



Ethnopharmacological Survey on the Traditional Use of Azerole (*Crataegus azarolus* L.) in Tabarka and Ain Draham Regions (Northwestern Tunisia)

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Abstract

Phytotherapy is one of the oldest medicines in the world. Indeed, humans have tested and selected the best medicinal plants to treat themselves. In this regard, ancient civilisations have described several wild or cultivated plants as a remedy for several diseases. Nowadays, this ancestral medicine remains massively deployed, especially in developing countries. In the same context, an ethnopharmacological survey concerning the use of azerole (*Crataegus azarolus* L.) in alternative medicine was carried out in the regions of Tabarka and Ain Draham. In this respect, we aimed, in the present study, to realize a survey by identifying the interviewed persons as well as to describe the modes, routes, frequency of use to treat several pathologies. The survey also described the plant used parts, the forms of use, and picking stages. Our results showed that the population of Tabarka and Ain Draham frequently uses the different plant parts to treat several pathologies, such as cardiovascular diseases, digestive tract disorders, and diabetes. The mature fruits were consumed directly, while the aerial and root parts were used fresh or dried in decoction, maceration, and infusion. Finally, the majority of the individuals surveyed expressed their satisfaction for treatment with azerole. The method of administration, dosage, and frequency of use of which strongly depend on the pathology to be treated. In conclusion, the obtained findings constitute a precious source of information for the northwestern regions of Tunisia and the national medicinal flora.

Keywords: Phytotherapy; *Crataegus azarolus*; Ethnopharmacological Survey; Northwestern Tunisia

Introduction

Since ancient civilizations, medicine was based mainly on the use of wild plants for the treatment of various diseases. Indeed, man has deployed these plants for their virtues discovered through the experiences passed on over generations [1,2].

In the Western world, the Greeks were the first founders of this concept, with Hippocrates (460-377 Jesus Christ), who detailed clinical observations with more than 380 medicinal plants [3].

With technological development, several active molecules have been identified and isolated from plants, some of which are derived from secondary metabolisms. These active compounds represent a subject of a pronounced chemical industry and used in several fields [4].

However, despite the progress and global expansion of the pharmaceutical industry, the populations, especially in developing

countries, have relied on ancestral medicine for their treatment. These practices can be attributed to the low cost and accessibility of plants, as well as satisfactory results after treatment [5].

The rosacea (*Crataegus azarolus*) is a tree belong to the Rosaceae family, that is very resistant to cold, drought, rain, and strong winds [6]. It usually grows in warm, sunny climates. It prefers heavy dry and clay soils and tolerates alkaline, even limestone soils [7,8].

The geographical distribution of azerole extends from southern Europe to North America, Asia Minor, the Middle East to China and North Africa [9,10]. *Crataegus azarolus* grows in forests, bushes, and mountains up to 2000 meters [11]. The use of the genus *Crataegus* in medicine dates back a long time.

Essentially, preparations based on leaves, fruits, roots, and flowers were applied in the form of extracts or tinctures. The plant bioactive components identified are mainly flavonoids, procyanidins and epicatechins.

In this context, we were interested in conducting an ethnopharmacological survey concerning the traditional use of azerole (*Crataegus azarolus*) describing the employment methods of the plant in ancestral medicine by the populations of Tabarka and Ain Draham.

Material and Methods

Study area

The research location (Tabarka and Ain Draham) was situated in northwest Tunisia. The selection of this area was explained by the bioavailability of the species proof of study and its identification as a medicinal plant.

Questionnaire formulation

In order to accomplish the survey, we have prepared an inquiry model that essentially includes two types of questions. The first part of the questionnaire aims to determine the individual civility, such as his name, his age, and his level of education.... The purpose of the second section was to describe the use of this plant in traditional medicine (parts used, frequency of intake, pathologies treated, ...). All the answers requested by the interlocutor were marked, even if they had additional information about the benefits of the plant, they would also be mentioned [12].

Methodology

Firstly, we have prepared 100 copies of the survey model and focused primarily on the urban population, farmers, practitioners, herbalists, and foresters in order to promise the credibility of the obtained information. The communication started with, introducing ourselves through a professional badge with a simple presentation of the importance of their information, of ancestral medicine, and of the thematic of our research. The survey was conducted at their workplaces and even in their homes. Each individual was interviewed separately, and the questions were made as simple as possible to make them understandable and to have the right answers. All the responses were noted during the discussion, and the person being questioned took the time to answer. Generally, even if the person gave us unnecessary information, we have to listen to him passionately and repeat the questions if necessary.

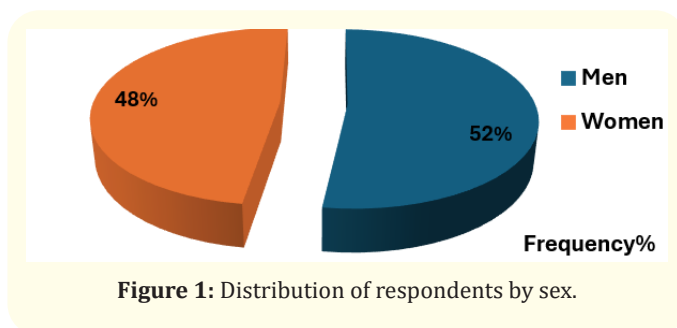
Processing of results

After the survey accomplishment, the variables were processed in Excel. Qualitative data are described using response frequencies, while quantitative variables are described by using frequencies.

Results

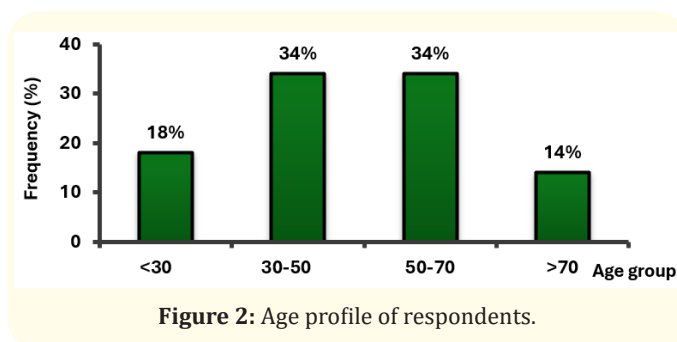
Distribution of respondents by sex

Respondents have almost equal proportions by sex, with a slightly higher rate for the male class (52%) (Figure 1).



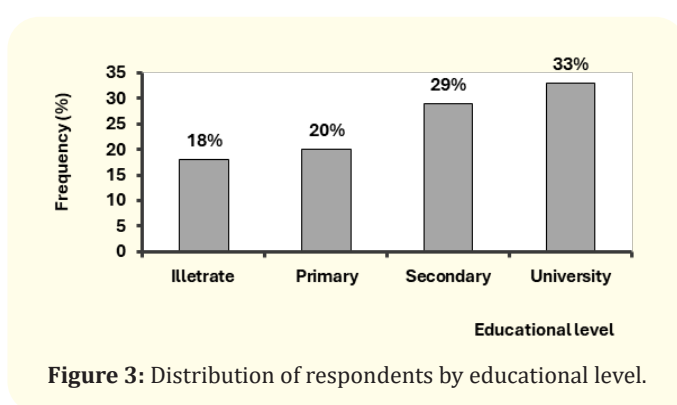
Age groups of the surveyed population

Respondents identify age ranges between 18 and 87 years old. Most are between 30 and 70 years (68%) (Figure 2).

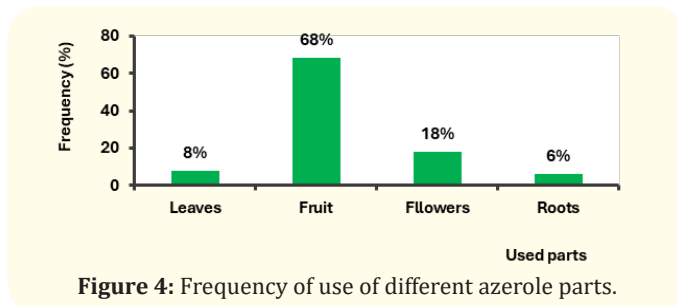


Level of education

The majority of respondents have primary and secondary secularity (49%), followed by the university level (33%), and only 18% of those surveyed were illiterate (Figure 3).

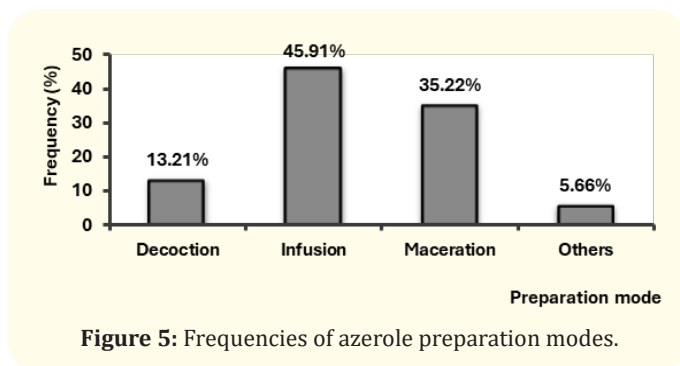


The established survey showed that the fruit was the most used part (68%), followed by flowers (18%). The population also used leaves and roots with proportions that oscillate around 24% (Figure 4).



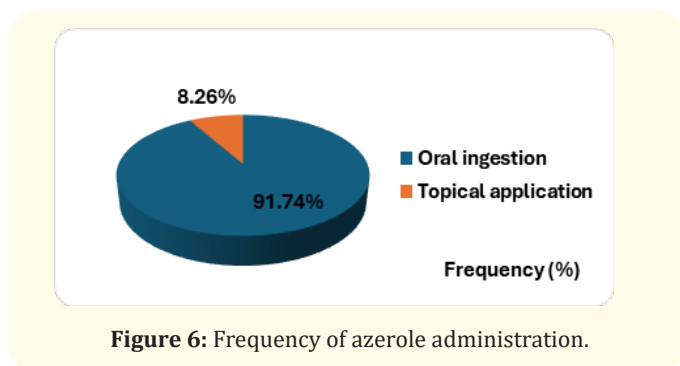
Techniques of preparation

According to the interviewed population, the different parts of the tree can be prepared in five methods: direct ingestion for fruit, maceration, decoction, and infusion for other aerial and root parts. After drying, the leaves were employed on dermal uses as wound dressings (Figure 5).



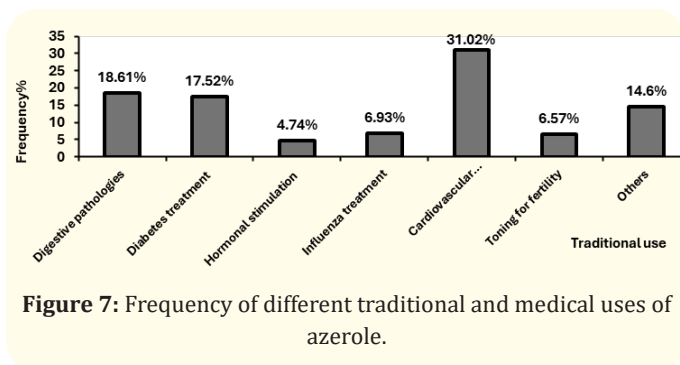
Administration modes

According to Figure 6, the oral route represents the commonly used mode of administration, with a rate estimated at 91.74%. The fruits were consumed directly. The leaves, flowers, and roots were prepared by decoctions, macerations, and infusions. These herbal teas were used to treat various chronic metabolic disorders and essentially circulatory system diseases, diabetes, and digestive tract pathologies. On the other hand, the dry powder of *Crataegus azarolus* can also be used dermally, but with very low proportions (8.26%). This external use used was recommended to heal wounds and ensure oral cavity hygiene.



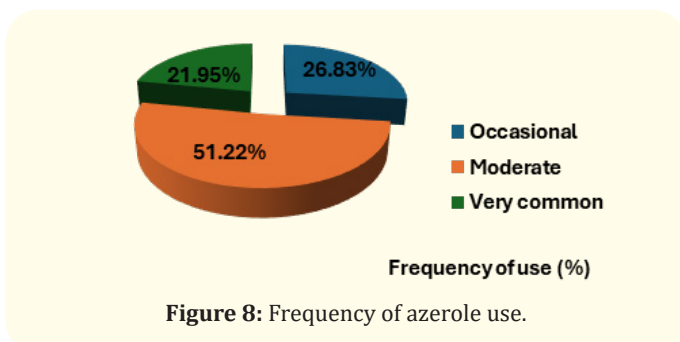
Traditional and Medicinal use of azerole

The present study revealed that the interviewed population used *Crataegus azarolus* to treat several pathologies, such as those of the cardiovascular system (31.02%), gastrointestinal disorders (18.61%), and diabetes (17.52%). The survey shows that this plant also acts on influenza and sore throats, strengthens fertility, and stimulates endocrine functions with rates of 6.93%, 6.57%, and 4.74%, respectively. As well, other pharmacological properties were reported, but in minor proportions. The plant represents a general fortifier of the body and a potent anti-inflammatory for the lungs. Fruit consumption also maintains good oral hygiene (Figure 7).



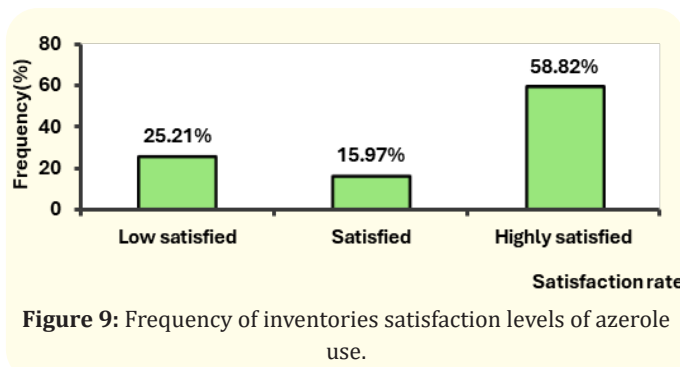
Frequency of use

The frequency of application revealed that 51.22% of respondents used azerole in a moderate manner. (Figure 8).



Assessment of satisfaction degree

The classification of satisfaction degrees showed that, 74.79% of the investigated population were between very satisfactory and satisfying (Figure 9).



Reasons for phytotherapy

According to the survey results, the plant was used for its effectiveness and preference over modern medicine (61.39%). On the other hand, 20.25% of the population preferred using the plant considering its low cost and abundance (Figure 10).

Discussion

Phytotherapy refers to therapeutic treatment based on the use of plant extracts and their bioactive molecules, in order to cure, relieve, or prevent a disease. In this context, researchers have developed and studied the virtues of each plant.

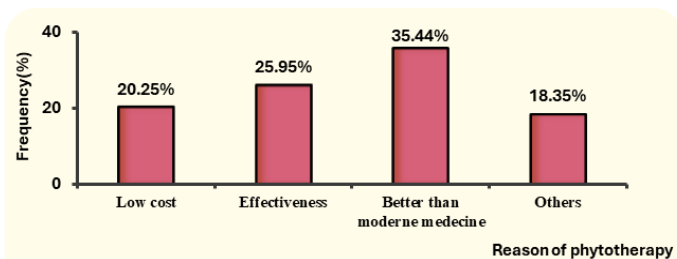


Figure 10: Frequency of phytotherapy reasons.

The ethno-pharmacological survey conducted in the Tabarka-Ain Draham regions enabled to interviewed 100 individuals. The majority of the inventories belong to the age group of 30-70 years. The inquiry responses revealed that azerole (*C. azarolus*) is widely used in traditional medicine to treat a wide range of diseases, including those of the cardiovascular and gastrointestinal systems. Additionally, the findings also showed that *Crataegus azarolus* is used in the treatment of diabetes and urinary pathologies system, which corroborate with those in the literature [13-15].

As mentioned by the interviewed population, 68% of the uses involved fruit, The oral route was the most common mode of administration (91.74%), and the frequency of intake was moderate. In the same respect, Koyuncu., *et al.* [8] have demonstrated that azerole fruit can usually be consumed without a prescription from herbalists. According to Foster and Duke [16] and Chang., *et al.* [17], the flowers of *C. azarolus* provide stability and cardiac function, regulate high blood pressure and blood circulation. It has also been shown to have calming and sedative effects [18]. On the other hand, Zapatero [19] demonstrated that the plant extracts were used to treat respiratory disorders and, the fruits showed a hypolipidemic effect [20, 21]. The active compounds identified are catechic and epicatechic condensed tannins, as well as flavonoids [13]. These secondary metabolites were characterized by a strong antioxidant potential [21], which plays an essential role in the prevention and treatment of several other diseases, such as cancer [22] and ageing [23].

Conclusion

Finally, this investigation represents a database on the medicinal virtues and use of the azerole as well as its therapeutic potentials. These results can be considered as a support for the valorization of the Tunisian national flora and for future phytochemical characterization and biological research.

Acknowledgement

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Research Ethics Committee Approval

The publication of the research paper in any open access journal has been authorised:

Conflicts of Interest

The authors declare that they have no conflict of interest.

Bibliography

1. Erman and Hermann R. "La civilisation égyptienne". *Grande bibliothèque Payot (Paris)* (1994): 749.
2. Gurib-Fakim A. "Medicinal plants: traditions of yesterday and drugs of tomorrow". *Molecular Aspects of Medicine* 27.1 (2006): 1-93.
3. Nutton V. "La médecine antique". *Les Belles Lettres* (2016).
4. Maffei ME. "Plant natural sources of the endocannabinoid (E)- β -caryophyllene: A systematic quantitative analysis of published literature". *International Journal of Molecular Sciences* 21.18 (2020): 6540.
5. HF HK., *et al.* "Effet cytoprotecteur de l'extrait aqueux des racines de *Dorsteniapsilurus* sur l'ulcère gastrique chez les rats males de la souche wistar". *Health Sciences and Disease* 12.4 (2011).
6. Alain Y M. "Les pratiques du jardinage, Les Arbustes". *Larousse (Paris)* (1988): 128.
7. Mioulane P. "Encyclopédie universelle des 15000 plantes et fleurs de Jardin". *Larousse* (2004).
8. Koyuncu T., *et al.* "Convective drying characteristics of azerole red (*Crataegus monogyna* Jacq.) and yellow (*Crataegus aronia* Bosc.) fruits". *Journal of Food Engineering* 78.4 (2007): 1471-1475.
9. Quézel P and Santa S. "Nouvelle flore de l'Algérie et des régions désertiques méridionales". (1992): 460.
10. Christensen KI. "Revision of *Crataegus* sect. *Crataegus* and *Nothosect. Crataeguineae* (Rosaceae-Maloideae) in the old world". *Systematic Botany Monographs* 22 (1992): 1-99.
11. Beloued A. "Plantes Médicinales d'Algérie; Offices Des Publications Universitaires: Algeria" (2005).
12. Jedidi S., *et al.* "Ethnobotanical survey on the traditional use of officinal sage (*Salvia officinalis* L.) in Tabarka and Ain Draham (Northwestern of Tunisia)". *Journal of New Sciences* 18 (2018): 3402-3412.
13. Rose JO and Treadway SC. "Herbal support for a healthy cardiovascular system". *Clinical Nutrition* 6 (1999): 1-6.

14. Fernandez M. "De quelques plantes dites médicinales et de leur fonction". Paris 63 (2003).
15. Ljubuncic P, et al. "Antioxidant activity and cytotoxicity of eight plants used in traditional Arab medicine in Israel". *Journal of Ethnopharmacology* 99.1 (2005): 43-47.
16. Foster S and Duke JA. "A field guide to medicinal plants: eastern and central North America". The Peterson field guide series (USA) 40 (1990).
17. Chang WT, et al. "Hawthorn: potential roles in cardiovascular disease". *The American Journal of Chinese Medicine* 33.01 (2005): 1-10.
18. Sezik E, et al. "Traditional medicine in Turkey X. Folk medicine in central Anatolia". *Journal of Ethnopharmacology* 75.2-3 (2001): 95-115.
19. Zapatero JM. "Selections from current literature: effects of hawthorn on the cardiovascular system". *Family Practice* 16.5 (1999): 534-538.
20. Zhang Z, et al. "Hypocholesterolemic activity of hawthorn fruit is mediated by regulation of cholesterol-7 α -hydroxylase and acyl CoA: cholesterol acyltransferase". *Food Research International* 35.9 (2002): 885-891.
21. Jemaa HB, et al. "Effets antihypercholestérolémiantes et antioxydant de l'extrait de *Crataegus azarolus* chez des rats ayant reçu un régime gras". *Nutrition Clinique et Métabolisme* 30.3 (2016): 283.
22. Sharif T. "Étude des effets anticancéreux de polyphénols d'origine naturelle : rôle essentiel des espèces réactives de l'oxygène et des gènes suppresseurs de tumeurs". Diss. Strasbourg, (2012).
23. D'Antuono I, et al. "Artichoke polyphenols produce skin anti-age effects by improving endothelial cell integrity and functionality". *Molecules* 23.11 (2018): 2729.