

Research article**Some ethnotherapeutic aspects of *Pistacia atlantica* in the El Bayadh region (South-West Algeria)**

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Abstract

The plant *Pistacia atlantica* belongs to the Anacardiaceae family and is the most used species in the Mediterranean, especially in Algeria. It is known as betoum or boutma in Arabic. This species is used in traditional medicine due to its many therapeutic virtues.

The results obtained from our ethnobotanical survey showed that almost all subjects use it in phytotherapy for its virtues in treating circulatory system diseases, with a rate of 72%, followed by digestive system disorders at 18%, skin problems at 5%, and other diseases mentioned by respondents totalling a rate of 5%. 40 % of the informants use the fruits, which are the most used part in the form of powder followed by decoction (31%), and extract (9%). The remaining preparation methods, namely infusion, maceration, are presented with rates ranging between 2% and 8%.

Key words

Pistacia atlantica, ethnobotanical survey, phytotherapy, decoction, infusion

Introduction

The use of traditional medicine today has proven effective and shown undeniable benefits for human health (Sharma *et al.*; 2012; Sakine *et al.*; 2012; Bene *et al.*, 2016, Aouadj *et al.*, 2020; Fyad; 2021; Seddiki, 2021). The use of herbal therapy has recently regained interest in many countries. Many diseases are treated with this method. Numerous studies, such as those by Sharma *et al.* (2012) and WHO (OMS) (World Health Organization) reports (2011), show that more than 80% of deaths from cardiovascular diseases occur in developing countries. Ueli *et al.* (2008) report that hypertension currently affects 26.4% of the world's population, with predictions suggesting this could rise to 29.2% by 2025. Additionally, diabetes, another scourge is considered, had a global prevalence rate of 2.8% in 2000, potentially rising to 4.8% by 2030 according to Ueli *et al.* (2008) and Sakine *et al.* (2012). Faced with these increasing diseases, natural medicine offers solutions for various human ailments. Biodiversity plays a crucial role in treating many human health issues, emphasizing the importance of plant-based medicine. Studies by Adjanahoun *et al.* (1980), Dongock *et al.* (2018), Fyad (2021), and Seddiki (2021), among others, confirm this trend. According to the WHO (2011), 80% of population relies on traditional medicine.

In Algeria, the use of medicinal plants has been omnipresent in people's lives. These plants and their products can be fundamental for sustainable economic development. However, the significance of these plants and their products depends on environmental conditions, primarily climate. Algeria's diverse climate varies by region east, center, west, and south. The phenological behavior of plants depends on their habitat, flourishing in coastal regions, mountainous areas, and even in Saharan zones with reduced coverage. According to Belouad (1998), these plants are potential natural remedies for various diseases.

The aim of this study is to highlight the value of *Pistacia atlantica* L. in the El Bayadh region. This plant, widespread in arid and semi-arid areas, deserves special attention. Many studies, such as those by Elyafi (1979); Benhassaini (1998), AL-Saghir *et al.* (2006), Belhadj (2007), Benaradj *et al.* (2015), Berrichi *et al.* (2017); Aouadj *et al.*, (2020a-d), Nasrallah *et al.*, (2020); Aouadj (2021), Chouati (2022) have focused on this plant. The research typically addresses ecological and physiological aspects, with limited work on its ethnobotanical value. To enhance the scientific understanding and better grasp the

medicinal importance of *Pistacia atlantica* in the study region, an ethnobotanical survey was conducted among citizens of different ages. This investigation took place from February to the end of March 2023.

Materials and methods

• Study Sites

Geographically, the Wilaya is between the parallels $30^{\circ} 42'$ and $34^{\circ} 28'$ of the northern altitude and between the meridians of longitude $0^{\circ} 24'$ in the West zone 30 and $2^{\circ} 16'$ in the East zone 31. It results from the recent territorial reorganization of the Western highlands region of the country undertaken in 1984 (Figure 1). It covers an area of $71,697 \text{ km}^2$, or 3% of the national territory (ANDI, 2013).

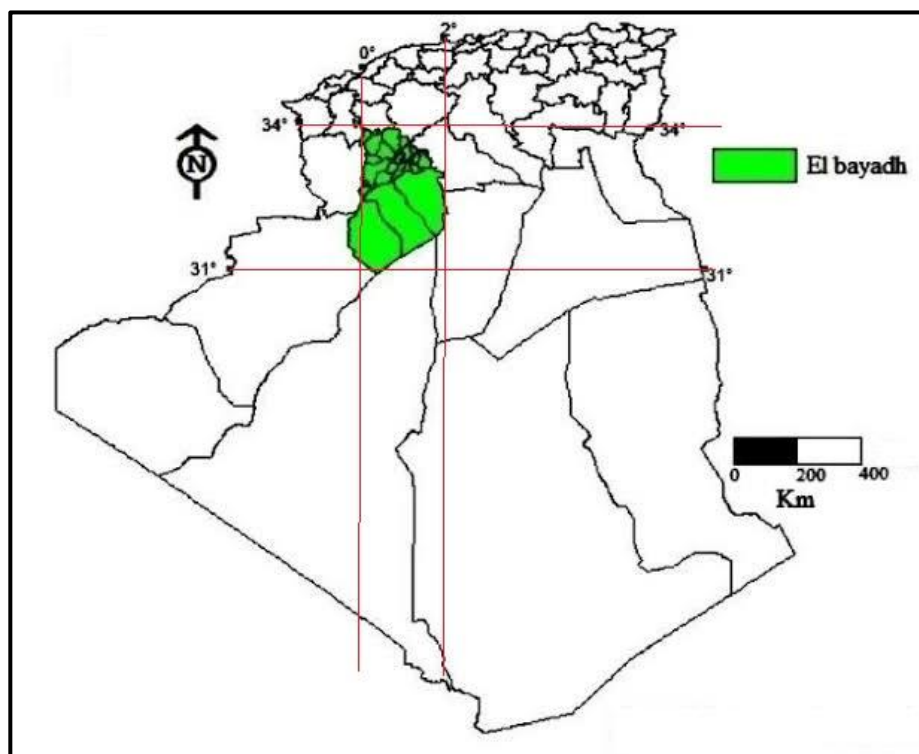


Figure 1. El Bayadh region

(Source: <https://interieur.gov.dz/Monographie/www.wilaya-elbayadh.gov.dz>)

According to data from ANDI (2013) and DPSB (2014), the population of the Wilaya is 305,600 inhabitants, with a density of $4.26 \text{ inhabitants / km}^2$. This situation reflects a significant change in the population to the extent that in 44 years, it has doubled at an absolute average annual rate of 5,167 inhabitants (DPAT, 2010).

Information on the use of *Pistacia atlantica* is collected from the inhabitants of the Wilaya of El Bayadh (Algeria), during the year 2022-2023, and more precisely during the good vegetative period of the species, that is to say i.e. from the beginning of February until the end of March of the same year.

In order to achieve our objective relating to the ethnobotanical study of medicinal plants and to seek to know their medicinal use, we opted to meet people capable of providing us with reliable information. In our case, we targeted herbalists and elderly people in the El-Bayadh region. We judged that the interviewees could tell us about the therapeutic capabilities of *Pistacia atlantica* (Figure 2). The photos of *Pistacia atlantica* are taken in their natural arid and semi-arid environment of the El Bayadh region in 2023.



Figure 2. *Pistacia atlantica* in natural environment in El- Bayadh region (Sehoul, 2023).

In this context, we followed the following steps:

- a) Preparation of survey sheets and ethnobotanical survey;
- b) Statistical processing of data.

• **Ethnobotanical Survey**

The ethnobotanical survey took place in households, making it possible to assess the endogenous knowledge of farmers and traditional therapists on the knowledge of medicinal plants, their instructions for use and the diseases treated. It consisted of interviewing people who had acquired knowledge about the use of *Pistacia atlantica*. A total of 100 people were surveyed. The

methodological approach consists of identifying traditional healers who have received personal experiences or knowledge passed down over a certain number of generations, healers and households with ancestral knowledge in the field of traditional medicine. During the investigation we retained the parameters that we will need to know: local name of the plant, scientific name, family of the plant, disease treated, part used, method of preparation, use of the plant, dose used.

To facilitate communication with people, we tried to respect the following rules: ask clear questions; speak the language of the respondents, avoid the implicit formulation of opinions, give the questions in several forms.

To provide as much information as possible, we have taken care to avoid a certain number of technical terms such as the use of scholarly words, adverbs, and long questions. As for the duration of the interview, we judged that it lasts on average 10 to 15 minutes.

Thus, the profile of each respondent includes their age, their level of education, their gender, and their place of residence, and the origin of the information. The second step consists of identifying the plant used (*Pistacia atlantica*) in traditional medicine.

In our approach and for more information on plants we supplemented our research with existing data either in official websites (telabotanica, ethnoplants, etc.), or medicinal plant documents (Delille, 2007).

Results and Discussion

• Ethnobotanical Results

Endogenous knowledge on medicinal plants in Algeria varies from one Wilaya to another and from one municipality to another. This difference is based on a certain number of parameters such as the presence of plants in the area, ancestral knowledge, age, intellectual level, place of residence (city dweller and/or rural environment (town, hamlet)). It appears from ethnobotanical surveys that the use of the atlas pistachio tree by the population is widespread among all age groups, with a rate of 61% among people aged 20 to 40, 37% for the age group, age from 41 to 60 years and only 2% for the age group over 60 years. It turns out that people aged 60 and under use the plant at a rate of 98%. This percentage is important and shows us the importance of the plant in herbal therapy (medication).

As for sex, statistical analyzes show that women use the plant less than men, with respectively 23% versus 77% of the population studied. Overall, men have a tendency towards the plant more than women.

- **Parts used and methods of use**

Our investigation carried out on the *Pistacia atlantica* tree revealed that the fruits are used more (40%). This high frequency can be explained by the ease and speed of harvesting, and also by the fact that they are the seat of storage of secondary metabolites responsible for the biological properties of the plant.

This result obtained is confirmed by the study results of Madani (2017), we see that fruits are most used.

We have collected information relating to the various traditional preparation methods which facilitate the administration of the active ingredient.

Shows that using it in powder form has the highest rate with 50% followed by the decoction 31%, and the extract in oil form 9%; these three methods of preparation are the most used compared to the methods remaining preparations namely: maceration, infusion are presented by rates which vary between 8% and 2% (Figure 3).

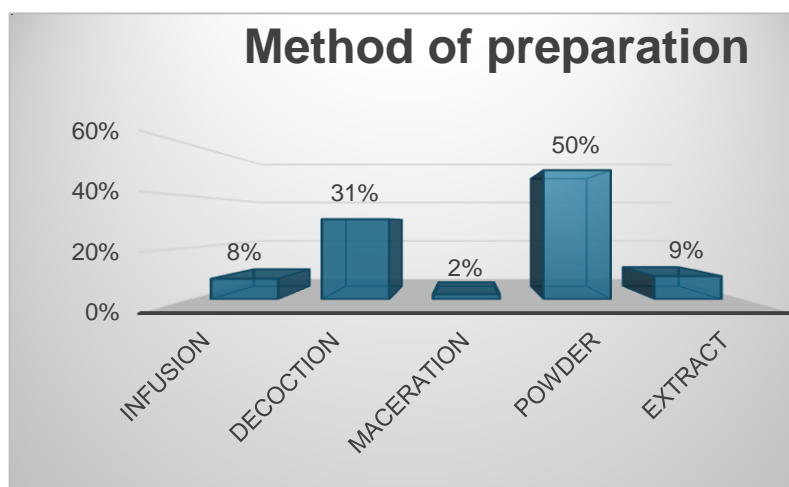


Figure 3. Preparation methods (Sehoul 2023)

We note that the use of a handful and/or a teaspoon in the dosage with respectively 11% and 47% confirm the results obtained in the preparation methods (Figure 3) with 50% of products are used in powder form.

• **Therapeutic effects**

This survey allowed us to list a certain number of diseases treated by this plant. The results show that is involved in the treatment of jaundice with a rate of 30%, brucellosis 24%, anemia 18% followed by stomach pain 10%. The other diseases cited by the respondents total a rate of 18% (Figure 4).

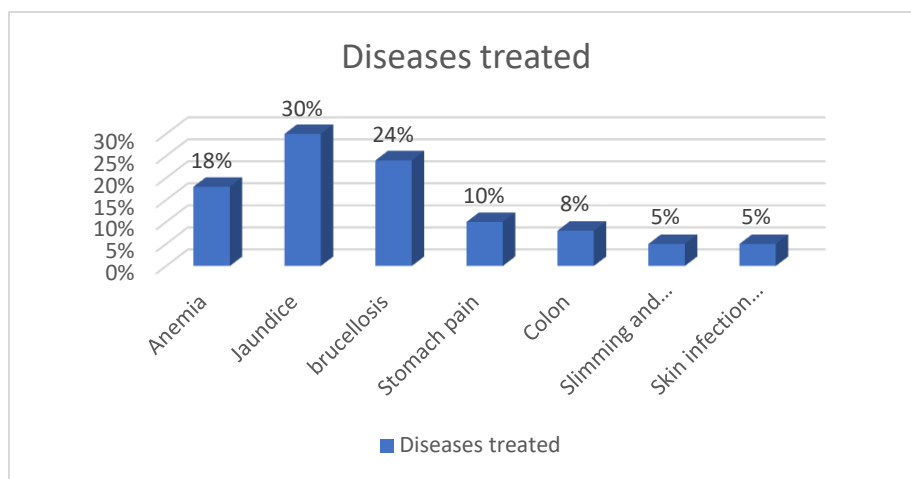


Figure 4. Diseases treated by *Pistacia atlantica* (Sehoul; 2023)

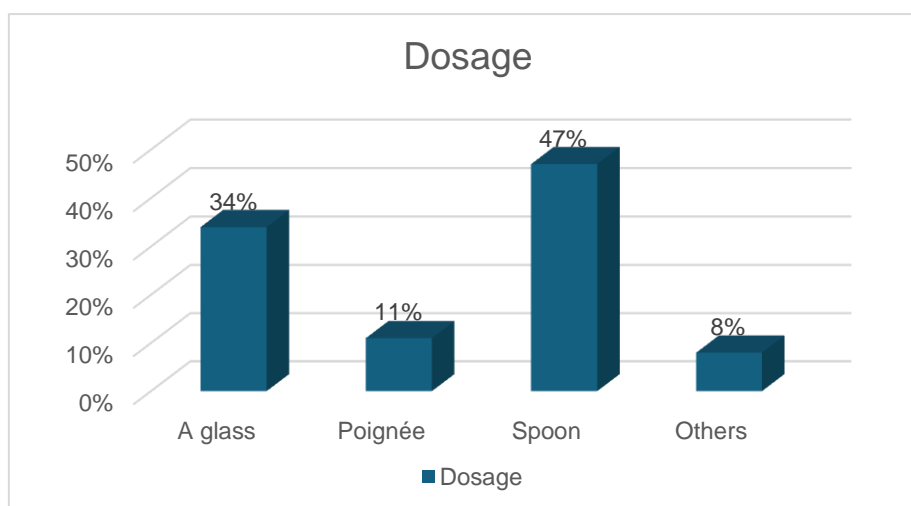


Figure 5. Dosage (Sehoul; 2023).

We note that for the dosage, the use of a water glass and/or a teaspoon are widely used with 34% and 47% respectively (Figure 5).

The species *Pistacia atlantica* is a medicinal plant par excellence. The leaves, resin, bark, and seeds are the parts most used in traditional pharmacopoeia (Salhi *et al.*, 2010). To enable the treatment, several methods of preparation are used, namely: decoction, poultice, infusion and maceration, etc.

This plant has been used as useful remedies for different diseases, for example, the seeds for their aphrodisiac activity and the treatment of liver, kidney, heart and respiratory disorders, the resin for the treatment of digestive, liver and kidney diseases and the gummy resin for their healing activity and the treatment of cerebrointestinal disorders (Labdelli *et al.*, 2021). These seeds are also used to extract oil used in the cosmetic industries (Acheheb, 2013).

• **Nutritional values**

The seeds of *Pistacia atlantica* are an important source of food, they have a considerable level of proteins and carbohydrates, in addition they provide an excellent edible oil of around 40% (Benhassaini, 1998).

The plant is a tree with multiple uses, it is known for its vast use in traditional medicine, cosmetics, food, industry and pharmacy. Despite its interest, little scientific work has been carried out on its use in the fight against pests and fungi. This prompted us to study the insecticidal and fungicidal activity of the chemical components of this plant through its methanolic and aqueous extract. In this context many works aims to determine and test the insecticidal and antifungal activity of *Pistacia atlantica* (Guessab and Benali khodja, 2022).

Conclusion

Nowadays, the use of medicinal plants in herbal medicine has received great interest in biomedical research but after consulting a specialist doctor. This renewed interest comes on the one hand from the fact that medicinal plants represent an inexhaustible source of bioactive and natural substances and compounds. on the other hand the need to research better medication through gentler therapy.

Thus, our ethnobotanical survey in the commune of the Wilaya of EL Bayadh aimed to identify the ethno-medical uses of this region. This study made it possible to reveal a multitude of results. All

respondents know *Pistacia atlantica* as a medicinal plant. Women and men have shared medicinal knowledge, with a slight difference favoring the former in terms of the use of medicinal plants.

The results show that this plant is involved in the treatment of the circulatory system with a rate of 72%, followed by disorders of the digestive system 18%, skin problems 5%, other diseases cited by the respondents total a rate by 5%.

Finally, this study allowed us to appreciate and learn about traditional medicine practices, transmitted by the population of the study area.

The wealth of know-how appears through the results obtained, but it is important, on the one hand to extend this type of investigation to other regions of the country in order to safeguard this cultural heritage and on the other hand to realize qualitative and quantitative investigations of active ingredients of this plant.

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