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Ethnobotanical survey on the use of medicinal and aromatic plants in the region of Ain Assel at the level of El tarf city (Northeast of Algeria)

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ABSTRACT

Introduction: The use of medicinal plants is still of a great interest for mankind despite the pharmaceutical industry development. This ancestral information is connected over time allowing the transmission of knowledge. The objective of this work is to conduct an ethnobotanical study on medicinal plants carried out in the region of Ain Assel, in order to evaluate, on one hand the region's potential in medicinal plants, and on the other hand to collect all the information on traditional therapeutic uses practiced by the local population.

Materials and Methods: Our survey has allowed us to identify 80 medicinal plants belonging to 46 families and 76 types, which are mostly used by the local inhabitants. The most represented family being that of the *Lamiaceae* with 10 species. Our results have showed that

Results and discussion: The majority of remedies are prepared in the form of an infusion. The vast majority of forms of medicinal plant use are herbal teas. The large number of medicinal plants are used to treat respiratory disorders and digestive diseases.

Conclusion: This study demonstrates the significance of floristic biodiversity in the region of Ain Assel. The sustainable use of this richness could be a way for the conservation of this natural heritage. In addition, sensitizing the new generation to exploit the field of phytotherapy is a way of protecting people's health.

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INTRODUCTION

For thousands of years, humans have used plants found in nature to treat and cure illnesses.[1]

Medicinal plants are valuable resources for the vast majority of the countryside populations, where more than 80% of this population uses them to provide health care in the absence of the modern medical system.[2] Despite the large place that modern medicine occupies in the world, the primary care for the majority of people is established by traditional medicine that is ubiquitous in popular culture.[3]

Phytotherapy refers to medicine based on plant extracts and natural active components. It is one of the oldest medicines in the world. It represents an interesting alternative to treat and cure without creating new diseases. Despite the phenomenal development of the pharmaceutical and chemical industry, popular interest in herbal medicine has never ceased to evolve.[4]

The use of plants in herbal medicine is extremely old and currently experiencing a place of interest with the public. According to the World Health Organization (WHO), approximately 65 to 80% of the world's population resorts to traditional medicine to satisfy their primary health care needs, due to poverty and lack of access to modern medicine.[5]

The term ethnobotany refers to the study of plants used by primitive and local populations. For other scientists, this discipline is the study of the relationship between man, plant and its environment.[6]

Ethnobotany and ethnopharmacology are interdisciplinary fields of research that specifically focus on the empirical knowledge of local populations regarding medicinal substances, their potential health benefits and the risks they induce.[7]

KEYWORDS:
Ethnobotanical survey,
Forms of use,
In Assel,
Medicinal Plants
Preparation methods,
Treated diseases.

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There are more than 600 species of medicinal and aromatic plants in Algeria. The region of Ain Assel which is located at the level of El Tarf city (north east of Algeria) presents an undeniable varied floristic and faunal diversity. It is well-known for its traditional therapeutic use.[8]

It is in this context, we are interested in doing an ethnobotanical investigation on the use of medicinal and aromatic plants in the region of Ain Assel.

This work aims to contribute to plants' awareness and produce a catalog of the existing plants, in order to assemble the maximum information concerning the therapeutic use by the local population.

Certainly, it is important to translate this traditional knowledge into a scientific one with the intention of enhancing, conserving and using it in a rational way.

METHODS AND MATERIALS

Presentation of the Study Station

Aïn Assel is a community in El Tarf city located in the northeast of Algeria. The city is placed on the former territory of Kroumirs's great Berber confederation. It holds a border post area between Algeria and Tunisia.

- **Coordinates:** 36° 47' 11 north, 8° 22' 57 east
- **Area:** 94.8 km²
- **Altitude:** Min. 123m / Max. 123m
- **Density:** 172 inhabitants. / km²
- **Population:** 16,285 inhabitants.

Méthodoloy

In parallel with the surveys carried out with the local residents, from March 2021 to February 2022, we've sampled the plants by producing transects in which we've surrounded stations inward to carry out floristic surveys. Sampling was carried out according to the minimum area principle: when the tree layer was dominant, sampling was done on stations with a surface area of 100 m²; when the shrub layer was dominant, samples were taken from 25 m² stations. Therefore, all the present species are rated from the arboreal to the herbaceous.

This sampling enabled us to draw up a list of the plant's species in Ain Assel forest. As a result, we were able to determine its specific richness and identify the existing natural potential, particularly in medicinal plants. This will then allow us to compare the natural resources available with those used by the local residents.

Given the large area of the study region, we've chosen to work in the most accessible stations, with different plant formations and landscapes. Thus, about twenty stations were considered, some of which were chosen because of their proximity to residences.

The common species were recognized in the field. As for those that we could not identify, they were carefully sampled and some of them were photographed when was possible, to be brought back to the laboratory for identification. This task was facilitated by the use of floras:.[10, 11], Flor and various guides for medicinal plants.[12]

120 ethnobotanical surveys were carried out in the form of a discussion with the oldest people (male or female) of that

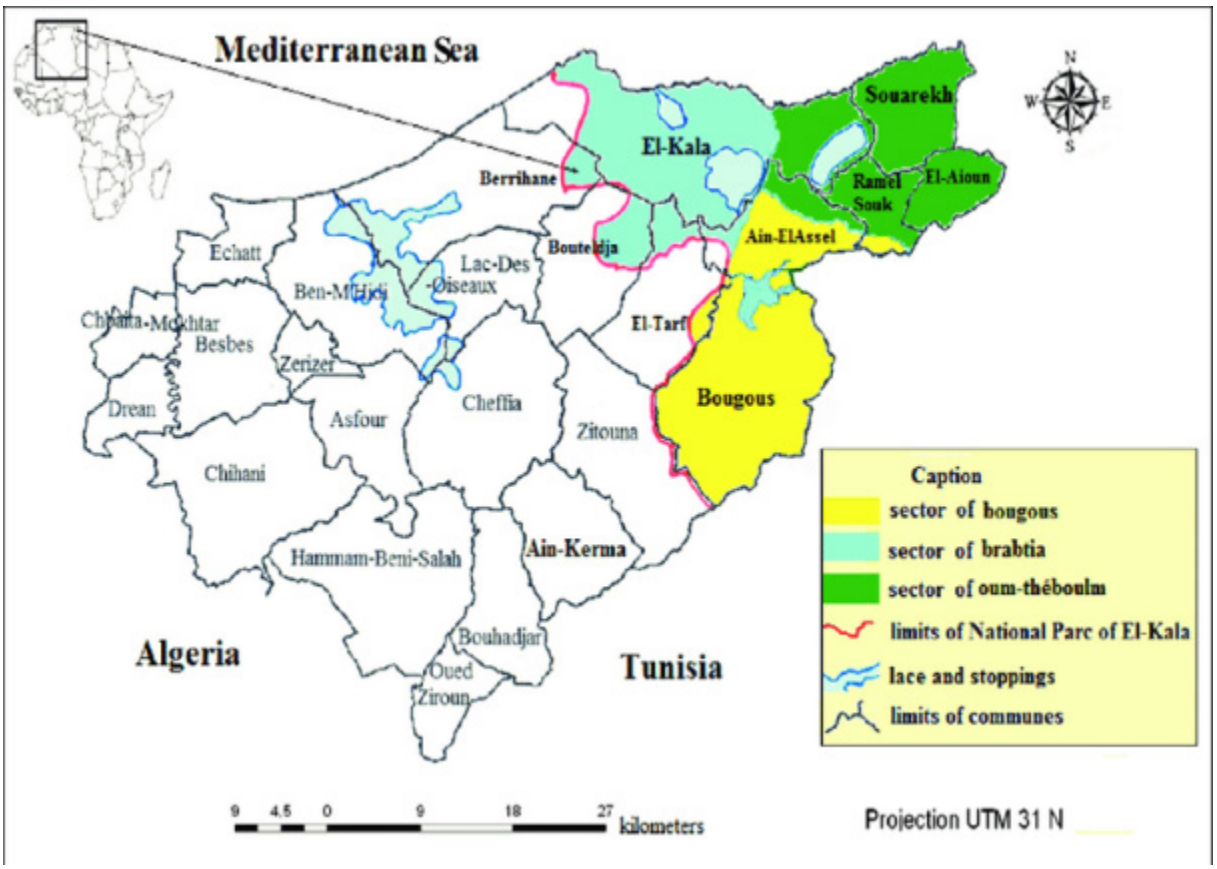

Fig. 1: Location of the study station (9)
★: Study station

rural area, whose average age was around 35 to 75 years old. The surveys were in the form of questionnaires related to: The questioned person's age and sex, type of the used plants, the harvest, the preparation, administration lanes, and treated diseases, etc.

RESULTS AND DISCUSSION

Result of the ethnobotanical survey

The analysis of the results for the ethnobotanical survey carried out on the field through the sector of Ain Assel, has allowed us to list 80 species belonging to 46 families and 76 genera.

We notice the predominance of *Lamiaceae* and *Asteraceae* with 10 and 05 species, respectively, followed by *Fabaceae* and *Oleaceae* with 04 species each. The rest of the families are represented by a number extending from 1 to 3 species.

Our results are similar to those obtained by.[13]

The Use of Medicinal Plants According to the Age

The use of the studied plants is widespread among all of the questioned people, with a predominance among those aged from 30 to 40 (28%).

However, a rate of 19% is noticed respectively for the age groups of 20 to 30 years and 40 to 60 years. The use is less important among the oldest informants (>60 years old) with only (14%) **(fig. 3).**

These results concerning the age of interviewees has also been reported by other authors like:[13-17]

The Use of Medicinal Plants According to the Used Plant's Organ

The analysis of the results shows that the most used parts of the plant are the leaves with a percentage of 55.81 followed by the fruits (13.95%)

Bulbs, flowers, stems and seeds take the third place with a rate of 5.81%, followed by barks, roots and tubers with values of 2.32% each.

The increased use of leaves has also been reported in other works Benkhnigue *et al.*[18-22] This can be explained by the ease and speed of harvesting, and also by the fact that the leaves are the base of photosynthesis and parts that are rich with active ingredients;[23] (23) After the leaves, come flowers, bulbs, tubers, seeds, stems, roots and sometimes the whole plant.

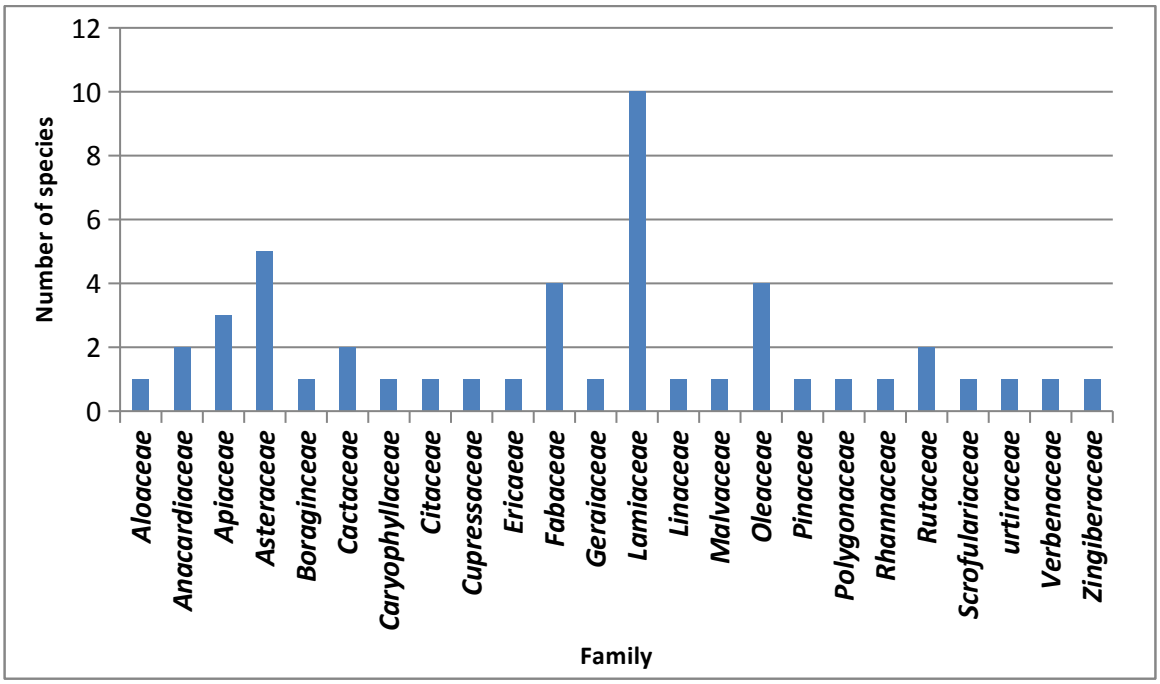

Fig. 2: Systematic spectrum of the different taxa for medicinal plants listed in the region of Ain Assel in EL TAR

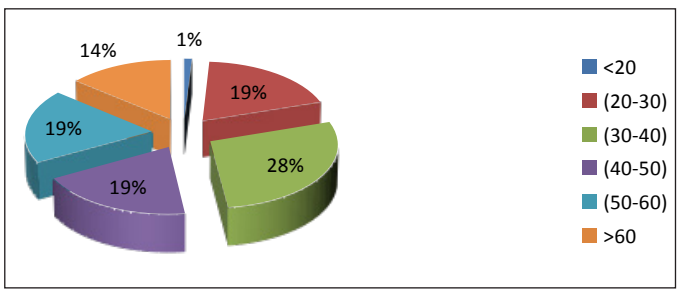

Fig. 3: Dividing the use of medicinal plants according to the age

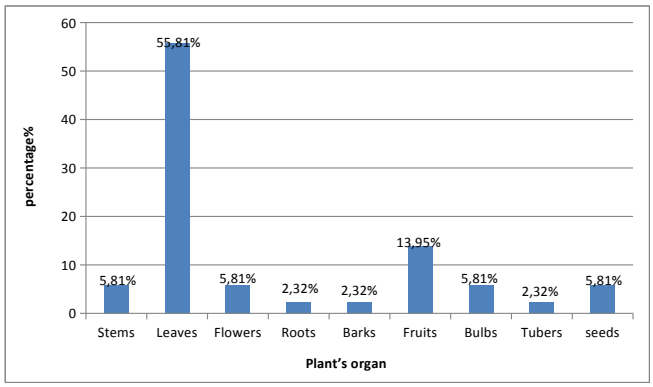

Fig. 4: The use of medicinal plants according to their organs

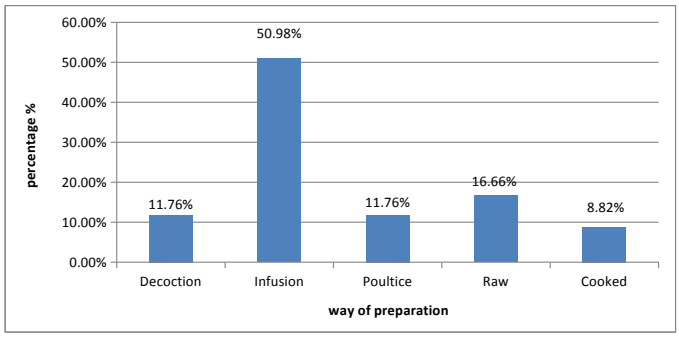

Fig. 5: The use of medicinal plants according to the way of preparation.

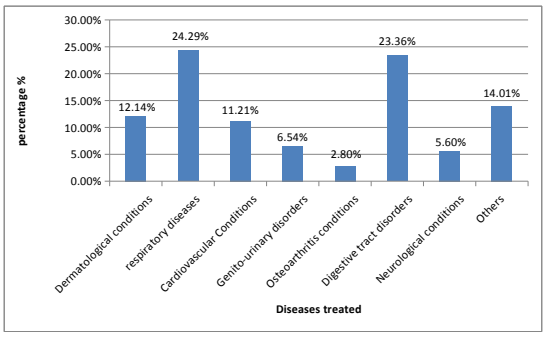

Fig. 6: Repair percentages of using medicinal plants according to the group of treated diseases.

The Use of Medicinal Plants According to the Way of Preparation

In order to facilitate the administration of the active ingredients, several modes of preparation are used, i.e. decoction, infusion, poultice, raw, cooked and other methods. Infusion is the most used technique of preparation with a rate of 50.98%.

Raw, decoction, poultice and cooked respectively represent rates of 16.66%, 11.76%, 11.76%, 8.82%.

Several studies report the predominance of decoction as a method of using medicinal plants

Cited by.[24] They believe that for local populations, the use of decoction as a method of preparing medicinal plants is the most appropriate way to warm the body and disinfect it. Furthermore, (25) confirm that this use makes it possible to reduce the toxicity when mixing certain plants, or even terminate it while keeping a large part of the secondary metabolites responsible for the plant's biological properties.

According to 14 For certain plants, oils and ointments are among the types of preparations used by local residents, particularly in local application. The consumption of fruits was also well-known for certain plants, as well as the use of vegetal oil traditionally extracted from the fruits of certain trees such as pistachio or olive.

Diseases Treated with Traditional Medicine

The analysis of the obtained results concerning the existing relationships between medicinal species and types of treated diseases, showed that the majority of the species are used in the care of respiratory diseases with (24.29%). Digestive disorders with (23.36%). Other plants are used to treat conditions and disorders, such as hypertension with (14.01%), dermatological conditions with (12.14%), cardiovascular conditions with (11.21%), genitourinary conditions with (6.54%), neurological conditions with (5.60%) and osteoarthritis conditions (2.80%).

These same results have been reported in Morocco and Tunisia.[27-29]

CONCLUSION AND PERSPECTIVES

Since the beginning of time, people have used plants to heal themselves. Even if the current pharmacopoeia keeps it as a secret, many are those who are seduced by their medicinal abilities. Therefore, in the recent decades, the medicinal plant has made a big comeback.

Despite the development in the medication industry with chemical origins, traditional phytotherapy currently constitutes an outstanding source of remedies. The present work is devoted to the ethnobotanical study at the level of Ain Assel region in El Tarf city, as well as the bibliographical research on medicinal plants and the survey carried out with the inhabitants. This has allowed us to draw several conclusions on the ethnobotanical reality of our study region.

We have found that the number of women has increased more by herbal treatment (with a percentage of 59%) than men with (41%). Medicinal plants are used more by people who have a secondary level. All age categories are interested in making herbal recipes (especially the 30 to 40 year old age group).

The floristic analysis carried out by the informants has helped us identify 46 families, in which the *Lamiaceae* family is the most represented. Either 10 vegetal species used in traditional medicine have been identified. The aerial part is the most used part, the decoction and the infusion are the most practiced forms.

The results of the surveys show that most of the medicinal species in the studied region are widely used in treating respiratory and digestive disorders.

This study demonstrates the significance of floristic biodiversity in the region of Ain Assel. The sustainable use of this richness could be a way for the conservation of this natural heritage. In addition, sensitizing the new generation to exploit the field of phytotherapy is a way of protecting people's health.

In addition, the authorities must intervene to regulate this sector through training specialists, promoting studies and research on medicinal plants, for the purpose of understanding and developing the field of phytotherapy.

It would be interesting to invest in the most used plants of our region at the molecular level, in order to dissect the active molecules which can be a solution for certain pathologies incurable.

Disclosure Statement

There is no actual or potential conflict of interest in relation to this article.

Authorship contributions

- Touil Wided carried out all the ethnobotanical surveys.
- Bouzata Chouhaira and Felleh Imene collaborated to evaluated the potential of the region in medicinal plants

and to collect all the information on the traditional therapeutic uses practiced by the local population.

- Gherib Imene translated the manuscript into English.

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