}.

The present findings can be compared with the ethnobotanical survey conducted by Adewale et al. (2020)³³ in Oyo State, Nigeria, which specifically investigated medicinal plants traditionally used for the management of leukemia. Their survey documented 89 plant species, with *Xylopia aethiopica*, *Calotropis procera*, *Morinda lucida*, *Piper guineense*, and *Nymphaea lotus* being the most frequently cited species. In contrast, the present study identified *Nigella sativa*, *Curcuma longa*, *Ephedra alata*, and *Salvia rosmarinus* among the most commonly used plants. These differences likely reflect variations in local flora, cultural traditions, and ethnomedicinal knowledge between North and West Africa. Nevertheless, both studies demonstrate the widespread reliance on medicinal plants as complementary approaches for leukemia management and emphasize the importance of scientifically validating their efficacy and safety.

Frequency of Herbal Use for the Treatment of Psoriasis and Eczema

A total of ten medicinal herbs have been recommended by herbalists for the treatment of both psoriasis and eczema (Table 5). The most commonly recommended herbs include *Matricaria chamomilla*, *Aloe*

vera, *Punica granatum*, and *Curcuma longa* (Figure 9). Similar findings have been reported in ethnobotanical surveys from Algeria and neighboring Mediterranean countries, where medicinal plants such as *Aloe vera*, *Matricaria chamomilla*, *Nigella sativa*, *Olea europaea*, and *Curcuma longa* are traditionally used for the management of psoriasis and eczema^{34,35}.

Clinical studies have demonstrated that topical *Aloe vera* significantly improves psoriasis lesions and exhibits therapeutic efficacy comparable to topical corticosteroids in patients with mild to moderate plaque psoriasis^{36,37}. In addition, curcumin, the principal bioactive constituent of *Curcuma longa*, has shown promising anti-inflammatory and immunomodulatory effects in psoriasis³⁸. Chamomile (*Matricaria chamomilla*) has also demonstrated beneficial effects in patients with atopic eczema due to its anti-inflammatory properties³⁹. Furthermore, topical preparations containing *Nigella sativa* have shown efficacy in the treatment of hand eczema⁴⁰. Although experimental studies suggest that *Punica granatum* and several other medicinal plants possess anti-inflammatory and antioxidant activities that may be beneficial in inflammatory skin diseases, additional well-designed clinical trials are required to confirm their efficacy and safety in the treatment of psoriasis and eczema.

CONCLUSION

Based on our survey of herbalists and traditional practitioners, we conclude that a diverse range of plant species is employed in the treatment of the diseases studied. Several of these species, particularly those without prior pharmacological documentation, represent promising candidates for drug discovery. This underscores the importance of systematic phytochemical and clinical investigations to bridge ethnomedicine with modern pharmacology.

ACKNOWLEDGMENTS

The author expresses sincere gratitude to Sondous Ben Hamed, Aya Errahmane Ben Haroune, and Rayhana Ben Khedoudja of the Faculty of Natural Sciences and Life, University of El-Oued, for their valuable support and assistance throughout the course of this research.

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Cite this article: Khaoula Z, Samar M. Ethnobotanical Survey of Medicinal Plants from El M'Ghair (Algeria) Used in the Treatment of Nephrolithiasis, Cirrhosis, Anemia, Leukemia, Psoriasis and Eczema. *Pharmacogn J*. 2026;18 (3): 330-338.