Ethnobotanical inventory of spontaneous medicinal plants in the rural region of Chehama (Tiaret, western Algeria): floristic richness and traditional knowledge valorization

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Research

Abstract

Background: Medicinal plants are considered a cornerstone in human life, and have long been used as a primary source of treatment for various illnesses. Floristic inventories helped identify species used by local populations, preserve traditional knowledge from erosion, and support biodiversity conservation. This study presents a systematic floristic inventory of medicinal plants in the Chehama region (Tiaret-western Algeria), aiming to document native species and their traditional uses.

Methods: A systematic inventory of spontaneous medicinal flora was conducted during the optimal vegetation period between 2021 and 2024. Sampling was based on ecologically homogeneous zones, with 100m2 surface. Taxa identification was done simultaneously in the field and the laboratory. Furthermore, their medicinal status was cross-referenced with existing literature, including ethnobotanical studies and books of Algerian medicinal plants.

Results: Out of 207 recorded species, 118 were medicinal, representing 102 genera and 40 botanical families. The Asteraceae family exhibited the highest species richness (21.2%). Leaves were the most commonly used plant parts (33.1%). While infusion (37.4%) and decoction (28.8%) were the most frequently reported methods, mainly for oral administration (70.1%). These plants were used to treat 15 categories of ailments. Gastrointestinal disorders were the most frequently cited (17.2%), followed by dermatological (11.8%), respiratory and urogenital diseases (10.7%) each. While these plants are used frequently, the presence of toxic plants implies strict precaution.

Conclusions: These results are valuable for the advancement of phytochemical research, the conservation of ethnobotanical knowledge and the preservation of phytodiversity within this region and Algeria as a whole.

Keywords: Herbal medicine, inventory, native plant, Tiaret (Algeria).

Background

For centuries, humans have utilized medicinal plants to address various health issues, maintaining reliance on this traditional knowledge despite significant advancements in modern medicine (Ghanmi et *al*. 2014; Zatout et *al*. 2021; Boutlelis et *al*. 2025). This practice remains particularly prevalent in developing countries, where approximately 80% of these countries use medicinal plants as a means of health care and pain relief (WHO 2023). It is especially common in indigenous and rural communities where access to modern medical infrastructure is limited (Singh et *al*. 2026). Besides therapeutics, herbal medicine is extensively used in the agri-food and cosmetics industry (Zouaoui et *al*. 2020).

Geographically, healthcare services in Algeria are often hardly accessible to rural populations (Taïbi et *al*. 2021). Moreover, the inadequate quality of services and delayed diagnoses complicate treatment, particularly for people from disadvantaged backgrounds (Taïbi et *al*. 2020). Therefore, many rural populations rely on more accessible alternatives, particularly the use of medicinal plants.

With its thousands of hectares, Algeria is distinguished by a particularly rich, diverse and extremely important flora (Amirouche & Misset 2009) which is at the origin of its geographical position as well as the great variety of its climatic and topographical conditions (Gordo & Hadjadj-Aoul 2019). It contains 4000 taxa divided into 131 families and 917 genera (Zatout et *al*. 2021) characterized by a notable richness in condiment and medicinal plant species (Miara et *al*. 2013), especially in the semi-arid, arid and Saharan regions (Sahi 2016).

Floristic inventories of (Boutabia et *al*. 2010 ; Miara et *al*. 2013 ; Saidi et *al*. 2015 ; Benaissa et *al*. 2018 ; Nouar et *al*. 2021) and the various ethnobotanical studies (Baziz et *al*. 2020 ; Ouadeh et *al*. 2021 ; Djahafi et *al*. 2021 ; Brahmi et *al*. 2023 ; Hedidi et *al*. 2024; Maghni et *al*. 2025) carried out in this country reveal a remarkable diversity of medicinal plants, together with their applications in traditional medicine, constitutes a core component of local cultural heritage, grounded in well-established empirical knowledge passed down through successive generations (Rebbas et *al*. 2012; Djahafi et *al*. 2021). These aromatic and medicinal plants have been proven to play a key role in the prevention and treatment of several common ailments, and even complex and chronic conditions, such as cancer (Taïbi et *al*. 2020; Bouhaous et *al*. 2022).

However, this country remains insufficiently investigated, despite its abundant natural resources distributed across a wide range of ecosystems and its considerable floristic diversity (Miara et *al*. 2019). Furthermore, many areas remain poorly explored or have not yet been explored at all.

In this context, we inventoried and valorized the medicinal flora of Chehama, a floristically under-explored area of the Wilaya of Tiaret. Our objectives were to: (i) compile a complete floristic list; (ii) identify species with documented medicinal uses; and (iii) synthesize parts used, preparation methods, routes of administration, and therapeutic categories.

Materials and Methods

Study area

The Chehama region is situated in the far north of the Wilaya (Tiaret), administratively within the Sebt Municipality (Fig. 1).

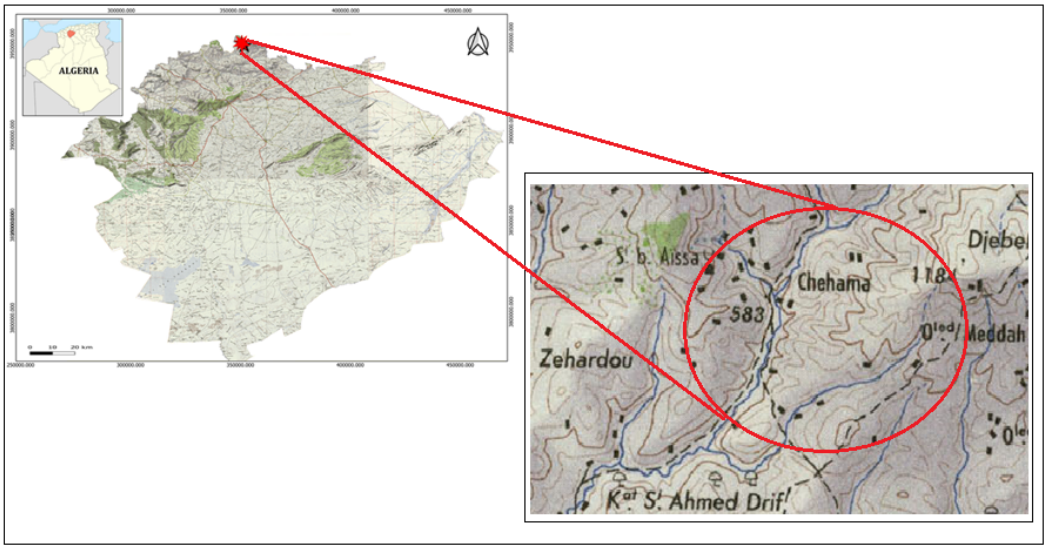

Figure 1. Map of Chehama region, Sebt province, Algeria (study area).

Climate data (1981 to 2025) provided by NASA POWER - Data Access Viewer (https://power.larc.nasa.gov/data-access-viewer/) indicates a semi-arid Mediterranean climate, with harsh, cold winters and hot dry summers. Annual rainfall is approximately 558 mm, with an average temperature of 16.7 °C. Monthly averages range from a minimum of 7.4 °C in January to a maximum of 27.5 °C. in July.

The vegetation is marked by relics of holm oak (*Quercus ilex* subsp. *ballota* (Desf.) Samp) and a very diverse herbaceous layer on marly soil (Nouar et *al*. 2023).

Sampling

An exhaustive inventory of plants within plant formations which are floristically homogeneous (Guinochet 1973). To ensure representativeness, these areas must be ecologically and floristically homogeneous, requiring relatively uniform species composition, an absence of clear break in the physiognomy or in the dominance of species and similar site conditions: soil type, texture, humidity, exposure, slope, altitude. Floristic surveys were carried out during the optimal vegetation period from March to June of the years 2021-2024. A total of 20 floristic surveys were conducted with a minimum area of 100m^2.

This minimum area has often been used by researchers studying mountainous vegetation that is more or less degraded in the Tiaret region (Maamar et *al*. 2018; Nouar et *al*. 2020; Nouar et *al*. 2021). Appropriate equipment was used (GPS, rope) and a general description of the site was made (altitude and vegetation characteristics).

Taxa were identified by local botanists using the flora of Quézel & Santa (1962 -1963) and scientific names were updated by the index of Dobignard & Châtelain (2010-2013).

For the determination of plants of medicinal interest, we referred to the books on medicinal plants of Algeria (Baba-Aissa 1991; Beloued 2005) as well as the different ethnobotanical surveys in a hierarchical level from local studies (Tiaret) to those carried out in the Mediterranean basin passing through those in Western Algeria, other regions of the country and studies in neighboring countries in North Africa.

Results and Discussion

Floristic richness and taxonomic composition

Among the 207 plant species inventoried, 118 spontaneous medicinal plant species belonging to 102 genera and 40 botanical families were identified (Table 1). Despite the relatively small surface area of the Chehama region, this richness exceeds that reported for the Tagdempt region, where Miara et *al*. (2013) recorded 66 medicinal plant species, and is also higher than the 108 species inventoried by Nouar et *al*. (2021) in the considerably larger Monts de Tiaret study area. This number is as important as that of several inventory works and ethnobotanical surveys, on the one hand, in Western Algeria of which 53 spontaneous species were inventoried in the mountains of Tessala in Sidi Bel Abbes by Saidi et *al*. (2015), 48 plants were recognized and identified as medicinal species in Ain Sefra (Naâma) in the work of Benamara et *al*. (2022) and 71 species were reported in Tlemcen by Souddi et *al*. (2023), on the other hand, in several regions in Algeria where 48 spontaneous plants of the total of 73 were reported in the region of El Oued (Hacini et *al*. 2022), 77 species in the region of M'Sila (Rebbas & Bounar 2014), 49 spontaneous plants of the total of 90 were reported in Skikda (Bouasla & Bouasla 2017), 48 in the El Kala National Park (Lazli et *al*. 2019), 112 in the Aures region (Baziz et *al*. 2020), 65 spontaneous of the total of 80 in the Djurdjura National Park (Meddour et *al*. 2020) and 24 in the Gouraya National Park (Dahmane et *al*. 2023).

Asteraceae emerged as the predominant botanical family, accounting for 25 species (21.2%), followed by Lamiaceae with 12 species (10.2%), Apiaceae with 8 species (6.8%), Fabaceae with 7 species (5.9%), Asparagaceae with 6 species (5.1%), Boraginaceae and Brassicaceae with 5 species each (4.2%), and Gentianaceae, Orchidaceae, Resedaceae and Rosaceae with 3 species each (2.5%). However, the remaining botanical families were represented by two or fewer species each (Fig. 2). Several studies have documented the high frequency of predominant families in Algerian medicinal flora, including those by Saidi et *al*. (2015); Benarba (2016); Benaiche et *al*. (2019); Baziz et *al*. (2020); Bendif et *al*. (2020); Djahafi et *al*. (2021); Nouar et *al*. (2021); Zatout et *al*. (2021); and Maghni et *al*. (2025).

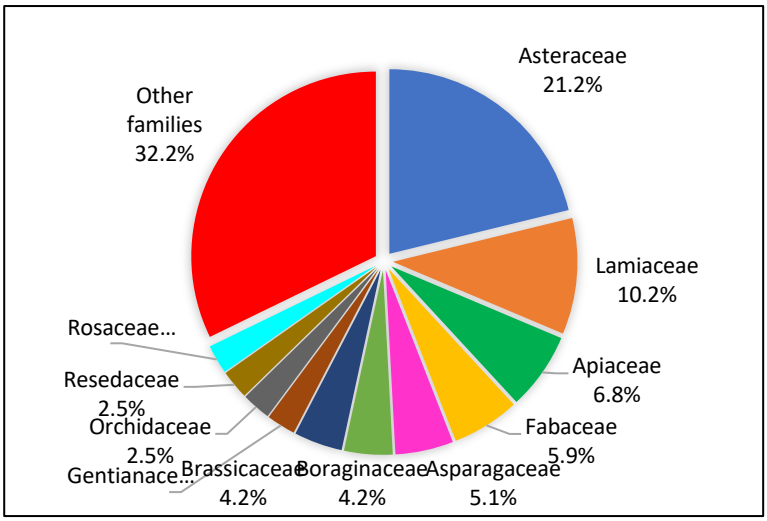

Figure 2. Taxonomic distribution of medicinal plants across botanical families.

Table 1. Spontaneous medicinal plants of Chehama region, Sebt province (Tiaret, Algeria).

Plant family, Species	Vernacular name	Used parts	Mode of preparation	Mode of administration	Recorded literature uses	References
Anacardiaceae						
Pistacia atlantica Desf.	Botma بطمة	Ba, Se, Le	Pow, De	Or	Thyroid disorders, throat infections, urological (kidney stones), toothache, dermatological (eczema, wound healing), leishmaniasis, dental pain, gingivitis, thrush	(Djahafi et *al*. 2021) (Maghni et *al*. 2025) (Chermat & Gharzouli 2015)
Apiaceae						
Ammi majus L	Noukha نوخة	Ae	In	Or	blood pressure balance	(Miara et *al*. 2013)
Ammoides pusilla (Brot.) Breistr	Noukha نوخة	Ae	In, Ma	Or	Cold, cough, flu, body pain	(Zatout et *al*. 2021)
Daucus carota L.	Zrodia زرودية	Se	In, juice	Or	Colon, depurative, prostate, ulcer, pinworm (children)	(Djahafi et *al*. 2021) (Miara et *al*. 2013)
Eryngium campestre L.	Chouk El Abiod شوك لبيض	Ae	In	Or	Disorders of the bladder and kidneys, urinary affections, cough, bronchitis	(Nouar et *al*. 2021)
Eryngium triquetrum. Vahl	Chouk zerka شوك زرقة	Rh	Pow, In	Or, To	Digestives, dermatological, cardiovascular, neurological	(Daoudi et *al*. 2016) (Ben Akka et *al*. 2017-a)
Ferula communis L.	Lkalkha لكلخة	Le	De	Or	Endocrine (against hyperthyroidism), treat cancer, stomach pain, migraine	(Maghni et *al*. 2025) (Nouar et *al*. 2021) (Miara et *al*. 2013)
Magydaris pastinacea (Lam.) Paol. & Bég	Ouaffel وافل	Fr	Pow	Or	Headache	(Merzouki et *al*. 2000)
Thapsia garganica L.	Deryas درياس	Ro, Le	Pow, In, De	Or, To	Anorexia, wounds, respiratory (lung problems), rheumatism, dermatological (wounds, chronic eczema, dandruff), against female sterility, gastrointestinal cancer, nervous system, insomnia fevers cases, cysts, diabetes	(Miara et *al*. 2019) (Djahafi et *al*. 2021) (Maghni et *al*. 2025) (Lahouel 2025)
Apocynaceae						
Nerium oleander L.	Deffla دفلة	Le, Fl	In, De	Or	Antidiabetic, urological (diuretic), dartre, eczema, intestinal disorders, bronchitis, cough, hair care, respiratory problems, heart problems	(Miara et *al*. 2013) (Miara et *al*. 2019) (Nouar et *al*. 2021) (Maghni et *al*. 2025) (Lahouel 2025)
Araceae						

Arisarum simorrhinum Durieu	Boukouka بقوقة	Ro	Pow	Or	Cancers, goiter	(Zatout et *al*. 2021)
Asparagaceae						
Agave americana L.	Sabbar صبار	Le	In, De	Or	Rheumatic pains	(Leporatti & Impieri 2007)
Asparagus acutifolius L.	Sekoum سكوم	Ae, Ro	De, Ra (in food)	Or	Rheumatism, skeletal (osteoporosis), digestive, aperitif, stomachic, diuretic, cardiovascular diseases	(Miara et *al*. 2013) (Djahafi et *al*. 2021) (Maghni et *al*. 2025) (Lahouel 2025)
Asparagus albus L.	Boudjelal, Bou Khala بوجلال, بوخالة	Le	In	Or	Jaundice, rheumatism, appetizer, stomachic	(Nouar et *al*. 2021)
Dipcadi serotinum (L.) Medik	/	Bu	In, Co	Or, To	Bronchitis, influenza, common cold	(Elhasnaoui et *al*. 2024)
Muscari comosum. (L) Mill	Beçal ed dib, Bou Tesel بصل الذيب, بوتسل	Bu	Po	To	Astringent and emollient effects, diuretic,	(Nayar et *al*. 1999)
Scilla maritima L.	Bouçilla, Beçal el Far بصل لفار ,بوصيلة	Le, Ps	De	Na, To	intrauterine antiseptic (After childbirth), skin diseases, digestive (stomach ulcers and intestines inflammation)	(Miara et *al*. 2013) (Lahouel 2025)
Asteraceae						
Anacyclus clavatus (Desf.) Pers	Bechibchou, Babounej بشيبشو, بابونج	Ro	De, Pow	Or, To	Rheumatism, digestive (stomach ulcer), skin	(Maghni et *al*. 2025) (Miara et *al*. 2013)
Anacyclus radiatus Loisel	/	/	/	/	Respiratory, urogenital, microbial	(Daoudi et *al*. 2016)
Atractylis gummifera L.	El ddad الداد	Ro, Fr	De	Or	Rheumatism (colds), neurological (headaches and paralysis), cancer, cysts cases	(Maghni et *al*. 2025)
Atractylis humilis L.	Teskeur, taboq, kennouda تاسكر, تابوك, كنودة	Le, Ro	De	Or	Constipation, Ballooning of the baby's belly, icterus, urinary	(Benamara et *al*. 2022)
Bellis sylvestris L.	Rezaïma رزيمة	Ae, Ro	In	Or	Analgesic, anti-inflammatory, diuretic	(Nouar et *al*. 2021)
Bombycilaena discolor (Pers.) M.	Bou soufa بوصوفة	Wp	Co	Or	Upper respiratory, infection acute	(Rivera et *al*. 2019)
Calcitrapa napifolia (L.) Moench	Bouneggar بونقار	Wp	De	Or	Tonic, febrifuges, diuretic	(Beloued 2005) (Nouar et *al*. 2021)
Calendula arvensis (Vaill.) L.	Jemra جمرة	Fl	In	Or	Respiratory (inflammation of the oral mucosa or pharynx (sore throat)	(Maghni et *al*. 2025)
Calendula stellata Cav.	/	/	/	/	Digestive, hepatic, sore throat, premenstrual pain	(Miara et *al*. 2020)

Calendula suffruticosa Vahl	Mourira مريرة	Fl	In	Or	Antiseptic, fungicidal, antibacterial, antiviral, healing action	(Nouar et *al*. 2021)
Carduncellus pinnatus (Desf.) DC.	Guern el djedi قرن الجدي	Wp, Le	De, In	Or	Digestive, dermatological	(Bammou et *al*. 2015)
Carduus pycnocephalus L.	Chouq شوك	Le	De	Or	Gallbladder and liver diseases, hepatitis, tonic, diabetes, atherosclerosis, blood (reduce cholesterol), digestive, strengthens the appetite, anti-worms.	(Khatib et *al*. 2021)
Centaurea pullata L.	Seguia سقية	Fl	In	Or	To increase the blood pressure, digestive, liver and urinary diseases	(Miara et *al*. 2013) (Miara et *al*. 2020)
Cichorium intybus L.	Seriss, ilfaf, Hindiba سريس, إلفاف, هندباء	Ae	De	Or	Slightly tonic, stomachic, depurative, gastrointestinal tract, hyperlipidemia, diuretic, anti-anemic	(Lucchetti et *al*. 2019) (Nouar et *al*. 2021) (Smaili et *al*. 2023)
Crepis vesicaria L.	/	Fl	In	Or	Sore throat, cold	(Ecevit Genç & Özhatay 2006)
Dittrichia viscosa (L.) Greuter	Amaquramane أمقرمان	Le	Pa, De, Pos	Or	Rheumatism, Digestive, dermatological (hemostatic and healing of skin wounds and purulent dermatoses)	(Djahafi et *al*. 2021) (Maghni et *al*. 2025)
Echinops spinosissimus subsp. *spinosus* Greuter	Tassekra تسكرة	Le, Ro	De, Pos	Or	Eye conditions (due to heat), dermatological, digestive, Clean the uterus, amenorrhea	(Benamara et *al*. 2022) (Maghni et *al*. 2025)
Hyoseris radiata L.	Dirz El Djouz درز لجوز	Le	Ra	Or	Stomach ulcer	(Meddour et *al*. 2022)
Onopordum macracanthum Schousb.	El Khourchef El Barri الخرشف البري	Le	De	Or	Urological (genitourinary and renal)	(Maghni et *al*. 2025)
Pallenis spinosa (L.) Cass	Nougd نوقد	Le	Ra, De	Na, To	Antidiabetic, anti-inflammatory, allergy, heartbeat	(Nouar et *al*. 2021) (Benamara et *al*. 2022)
Phagnalon saxatile (L.) Cass	Foddia, Arfedj أرفج ,فودية	Ae, Fl	/	Or	Analgesic, lower blood cholesterol	(De Santayana et *al*. 2005)
Reichardia picroides (L.) Roth	Zid et moum	Le	In	Or	Diuretic	(Nouar et *al*. 2021)
Scolymus hispanicus L.	Garnina قرنينة	Le, Rh	Ra (eaten directly)	Or (ingestion in food)	Digestive (gastritis)	(Maghni et *al*. 2025)
Silybum marianum L.	Chouk El Jemal, Chouk El Hmire شوك الجمل, شوك الحمير	Le, Fr	In, De	Or	Constipation, liver (hepatoprotective), spleen, aperitifs, tonics, febrifuges	(Miara et *al*. 2013) (Djahafi et *al*. 2021) (Maghni et *al*. 2025)

Taraxacum obovatum (Willd.) DC.	Marrara مرارة	Le	Ra (in salads)	Or	Hepatoprotective, kidney diseases, malfunction, asthenia	(Morales et *al*. 2014)
Boraginaceae						
Anchusa azurea Mill.	Cheikh El Boukoul, Lissane El Thaour شيخ البقول, لسان الثور	Ro, basal Le	De	Or, To	Antitumor, anti-inflammatory, wound-healing	(Altundaga & Ozturk 2011) (Nouar et *al*. 2021)
Borago officinalis L.	Harcha, Bouchenaf, Bou Kerich, lissane et'thawr بوشناف, بوكريش, لسان ,حرشة الثور	Le, Ro	In, Pos	Or, To	Skeletal (plaster for bone fractures), urological (against kidney stones and urine retention), stomach pain, asthma	(Maghni et *al*. 2025) (Lahouel 2025)
Cynoglossum cheirifolium L.	Oudnine El Djediane وذنين الجديان	Le	Cr	Or	Astringent, diarrheal, soothing, skin (burns)	(Nouar et *al*. 2021) (Meddour et *al*. 2022)
Cynoglossum creticum Miller	Saboun El Araïs صابون العرايس	Fr	Pow	Or (triturated)	Warts	(Tsioutsiou et *al*. 2019)
Echium plantagineum L.	Leçane El Tsour لسان الثور	Fl	In	Or	Diuretic, bronchitis, lung cancer	(Orch et *al*. 2020) (Nouar et *al*. 2021)
Brassicaceae						
Brassica fruticulosa Cirillo	/	Wp, Se	In	Or	Respiratory, gastrointestinal	(El-assri et *al*. 2025)
Eruca vesicaria (L.) Cav.	Jarjir جرجير	Le	In	Or	Rheumatism	(Djahafi et *al*. 2021)
Matthiola fruticulosa (L.) Maire	Nekissa نكيسة	/	/	/	Renal stones, piles	(El-Mokasabi et *al*. 2018)
Moricandia arvensis (L.) DC	Kromb el Djemel, Gdem كرمب الجمل	Le, Fl, Ro	De	Or	Rheumatism, burns, infected injuries, stomach pains, gas trouble, ulcers, constipation, hypotensive, antidiabetic, dermatoses, treat or prevent the development of cancer	(Chermat & Gharzouli 2015) (Karous et *al*. 2021)
Sinapis arvensis L.	Khardal, Chenafou خردل, شنافو	Le, Fl	In	Or	Digestive (stomach and intestines disorders), gynecological (menstrual pain)	(Miara et *al*. 2019) (Nouar et *al*. 2021) (Maghni et *al*. 2025)
Capparaceae						
Capparis spinosa L.	Kebbar كبار, قبار	Wp	De, Ra	Or, To	Female sterility, cancer cases, cysts, strong teeth pain, hypothermia, fever, antidiabetic, diuretic	(Karous et *al*. 2021) (Benamara et *al*. 2022) (Maghni et *al*. 2025)
Caprifoliaceae						
Scabiosa atropurpurea L.	Bou Merhar بومرحار	Ft	In	Or	Measles, furuncles	(Bonet et *al*. 1999)
Lomelosia stellata L.	Nedjima نجيمة	Le, Fl	In	Or	Fevers (children), heel cracks	(Ziri et *al*. 2017) (Nouar et *al*. 2021)
Caryophyllaceae						

Paronychia argentea Lam.	Tay lard, Kassarat El Hadjer تاي لرض, كسارة لحجر	Fl, Le	In	Or	Renal lithiasis, urological (urinary problems), eyes, mouth, biting insects, diuretic, appetitive	(Miara et *al*. 2013) (Miara et *al*. 2019) (Djahafi et *al*. 2021) (Nouar et *al*. 2021) (Lahouel 2025)
Cistaceae						
Cistus villosus var. eriocephalus (Viv.) Grosser	/	/	/	/	Digestive	(Daoudi et *al*. 2016)
Fumana thymifolia (L.). Verlot	/	Ae	In	Or	Common cold, flu, diuretic, pain during menstruation	(Akbulut & Ozkan 2014)
Convolvulaceae						
Convolvulus althaeoides L.	Louïa, Alleg علق ,لوية	Wp	In	Or	Antispasmodic, stomachic, tonic, purgative	(Nouar et *al*. 2021)
Crassulaceae						
Umbilicus horizontalis (Guss.) DC.	Oudenech Cheikh وذن شيخ	Le	Po	To	Healing, emollient, pimples, burns, swelling, fistulas	(Tuttolomondo et *al*. 2014) (Nouar et *al*. 2021)
Sedum album L.	Kouskous El Djebel كوسكس الجبل	Le	Cr	To	Skin diseases (verruca)	(Özdemir & Alpinar 2015) (Danna et *al*. 2022)
Cupressaceae						
Cupressus sempervirens L.	Araar, Sarou سرو ,عرعار	Co (green and fleshy), Le	De, Pos, Ba	Or, To	Stimulant, diuretic, stomach tonic, diarrhea and mucous flow, pulmonary antiseptic, depurative, disorders of the venous system, in the treatment of varicose veins, urinary (children), hemorrhoids	(Beloued 2005) (Nouar et *al*. 2021)
Juniperus oxycedrus L.	Tagga طاقة	Le, Frs	In, Ti, Pow, De	Or, To	Fever, urological (urinary problems), digestive, respiratory (asthma), stimulant, skin diseases (eczema), migraine, rheumatism, articular system diseases, eye infections	(Boudjelal et *al*. 2013) (Miara et *al*. 2013) (Chermat & Gharzouli 2015) (Miara et *al*. 2019) (Djahafi et *al*. 2021) (Maghni et *al*. 2025)
Euphorbiaceae						
Euphorbia falcata L.	/	Wp, St	Po, In, De	Or	Aphrodisiac, rheumatism, urinary (urolithiasis)	(Abouri et *al*. 2012) (Chakit et *al*. 2022)
Euphorbia helioscopia L.	Halib El Diba حليب الذيبة	La, Le	In, Pos	To	Stimulates lactation in breastfeeding women, dermatological (ulcers, warts, wounds and skin burns), respiratory	(Maghni et *al*. 2025)

Fabaceae						
Anthyllis vulneraria L.	Arq Safir عرق صفير	Fl, Wp	In, De, Ba	Or, Co, Ga, To	Astringent, vulnerable, depurative, slightly laxative, intestinal and stomach laziness and vomiting (children), eczema, inflammations of the oral cavity and gums, accelerate the healing of wounds and heal bruises	(Beloued 2005) (Nouar et *al*. 2021)
Calicotome spinosa (L.) Link subsp. *spinosa*	Gendoul قندول	Fl, Le, Se	In, Pos	Or, To	Various episodes of intoxication, hypoglycemic, cardiovascular, hemorrhoids, stomach pain, eye treatment, swelling, edema, urinary	(Benderradji et *al*. 2014) (Chermat & Gharzouli 2015) (Nouar et *al*. 2021)
Genista tricuspidata Desf	Guendoul, Chebrak قندول, شبرق	Ro	De	Or	Body pain, hypercholesterolemia	(Zatout et *al*. 2021)
Lotus tetragonolobus L.	Guernich, Garaubouche, Guerfa قرنيش, قربوش, قرفة	/	/	/	Gastritis, colitis	(El-Mokasabi et *al*. 2018)
Melilotus sulcatus Desf	Nefel, Kenaba نفل, كنابة	/	/	/	Rheumatism, cardiac complications	(Al-Traboulsi & Alaib 2021)
Scorpiurus muricatus L.	/	Tender St	Ra	To	Scorpion sting, snake bites	(Arnold et *al*. 2015) (Nouar et *al*. 2021) (Aboukhalaf et *al*. 2022)
Spartium junceum L	Tertak, Kessaba طرطاق, قصبة	Fl, Wp	In	Or	Stomachic, palpitation, diuretic, respiratory system, purgative, diabetes, skin diseases, burns, warts	(Senkardes & Tuzlaci 2014) (Hani et *al*. 2023)
Fagaceae						
Quercus ilex subsp. ballota (Desf.) Samp	Ballout, Kerouch بلوط, كروش	Fr, Le, Ba	De, Ra, Co	Or	Enuresis, Blood (hypotension), digestive gastroenteritis (acute diarrhea, vaginal discharge), inflammations of the mucous membranes (mouth and throat), skin (dermatitis, chapping wound healing) frostbite	(Miara et *al*. 2019) (Djahafi et *al*. 2021) (Maghni et *al*. 2025)
Gentianaceae						
Blackstonia perfoliata (Viv.) Maire	Rechitt رشيت	Ap with Fl, Wp	In	Or	Febrifuge, stomachic, tonic, brucellosis	(González-Tejero et *al*. 1995) (Nouar et *al*. 2021) (Cocco et *al*. 2022)

Centaurium erythraea subsp. suffruticosum (Salzm. ex Griseb.) Greuter	Merraret el-hnech مرارة الحنش	Fl, Le	In	Or	Colon, diabetes, high blood pressure	(Djahafi et *al*. 2021)
Centaurium spicatum (L.) Fritsch	/	Wp	De	Or	Respiratory (inflammation of respiratory tract)	(Ben Akka et *al*. 2017-b)
Geraniaceae						
Erodium cicutarium L'Her.	Regma رقمة	Fl, Le	In	Or	Constipation	(Cakilcioglu & Turkoglu 2010)
Iridaceae						
Gladiolus italicus Mill	Kheta, Sif er r'orab خطاف, سيف الغراب	Ro, Fr	De, In	Or	Heart and lung problems, infections, stomach pain	(Zouhri & Aarab 2018)
Moraea sisyrinchium (L.) Ker Gawl	Rod El Hanech, Kikout el Kelb رود الحنش, كيكوط الكلب	Ro	De	Or	Cough	(Aboukhalaf et *al*. 2022)
Juncaceae						
Juncus acutus L.	Samar سمار	Cu, Rh, Fr	In	Or	urological (renal colic), colic, cold, genitourinary diseases	(Miara et *al*. 2013) (Lombardi et *al*. 2023)
Lamiaceae						
Ajuga iva (L.) Schreb	Chendgoura شندقورة	Ae	De, In, Pow	Or	Diabetes, High blood pressure, intoxications, snake bites, wounds, digestive, antiseptic, antirheumatic, emmenagogue	(Miara et *al*. 2013) (Miara et *al*. 2019) (Djahafi et *al*. 2021) (Karous et *al*. 2021) (Maghni et *al*. 2025)
Ballota hirsuta Benth	Merheroui مرهيوي	Le	Po	To	Hypertension, fungal infections, skin diseases, migraine, headache, rheumatism	(Zatout et *al*. 2021) (Bouafia et *al*. 2021)
Marrubium vulgare L.	Timeriouet تيمريوت	Ae	De, In, Pos	Na, Or, To	Respiratory (bronchitis, asthma), heart, influenza, rheumatism, digestive, liver diseases, allergies	(Djahafi et *al*. 2021) (Maghni et *al*. 2025) (Miara et *al*. 2013)
Mentha rotundifolia L.	Timerssat, Mersit تيمرسات, مرسيت	Le	Pow	Or	Heart, ulcer, gastrointestinal disorder, fever, headache, skin injury, anti-inflammatory, gynecologic diseases, rheumatism, hemorrhoids, clearing mouth, reducing stress	(Djahafi et *al*. 2021) (Djekoun et *al*. 2022)
Origanum vulgare (Desf.) Ietsw	Zaater زعتر	Le	In, De, Fu	Or	Rheumatism, cough, colds, influenza, respiratory problems, digestive, blood (antihypertensive)	(Miara et *al*. 2019) (Nouar et *al*. 2021)
Phlomis crinita Cav	Khayatt El Adjarah خياط لجراح	Le	Pow	To	Dermatological, digestive, osteoarticular	(Saidi et *al*. 2022)

Salvia verbenaca (L.) Briq.	Zergtoun, Koussa زرقتون, كوسة	Ap	De	Or	Stimulant, tonic, antiseptic, wounds	(Tuttolomondo et *al*. 2014) (Nouar et *al*. 2021)
Teucrium polium L.	Khiyata خياطة	Ae	De, In, Po, Pow	Or, To	Analgesic, diabetes, heart, ulcer, vomiting, wounds, gastrointestinal, hypoglycemic action, anticancer, rheumatism, angina, hemorrhoids	(Miara et *al*. 2019) (Djahafi et *al*. 2021) (Maghni et *al*. 2025) (Lahouel 2025)
Teucrium pseudochamaepitys L.	/	/	/	/	Digestive, spasms and colic	(Nouar et *al*. 2021)
Teucrium thymoides Pomel,	/	/	/	/	Vomiting, pinworms	(Nouar et *al*. 2021)
Thymus algeriensis Boiss. & Reut	El Zaatar الزعتر	Le	In, Fu	Or	Respiratory, digestive, neurological, cardiovascular, against female sterility, coronavirus (headaches, fever and to purify and disinfect the air)	(Maghni et *al*. 2025) (Lahouel 2025)
Thymus ciliatus (Desf.) Benth. subsp. *ciliatus*	El zaatar	Le	In, Fu	Or	Depurative, influenza, cough, cold, abdominal meteorism, endocrine glands diseases	(Nouar et *al*. 2021)
Malvaceae						
Malva sylvestris L.	Kholbeïza خبيزة, خبيز	Ae, Le, Ro	In, De, Pos	Or, To	Respiratory (bronchitis, coughs, asthma), digestive (against gastrointestinal conditions), diabetes, tumors, eye irritations, inflammations, urinary	(Miara et *al*. 2019) (Maghni et *al*. 2025) (Lahouel 2025)
Myrtaceae						
Eucalyptus camaldulensis Dehnh	Kalitous كاليتوس	Le	In, Pos	To	Respiratory (bronchitis and flu), coronavirus	(Maghni et *al*. 2025)
Orchidaceae						
Ophrys fusca Link.	/	Tu	In	Or	Problems of sexual incapacity among men	(Miara et *al*. 2013) (Nouar et *al*. 2021)
Ophrys lutea (Cav.) Gouan	/	Tu	In	Or	Problems of sexual incapacity among men	(Miara et *al*. 2013) (Nouar et *al*. 2021)
Ophrys speculum Link	/	Tu	In	Or	Problems of sexual incapacity among men	(Miara et *al*. 2013) (Nouar et *al*. 2021)
Oxalidaceae						
Oxalis pes-caprae L.	Qouarça, Homida قرصة, حميضة	/	/	/	Gingivitis, constipation, jaundice, stimulate bile secretion	(El-Mokasabi et *al*. 2018)
Papaveraceae						

Papaver rhoeas L.	Ben naâ'man بن نعمان	Fl	In	Or	Asthma, Eye inflammations, dental abscesses, digestive problems, antispasmodic	(Miara et *al*. 2019) (Djahafi et *al*. 2021) (Maghni et *al*. 2025)
Fumaria officinalis L.	Ourag el nssa النسا ورق	Ae	In, De	Or	Digestive, abdominal congestion, jaundice, skin conditions, diuretic, cholagogue, decrease of blood fats, gastrointestinal liver and gall ailments. Tincture for decrease of blood sugar, high blood pressure	(Miara et *al*. 2013) (Šarić-Kundalić et *al*. 2021)
Pinaceae						
Pinus halepensis Mill.	Snouber صنوبر	Ba, Se, Le, resin	Pa, In, De	Or, To	Burns, respiratory (bronchitis, cough, pneumonia), osteoarthritis, diabetes, rheumatism, urinary, wounds, stomachache, dermatological (skin burning, eczema	(Miara et *al*. 2019) (Djahafi et *al*. 2021) (Maghni et *al*. 2025) (Lahouel 2025)
Plantaginaceae						
Plantago coronopus L.	Boudjenah, Derhis بوجناح, دريس	/	/	/	Softening, astringent, emollient, respiratory, dermatological	(Daoudi et *al*. 2016) (Nouar et *al*. 2021)
Poaceae						
Aegilops geniculata Roth		Se	Ra	/	Snake bites	(Tardío et *al*. 2006)
Ampelodesmos mauritanicus (Poir.) Durand & Schinz	Diss ديس	Ae	De	Or	Kidney stones and gallbladder, diabetic, blood (hypotension)	(Boudjelal et *al*. 2013) (Nouar et *al*. 2021) (Miara et *al*. 2019)
Polygonaceae						
Rumex bucephalophorus L.	Hammeida El Hadjel حميضة الحجل	Wp	In	Or	High level of toxins, constipation	(Nouar et *al*. 2021)
Primulaceae						
Lysimachia arvensis (L.) U. Manns & Anderb	Ain el guathous, Meridjan عين القطوس, مريجان	Ap	De	To	diuretic, depurative, expectorant, fungicidal and hepatic, dermatology (wounds disinfection)	(Akerreta et *al*. 2010) (Miara et *al*. 2013)
Lysimachia monelli (L.) U. Manns & Anderb	Loubayn, hachichet el-âlaq لوبين, حشيشة العلق	/	/	/	Dermatological, internal infections	(Saidi et *al*. 2015)
Resedaceae						
Reseda alba L. subsp. *alba*	Qaua el Kherouf كوا الخروف, ذيل الخروف	Le, St	In, Cr	Or, To	Diarrhea, colic and digestive intoxications, foot cracks	(Daoudi et *al*. 2016) (Nouar et *al*. 2021) (Meddour et *al*. 2022)

Reseda collina Müll. Arg.	Qaua el Kherouf /	Le	In	Or	Sudorific	(Nouar et *al*. 2021)
Reseda luteola L.	Qaua el Kherouf /	Le	In	Or	Sudorific, diaphoretic, diuretic, stomachic, digestive	(Daoudi et *al*. 2016) (Nouar et *al*. 2021) (Cocco et *al*. 2022)
Rhamnaceae						
Ziziphus lotus (L.) Desf.	Sedra سدرة	Fr, Le, Ro	De, In, Pos	Or, To	all diseases: urological (kidney stones), anti-diabetic, digestive, pulmonary conditions	(Miara et *al*. 2013) (Djahafi et *al*. 2021) (Nouar et *al*. 2021) (Maghni et *al*. 2025)
Rosaceae						
Rosa canina L.	Nab el Kelb ناب الكلب	Fr (matured)	De	Or	digestive system (stomach cramps), diuretics, antiseptic, colds and flu, diabetes	(Cakilcioglu & Turkoglu 2010) (Miara et *al*. 2013)
Rubus ulmifolius Schott.	El Allaigue العليق	Le, Fr	De, Ra (eaten directly)	Or	Dermatological (healing of ulcers and burn wounds), against cancer	(Maghni et *al*. 2025)
Sanguisorba minor Scop.	Meskiya مسكية	Fl	Ba	To	For ill eyes (ocular antiseptic)	(Rigat et *al*. 2007)
Rubiaceae						
Galium tricornutum Dandy	/	Wp	In	Or	Gynecologic disease	(Altundaga & Ozturk 2011)
Tamaricaceae						
Tamarix gallica L.	Tarfa طرفة	Ba, Le, Fl	In, De	Or	Arthritis and rheumatism, liver (hepatoprotective), diabetes	(Miara et *al*. 2013) (Nouar et *al*. 2021) (Maghni et *al*. 2025) (Lahouel 2025)
Thymelaeaceae						
Thymelaea hirsuta Endl.	Methnan مثنان	Ae	Pow	Or	Pregnancy, uterine fibroids, cough, constipation, hair, anemia, digestive	(Miara et *al*. 2013) (Nouar et *al*. 2021) (Djahafi et *al*. 2021) (Lahouel 2025)
Urticaceae						
Urtica dioica L.	Hourrig حريق	Le	De, In, Pa, Ma	Or, To	Neurological conditions, skeletal (osteoarticular disorders), cancer cases, cysts, anemia, rheumatism, hair loss, digestive	(Miara et *al*. 2013) (Djahafi et *al*. 2021) (Lahouel 2025)

Used parts: Aerial parts = Ae/ Barks = Ba/ Bulbs = Bu/ Cones = Co/ Culms = Cu/ Floral tap = Ft/ Flowers = Fl/ Fruits = Fr/ Latex = La/ Leaves = Le/ Plant sap = Ps/ Rhizome = Rh/ Roots = Ro/ Seeds = Se/ Stem = St/ Tubers = Tu/ Whole plant = Wp

Mode of Preparation: Bath = Ba/ Cooked = Co/ Crushed = Cr/ Decoction = De/ Fumigation = Fu/ Infusion = In/ Maceration = Ma/ Paste = Pa/ Poultice = Po/ Powder = Pow/ Raw = Ra/ Tincture = Ti

Mode of administration: Compress = Co/ Gargle = Ga/ Nasal = Na/ Oral = Or/ Topical = To

Analysis of Table 1 allowed us to identify the species most frequently cited in traditional medicine (Fig. 3). In terms of the category of disease treated by the plants, *Thapsia garganica* L. *Juniperus oxycedrus* L., *Mentha rotundifolia* L., and *Moricandia arvensis* (L.) DC. were the most prominent, each recommended for treating 9 categories of diseases. Followed by *Ajuga iva* (L.) Schreb., *Calicotome spinosa* (L.) Link subsp. *spinosa*, and *Teucrium polium* L., each cited for treating 7 categories. In addition, *Capparis spinosa* L., *Cupressus sempervirens* L., *Malva sylvestris* L., *Nerium oleander* L., *Pinus halepensis* Mill., *Spartium junceum* L and *Urtica dioica* L. were recommended for treating 6 categories. The remaining plants treated between 2 and 5 categories, while some plants showed specificity to one category.

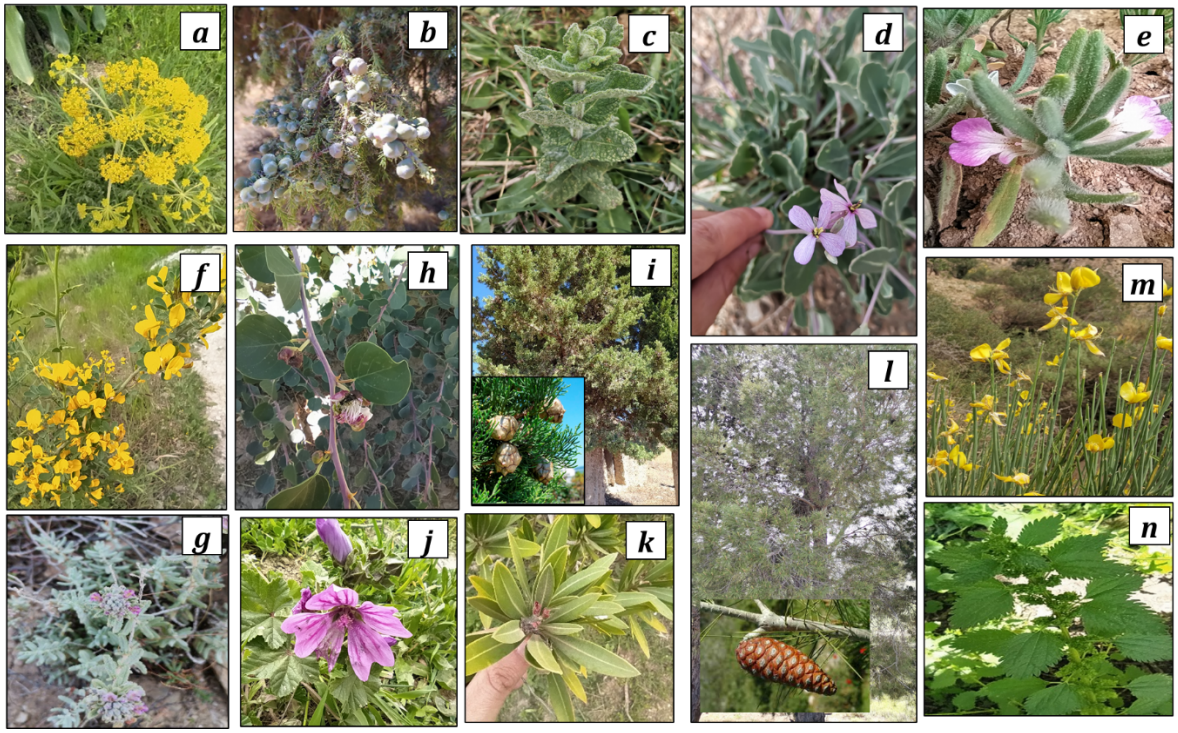

Figure 3. The most frequently cited plants in pharmacopoeia.
a) *Thapsia garganica* L / ***b)*** *Juniperus oxycedrus* L / ***c)*** *Mentha rotundifolia* L / ***d)*** *Moricandia arvensis* (L.) DC / ***e)*** *Ajuga iva* (L.) Schreb/ ***f)*** *Calicotome spinosa* (L.) Link subsp. *spinosa* / ***g)*** *Teucrium polium* L / ***h)*** *Capparis spinosa* L / ***i)*** *Cupressus sempervirens* L / ***j)*** *Malva sylvestris* L / ***k)*** *Nerium oleander* L / ***l)*** *Pinus halepensis* Mill / ***m)*** *Spartium junceum* L / ***n)*** *Urtica dioica* L.

Plant parts used

Leaves were the most commonly used plant part (33.1%), followed by flowers (13.4%), aerial parts (11.5%), roots (10.2%), whole plant (8.3%), fruits (7%), seeds (3.8%). However, the use of barks, tubers, stem, rhizomes, bulbs, resin, plant sap, latex, culms and cones was less frequent and was cited less than 3% each (Fig. 4).

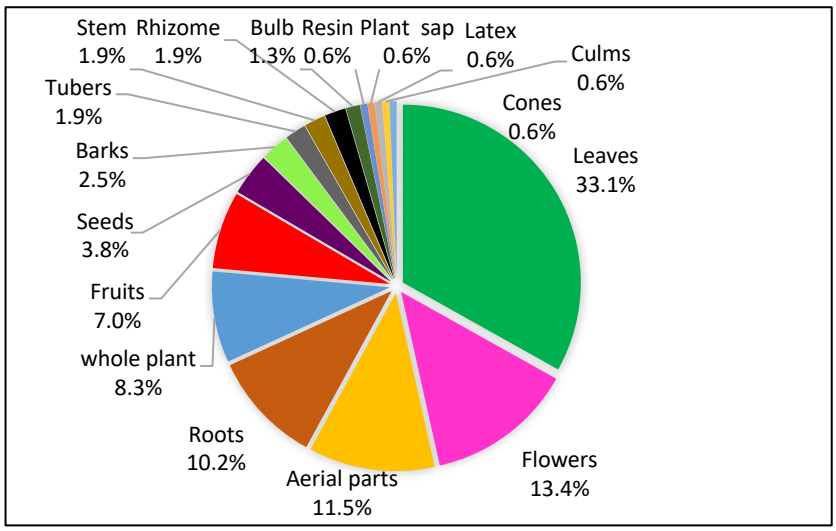

Figure 4. Frequency of use of different plant parts.

The quantity and quality of phytochemicals change depending on the part of the plant where they are accumulated (Djahafi et *al*. 2021). Very abundant, easily accessible for harvesting, the aerial part in general and the leaves in particular are commonly utilized in traditional medicinal practices (Bouasla & Bouasla 2017; Djahafi et *al*. 2021).

Maghni et *al*. (2025) attribute the high demand for leaves to their notable effectiveness, which stems from their role as the primary site for producing various secondary metabolites.

In light of this, most of the latest studies on ethnobotany indicate that the above-ground sections (like leaves) are the most commonly utilized parts of medicinal plants (Kefifa et *al*. 2020; Mechaala et *al*. 2022; Zatout et *al*. 2021; Layadi et *al*. 2024; Maghni et *al*. 2025).

Modes of preparation

The most frequently used preparation methods were: infusion (37.4%), decoction (28.8%), poultice and powder (8.6%) each, raw (6.1%). Nevertheless, the rest of the preparation such as: crushed, fumigation, cooked, bath, maceration, paste, juice, nasal and tincture were less frequent less than 2% each (Fig. 5).

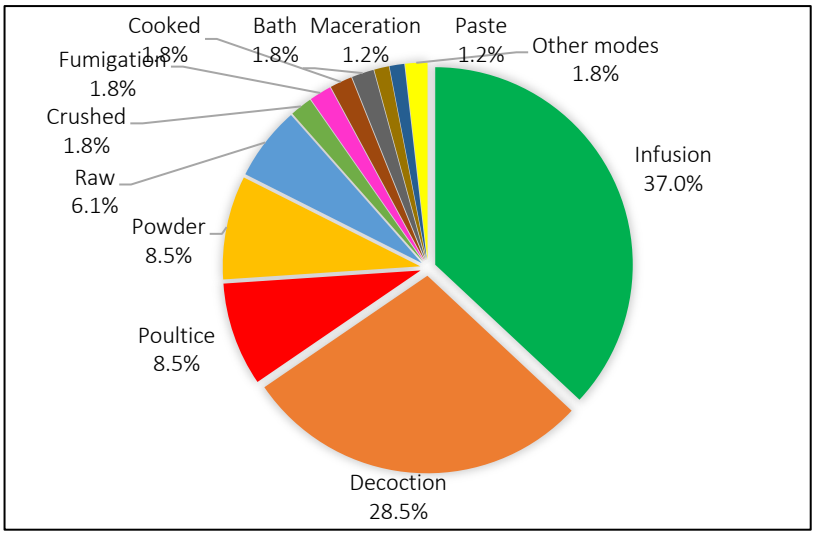

Figure 5. Modes of preparation of the inventoried medicinal plant species.

The predominance of two methods of preparation (infusion and decoction) is due to how simple they are, requiring minimal equipment (Smaili et *al*. 2023) and the fact that they can easily be performed in daily life (Leporatti & Impieri 2023). Conversely, these two methods help extract the highest number of active compounds (Benaiche et *al*. 2019) and to lower toxicity while ensuring the disinfection of the plant (Benarba et *al*. 2015).

Modes of administration

According to our results, oral administration with 72.9% was the most frequently described. Moreover, 23.3% of plant species are used via topical application, followed by nasal administration at 2.3%, and compress and gargle at 0.8% each (Fig. 6).

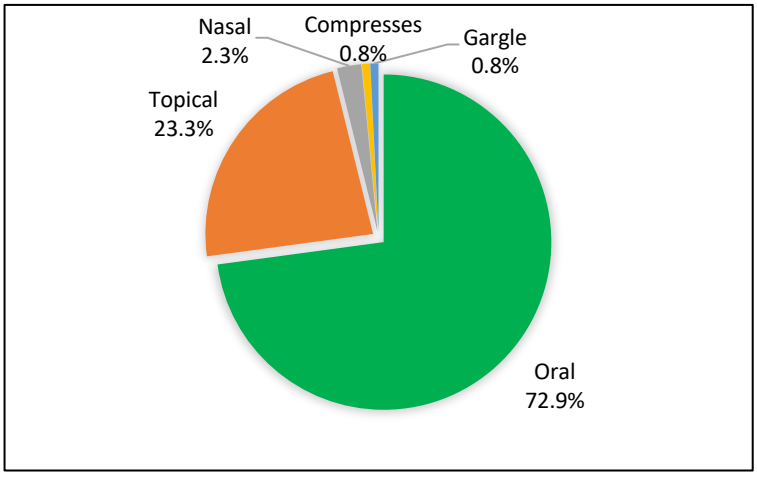

Figure 6. Modes of administration of the inventoried medicinal plant species.

The oral mode of administration remains the most frequent in ethnobotanical studies carried out in different regions of Algeria (Belhouala & Benarba 2021). This pattern is consistent in the Northwest (Benarba et *al*. 2015; Benarba 2016; Djahafi et *al*. 2021; Maghni et *al*. 2025), Northeast (Chermat & Gharzouli 2015; Baziz et *al*. 2020; Brahmi et *al*. 2023), Southwest (Benamara et *al*. 2022) and the Sahara (Lakhdari et *al*. 2016; Hassaïne & Benmalek 2023).

It is thought that the oral route is the most acceptable to the patient (Benarba 2016). Additionally, Zatout et *al*. (2021) explain that the predominance of the oral route as a mode of administration is due to the high prevalence of internal disorders, alongside cultural determinants. On the other hand, the high percentage of topical application in our study is closely related to the external application of plants for the treatment of skin diseases. Rehman et *al*. (2015) report that oral and topical modes of administration promote healing power because both allow for rapid physiological action.

Disease categories and corresponding therapeutic indications

The therapeutic applications of the medicinal plants documented in this study have been classified in 15 categories; digestive diseases (colic, intoxications, constipation, diarrhea, ulcer, colon …etc) with (17.2%); dermatological diseases (eczema, wounds, verruca, dandruff, dartre …etc) with (11.8%); respiratory diseases (asthma, bronchitis, flu, lung problems, cold, cough, influenza …etc) and urogenital diseases (urolithiasis, urinary affections, renal colic, uterus, bladder disorders, menstrual pain, prostate …etc) with (10.7%) each; circulatory disorders (hypotension, cholesterol, atherosclerosis, disorders of the venous system …etc) with (6.8%) ; glandular disorders (diabetes, hyperthyroidism, endocrine glands diseases, goiter …etc) with (5.1%); osteoarticular diseases (arthritis, rheumatism, foot cracks, osteoporosis, fractures …etc) and general disorders (fever, headache, hypothermia, migraine …etc) with (3.7%) each; mouth diseases (inflammations of the mucous membranes, dental abscesses, gingivitis, teeth pain …etc) with (3.1%); cancer with (2.3%); eye diseases and disorders (eye infections, inflammations and irritations) with (2%); neurological and psychological disorders (nervous system) ; bacterial, virus and fungal infections and Spasms and colic with (1.4%) each and finally other effects and diseases with (18.9%) (Fig. 7).

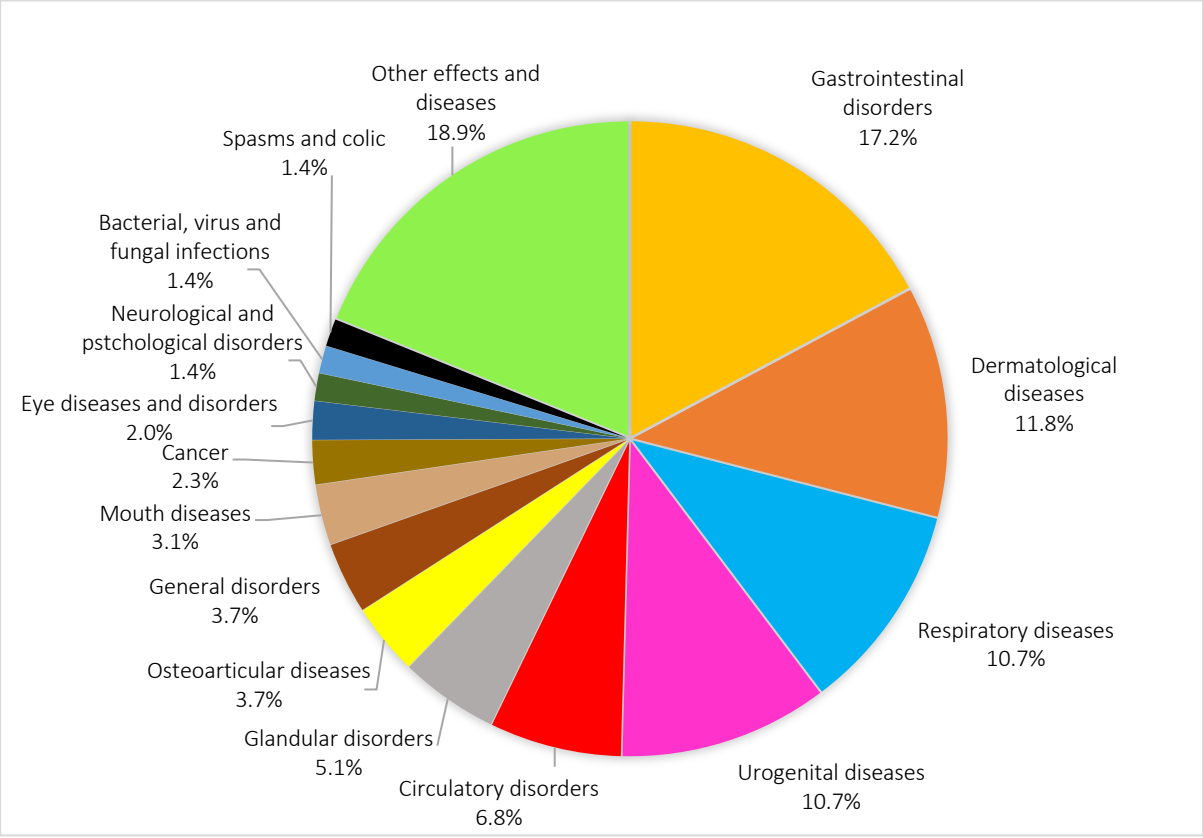

Figure 7. Therapeutic applications of medicinal plants by disease category.

Our results go in the same direction as various ethnobotanical studies located locally in Tiaret. Miara et *al*. (2013) mentioned that the majority of medicinal plants are used in the treatments of the digestive system, then urinary and internal diseases, while Djahafi et *al*. (2021) reported that 52, 39, 37 and 33 species are recommended for the treatment of the digestive, circulatory, respiratory and urogenital systems, respectively. On the other hand, plants inventoried by Nouar et *al*. (2021) are mainly used in order of importance in the treatment of the digestive tract (18.6%), cardiovascular (10.7%) and dermal diseases (7.5%). This is confirmed by the most recent study in the same region (Tiaret) by Maghni et *al*. (2025), whose

treatment of diseases of the digestive and respiratory system were the most cited by the informants with informant consensus factor (ICF=0.90) and (ICF=0.87) respectively.

In addition, digestive disorders have been found to be the most recommended for treatment with medicinal plants in most ethnobotanical surveys in Algeria (Benarba et *al*. 2015; Benarba 2016; Djahafi et *al*. 2021; Zatout et *al*. 2021; Benamara et *al*. 2022) and neighboring countries such as Morocco (Merzouki et *al*. 2000; Daoudi et *al*. 2016; Zouhri & Aarab 2018; El-assri et *al*. 2025), Tunisia (Karous et *al*. 2021), Libya (El-Mokasabi et *al*. 2018) and Mediterranean countries, in Syria (Khatib et *al*. 2021), Turkey (Altundaga & Ozturk 2011; Şenkardeş & Tuzlaci 2014), Greece (Skoula et *al*. 2009; Perouli & Bareka 2022), Bosnia and Herzegovina (Šarić-Kundalić et *al*. 2010), Italy (Danna et *al*. 2022; Cocco et *al*. 2022) and Spain (Bonet et *al*. 1999; Bonet & Valles 2003; Rivera et *al*. 2019).

Toxicity

Thirteen of the inventoried species (11%) were identified as toxic, containing biologically active substances that can cause adverse effects, or even serious poisoning, if misidentified, overdosed, or used inappropriately (Fig. 8). Each species-specific toxicological profile is summarized below:

***Atractylis gummifera* L:** all the parts contain toxic compounds (Hammiche et *al*. 2013). The aerial parts contain lesser toxins (Benzeid et *al*. 2018). Ouadeh et *al*. 2021, confirm that accidental poisoning is common among children, who mistake its whitish substance secreted by the plant for chewing gum or when there is confusion between the sticky thistle and the wild artichoke.
***Echinops spinosissimus* Turra:** is considered among toxic plants known to be harmful during pregnancy (Hammiche et *al*. 2013).
***Ferula communis* L:** the entire plant and its gum resin are toxic. Prenylated coumarins: ferulenol, ferprenin and related derivatives are the toxic principles (Hammiche et *al*. 2013).
***Juniperus oxycedrus* L:** considered among the most toxic plants in Morocco, the essential oil and oleoresins extracted from *J. oxycedrus* are toxic at high doses and with prolonged application (carcinogenic risk) (Benzeid et *al*. 2018).
***Marrubium vulgare* L:** Slightly toxic, it causes allergy and diarrhea (Djarmouni et *al*. 2023).
***Nerium oleander* L:** the entire plant is toxic, fresh and dried, even after boiling, and its primary toxicity is cardiac (Hammiche et al. 2013). Its parts are toxic to humans, animals, and certain insects (Benzeid et *al*. 2018; Meddour et *al*. 2020). Its oral ingestion strongly discouraged (Meddour et *al*. 2020). Furthermore, strict care must be taken to avoid confusion with bay leaves, commonly used as a condiment (Benzeid et *al*. 2018).
***Origanum vulgare* (Desf.) Ietsw:** the toxicity was confirmed in the work of Begaa & Messaoudi, (2018) in which arsenic, bromine, cerium, cobalt, chromium, and antimony were presented.
***Scilla maritima* L:** the entire plant is toxic, particularly the bulb, the toxic principles are cardiotonic bufadienolide glycosides: scillarene A and B and scilliroside, which is also a cardiotonic and rodenticide. Ingestion of a dose between 3 to 5 g of squill powder would be fatal to adults (Hammiche et *al*. 2013).
***Tamarix gallica* L:** the toxicity is well documented; it is especially known to be harmful during pregnancy (Hammiche et *al*. 2013).
***Teucrium polium* L:** moderately toxic, linked to hepatotoxicity and can lead to liver failure (Djarmouni et *al*. 2023).
***Thapsia garganica* L:** reported to be toxic (Djarmouni et *al*. 2023), causing skin irritation and vomiting. If ingested, can potentially be fatal (Meddour et *al*. 2020).
***Urtica dioica* L:** moderately toxic plant that causes skin burns when used externally (Djarmouni et *al*. 2023).
***Ziziphus lotus* (L.):** This species is considered moderately toxic and notably associated with hypoglycemia (Djarmouni et *al*. 2023).

Conclusions

The present study reports on the floristic richness of the Chehama region, revealing 118 plants from 102 genera and 40 botanical families dominated by Asteraceae and Lamiaceae with 21.2% and 10.2%, respectively. The leaves of the plants are the most commonly used 33.1%, typically administered orally 72.9% via infusion 37.4% and decoction 28.8%.

Therapeutic scope comprises 15 disease categories, led by degenerative diseases 17.2%, skin diseases 11.8%, respiratory and urinary diseases 10.7% each, while the treatment of other diseases represents less than 7%.

Among the most frequent plants used in traditional pharmacopeia were *T. garganica* L., *J. oxycedrus* L., *M .rotundifolia* L., *M. arvensis* (L.) DC., *A. iva* (L.) Schreb., *C. spinosa* (L.) Link subsp. *spinosa*, *T. polium* L., *C. spinosa* L., *C. sempervirens* L., *M. sylvestris* L., *N. oleander* L., *P. halepensis* Mill., *S. junceum* L and *U. dioica* L. for the treatment of several disease categories.

Critically, other plants have been recognized as toxic, *A. gummifera* L., *E. spinosissimus* subsp. *spinosus* Greuter, *F. communis* L., *J. oxycedrus* L., *M. vulgare* L., *N. oleander* L., *O. vulgare* (Desf.) Ietsw., *S. maritima* L., *T. gallica* L., *T. polium* L., *T. garganica* L., *U. dioica* L and *Z. lotus* (L.) Desf. Underlining extreme caution to their use, whether for their various vegetative organs or one of their extracts (e.g., *J. oxycedrus* L essential oil.).

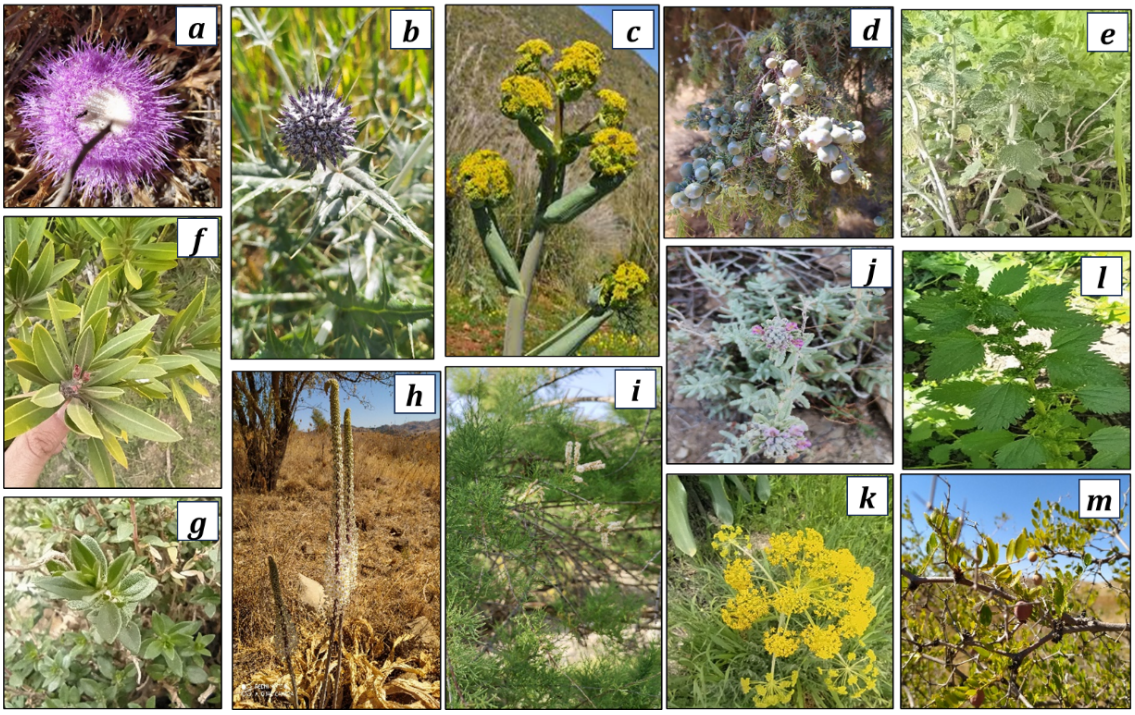

Figure 8. Toxic medicinal plants in the study area.

a) *Atractylis gummifera* L / ***b)*** *Echinops spinosissimus* subsp. *spinosus* Greuter / ***c)*** *Ferula communis* L / ***d)*** *Juniperus oxycedrus* L / ***e)*** *Marrubium vulgare* L / ***f)*** *Nerium oleander* L / ***g)*** *Origanum vulgare* (Desf.) Ietsw / ***h)*** *Scilla maritima* L / ***i)*** *Tamarix gallica* L / ***j)*** *Teucrium polium* L / ***k)*** *Thapsia garganica* L / ***l)*** *Urtica dioica* L / ***m)*** *Ziziphus lotus* (L.) Desf.

These findings provide a prioritized baseline for phytochemical and pharmacological validation, through *in vitro* and *in vivo* studies. This research supports both: conservation of ethnobotanical knowledge and the development of local pharmacopeia. Finally, these data contribute to developing a regional potentially progressing to a national catalog of medicinal plants guide to sustainable use, local value chains, and integrative health strategies.

Declarations

List of abbreviations: Used parts: Aerial parts = Ae/ Barks = Ba/ Bulbs = Bu/ Cones = Co/ Culms = Cu/ Floral tap = Ft/ Flowers = Fl/ Fruits = Fr/ Latex = La/ Leaves = Le/ Plant sap = Ps/ Rhizome = Rh/ Roots = Ro/ Seeds = Se/ Stem = St/ Tubers = Tu/ Whole plant = Wp**;** Mode of Preparation: Bath = Ba/ Cooked = Co/ Crushed = Cr/ Decoction = De/ Fumigation = Fu/ Infusion = In/ Maceration = Ma/ Paste = Pa/ Poultice = Po/ Powder = Pow/ Raw = Ra/ Tincture = Ti**;** Mode of administration: Compress = Co/ Gargle = Ga/ Nasal = Na/ Oral = Or/ Topical = To

Ethics approval and Consent to participate: Not applicable for this study

Consent for publication: Not applicable

Availability of data and materials: The data featured in this manuscript can be obtained from the corresponding author.

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Author contributions: Nouar Belgacem: collected the data, identified the plant species, wrote the article, Berrabah Hicham: revised article, Saad Ahmed: helping with discussions, Aouadj Sid Ahmed: identified the plant species and revised article, Maamar Benchohra: revised and approved the final version of article, Tir Elhadj: monitoring data collection and analysis, Nouar Chaimaâ: collected the data.

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