

Ethnobotanical study of medicinal and aromatic plants used in the city of Ain Temouchent in Algeria

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ABSTRACT

Ethnobotanical study was made in order to gather general informations about the therapeutic uses practiced in the region of Ain Temouchent. Using a questionnaire, the series of ethnobotanical surveys accomplished allowed us to identify 77 species belonging to 44 different plant families. The family of Lamiaceae is the most dominant. The analysis of the results, concerning the relations existing between the medicinal species and types of diseases treated, has shown that most of these species are used primarily in the care of the digestive and respiratory system. These devices are handled mainly by the foliage which is the plant organ most used and the infusion which is the method of preparation the most dominant. This work is a source of information that can serve as a basis for pharmacological studies to evaluate the therapeutic efficacy and safety of medicinal plants.

Keywords : Medicinal plants, Ain Temouchent, Ethnobotanical study, Traditional medicine, Survey

I. INTRODUCTION

Medicinal plants constitute a precious heritage for the humanity, they are natural chemical factories, producing biochemical active substances as alkaloids, essential oil, flavonoids, tannins, and give them to man who can make use of it for his health and satisfy his vital needs [1]. In spite of the pharmacology progress the therapeutic use of medicinal plants is very present in certain countries of the world and especially developing countries [2]. they establish a precious resources for the great majority of the rural populations in Africa, where more than 80% of this population use them to assure health care [3], more and more people resort to the traditional medicine in the treatment of the disease because on one hand, the cost of conventional medicine is relatively high and on the other hand medicine can have a limited effect. At present, this medication, by plants, knows a notable

renewed interest and it is thanks to the scientific studies based on the analytical methods and the new experiments, that the medical world discovers more and more the legitimacy of the empirical prescriptions of medicinal plants [4]. Among the scientific disciplines which are interested in the traditional herbal medicine, the ethnobotanics. The traditional medicine establishes certainly a complete part of the Algerian culture population. In Algeria, we resorted for a long time to the traditional medicine thanks to the wealth and the diversity of its flora, which establishes a real phylogenetic reservoir, with approximately 3000 species belonging to several botanical families [5], and more particularly the region of Ain Temouchent. The use of plants in herbal medicine is still very present in this region. The valuation of these plants can help the inhabitants look after themselves but it is very important also to

inventory the medicinal plants and to determine the species keys of the medicinal flora in this region.

II. METHODS AND MATERIAL

An ethnobotanical investigation was realized in the city of Ain Temouchent, during a period of two months (in July and August, 2018) with 500 informants at random of different ages, gender and intellectual levels. Who informed us about the therapeutic and traditional local applications of the population of Ain Temouchent with the help of questionnaires beforehand established, containing information concerning the informant profiles (age, gender, level of study ...), informations on the nature and pharmaceutical techniques of the medicinal plant used (local name, part used, method of preparation, dose), informations on their use in the treatment of different kind of diseases.

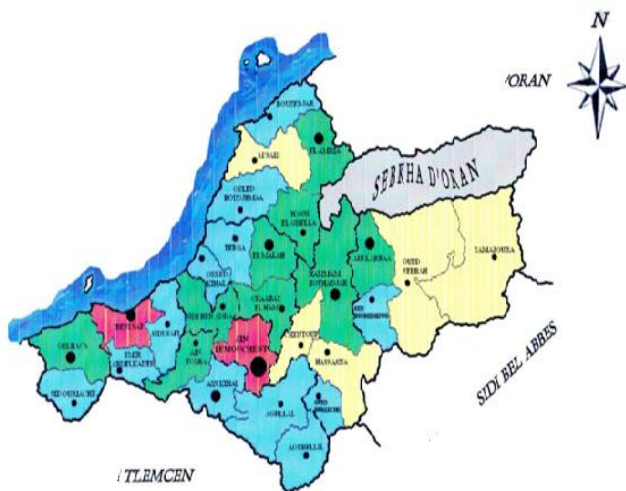


Figure 1 Study zone.

III. RESULTS AND DISCUSSION

1. Frequency of plants use by the population

Among 500 people asked, 68% turned to the traditional medicine and 18% to the modern medicine and 14% to the both. The use of healing plants was very widespread with a percentage of 68%, it indicates that the

studied population strongly turned to the herbal medicine (figure 2A). That result is in accordance with that of the OMS which announces that 80% of the African population depends on the traditional medicine [9].

2. Plants Frequency used by the population studied according to the parameters of survey

According to the age survey the highest percentage was observed in people aged between [20-40years old] with a 57 % rate come then the age bracket of [40-60years old] with a 31% rate and the people of lower age then 20 years old and superior then 60 years old represent respectively the following percentages of 2% and 10% (figure 2B). That notable difference returns to the fact that the oldest people have an advantage of knowledge in healing plants that the other ages, The experience accumulated with the age establishes the main traditional information source of the plants use in medicine this result confirms other results of realized works on a national scale [5] . As regards the gender, women have most appeal to plants with a 86% percentage, this can be explained by the use of healing plants by women in other domains and by their responsibilities as mothers because they give the first care to their children and families while 32% men turn to plants (figure 2C) this result follows those obtained in Morocco and in Algeria [5] [7]. For the family situation the highest percentage was observed with married people with a 84% rate followed by the singles with a 16% rate (figure 2F), this can be explained by the fact that they are responsible as parents to give the first care in particular for their children and to know all the plants which can relieve the pains of themselves or their relative in necessity cases.

The survey results showed that people who use healing plants with university level represent 53% followed by those with a secondary level of a 17% percentage then an average level with 6% and illiterate with 8% (figure 2D), the academic level influences significantly the use of the healing plants, because we noticed that the use of these plants by the informants who had university

studies is higher than that of the lower levels, which is distinct to the study results realized in the region of Sidi Bel Abbes [5]. The questioned people use miscellaneous parts of the used plants but the results show that leaves are the most used with a 29% percentage followed by seeds, flowers 14%, fruits, roots and the aerial parts 7%, the bark 2%, gums and bulbs 1% and the whole plant 6%. Leaves are the parts the most used by the informants (figure 2E). The raised percentage of leaves used can be explained by the ease and the speed of the harvest [8], also by the fact that it is the seat of the photosynthesis and sometimes the storage of the secondary metabolites responsible of the plant biological properties [9]. As regards the preparation mode several modes are used by the population of Ain Temouchent, the most one used is infusion with a 73% rate followed by decoction 17%, cataplasms 3%, raw 6% and fumigation with a 1% rate (figure 3G) it was confirmed by previous studies [7] [6] [5], this percentage shows that the local population believe in decoction and infusion mode and find it adequate to warm the body and disinfect the plant [4]. On the other hand, the both modes allow to collect most active ingredients and limit or cancel the toxic effect of certain receipts [7]. Among the informants 79% use spoons of medicinal plant and 19% use a handle and only 2% uses a pinch (figure 3H). Concerning the treatment duration 54% of the questioned population use healing plants for a day only and 24% use them for a week while 3% use them for a month while 19% use herbs until the cure (figure 3I). About ownership mode of the information about healing plants 46% of the informants refer to others (family, friends, social networks, TV, internet.), 35% referent to themselves, 19% learnt it by an herbalist (figure 3J).

Concerning the treatment efficiency 43% of the informants think that plants allow a cure, 56% see that it helps to improve the health on the other hand 1% think that the plants are ineffective (figure 3K). About the posology adults use plants once a day with a 78% percentage, twice a day with a 12% percentage and three times a day with a percentage of 10%. As for the

elderly 13% use plants once a day, 75% use them twice a day and 12% use plants three times a day. And for children 22% of the people use medicinal herbs once a day while 56% of the informants use them twice a day while 22% of people use them three times a day for children.

In our ethnobotanical study, the digestive affections are the most treated diseases with medicinal plants with a percentage of 42% and respiratory affections with 21% follow-up of cardio-vasculaire diseases 10%, gland affections with 2%, genito-urinary affections 8%, the neurological and metabolic diseases with a 4% percentage and lastly the ostéo-articular and dermatological affections and diseases affecting the digestive tube annex's with a 3% percentage (figure 4).

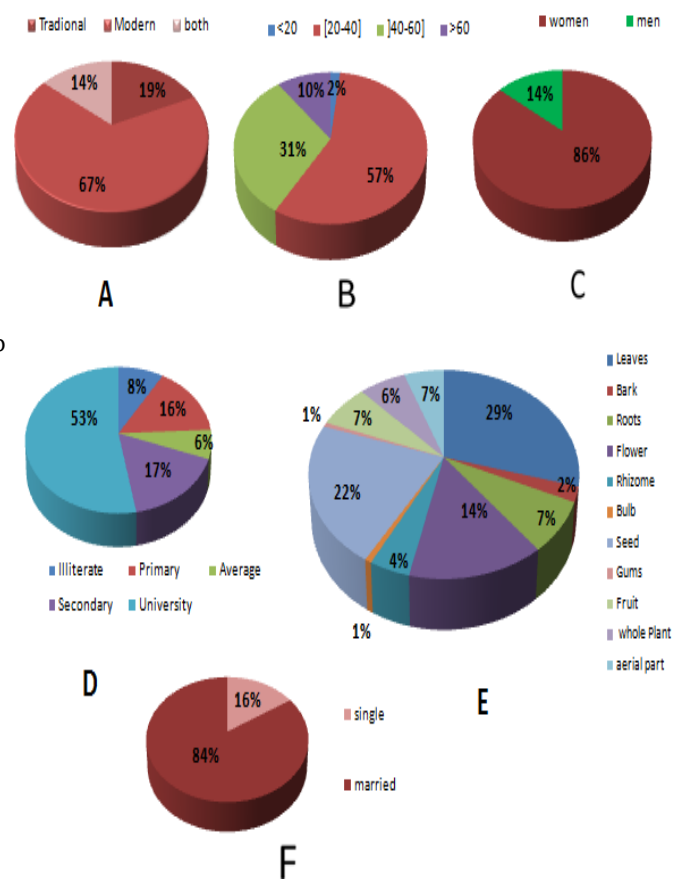


Figure 2: Informant profile results (A: users of traditional medicine and modern medicine, B: age, C: gender, D: education level, E: plant part used, F: family situation).

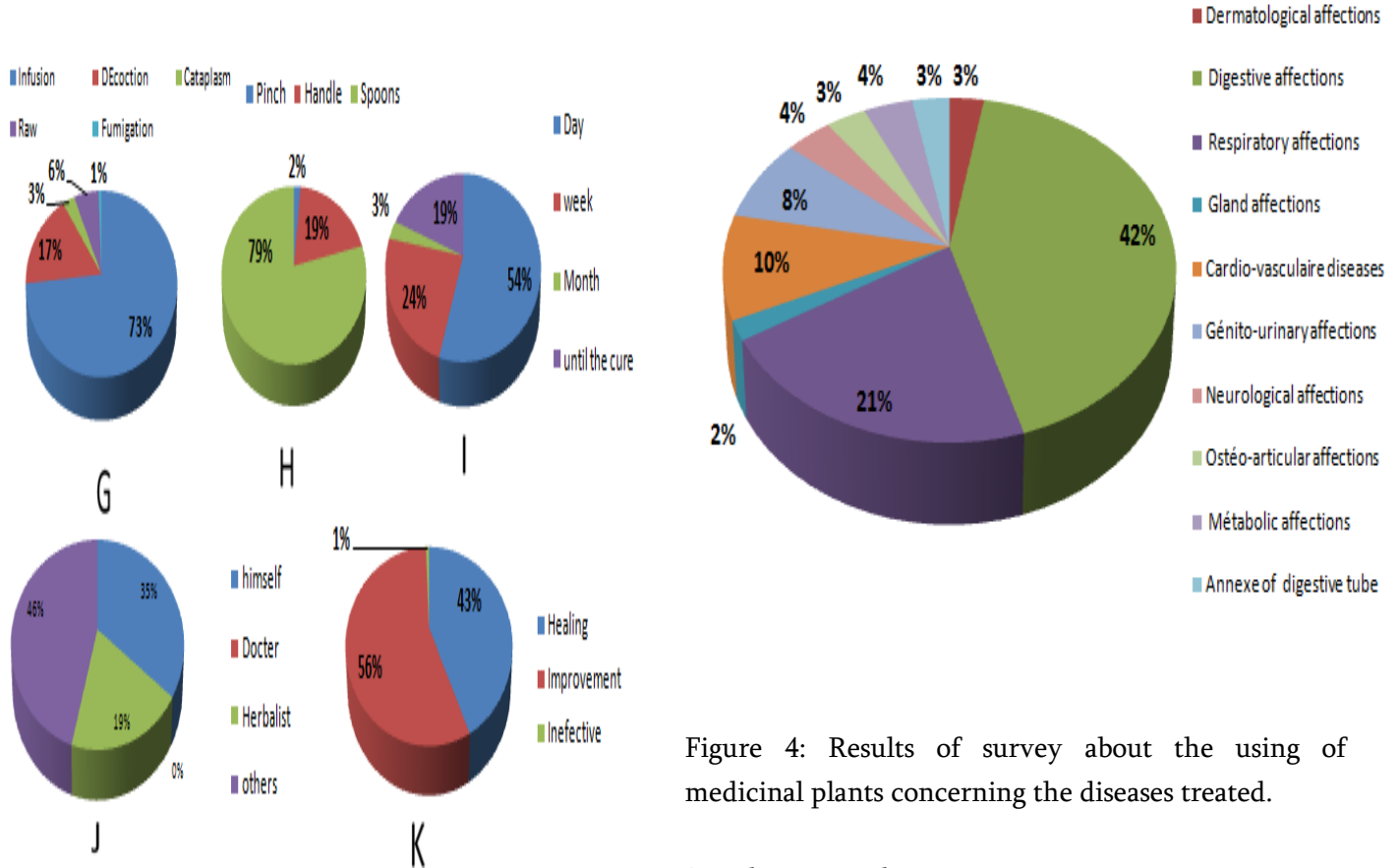


Figure 3: Results of the medicinal plants using (G: preparation method, H: the dose used, I: the using duration, J: information possession, K: effectiveness).

Figure 4: Results of survey about the using of medicinal plants concerning the diseases treated.

3. Floristic analysis

On the basis of 500 questionnaires carried out in the Cercle of Ain Temouchent, an ethnofloristic catalog was drawn up. The medicinal plants which are usually used by the population of Ain Temouchent were identified and listed in Table 01. This data was used to carry out floristic study.

Table 1 Main medicinal plants used by the population of Ain Temouchent (Algeria)

Family	Scientific name	Common name	Percentage (%)
Amaranthacées	<i>Haloxylon ammodendron</i>	Haloxylon	0.70%
Anacardiacees	<i>Pistacia lentiscus</i>	Lentisque	0.93%
Apiacées	<i>Pimpinella anisum</i>	Anis vert	3.27%
	<i>Foeniculum vulgare</i>	Fenouil	3.03%
	<i>Cuminum cyminum</i>	Cumin	1.16%

	<i>Ammi visnaga</i>	Faux ammi	1.86%
	<i>Ammodaucus leucotrichus</i>	Ammodaucus	0.46%
	<i>Anethum graveolens</i>	Aneth	0.46%
	<i>Bunium bulbocastanum</i>	Châtaigne de terre	1.86%
	<i>Apium graveolens</i>	Céleri	0.46%
	<i>Coriandrum sativum</i>	Coriandre	0.46%
	<i>Petroselinum crispum</i>	Persil	0.46%
Aristolochiacées	<i>Aristolochia baetica</i>	Aristolochie	1.16%
Astéracées	<i>Artemisia vulgaris</i>	Armoise	2.57%
	<i>Chamaemelum nobile</i>	Camomille	2.10%
	<i>Saussurea costus</i>	Saussurea costus	0.46%
Berbéridacées	<i>Berberis vulgaris</i>	Epine vinette	0.93%

Brassicacées	<i>Lipidium satvum</i>	Cresson alénois	1.40%
	<i>Cardamine pratensis</i>	Cardamine	0.46%
	<i>Eruca sativa</i>	Roquette	0.46%
Boraginacées	<i>Borago officinalis</i>	Bourrache	0.93%
Burséracées	<i>Commefora molmol</i>	Amer ou myrrhe	0.46%
Cactacées	<i>Cactaceae</i>	Cactus	0.46%
Capparacées	<i>Capparis spinosa</i>	Câprier	0.46%
Caryophyllacées	<i>Arenaria serpyllifolia</i>	Sabline	0.93%
Chenopodiacées	<i>Atriplex halimus</i>	Pourpier de mer	1.86%
Costacées	<i>Costus</i>	Costus	0.46%
Cupressacées	<i>Jumperus communis</i>	Genévrier	3.73%
	<i>Thuja</i>	Thuya	0.23%
Cyperacées	<i>Cyperus</i>	Cyperus	0.93%

Droséracée	<i>Drosera rotundifolia</i>	Rosée du soleil	0.46%
Fabacées	<i>Cassia senna</i>	Séné	1.40%
	<i>Glycyrrhiza glabra</i>	Réglisse	2.57%
	<i>Trigonella foenum</i>	Fenugrec	3.27%
	<i>Lupinus</i>	Lupin	0.93%
Illiciacées	<i>Illicium verum</i>	Badiane chinoise	0.70%
Labiacées	<i>Ocimum basilicum</i>	Basilic	1.40%
Lamiacées	<i>Lavandula officinalis</i>	Lavande	4.20%
	<i>Mentha pulegium</i>	Menthe pouliot	3.27%
	<i>Salvia officinalis</i>	Sauge	2.33%
	<i>Rosmarinus officinalis</i>	Romarin	2.57%
	<i>Mentha spicata</i>	Menthe	1.86%
	<i>Origanum majorana</i>	Marjolaine	1.40%
	<i>Thymus vulgaris</i>	Thym	4.90%
	<i>Marrubium vulgare</i>	Marrube blanc	0.46%
	<i>Nepeta cataria</i>	Cataire	1.40%
	<i>Calamintha nepta</i>	Calament	0.93%
	<i>Lavandula stoeckas</i>	Lavande sauvage	0.46%
Lauracées	<i>Laurus mobilis</i>	Laurier	0.70%
	<i>Cinnamomum verum</i>	Cannelle	1.40%
Liliacées	<i>Allium sativum</i>	Ail	0.46%
Linacées	<i>Linum usitatissimum</i>	Graine de lin	2.57%
Lythracées	<i>Punica granatum</i>	Grenadier	1.86%
	<i>Lawsonia inermis</i>	Henné	0.46%
Malvacées	<i>Hibiscus sabdariffa</i>	Karkadé	1.63%
Mimosacées	<i>Acacia senegal</i>	Gomme arabique	0.23%
Myrtacées	<i>Myrtus communis</i>	Myrte	0.93%
	<i>Eugenia caryophyllata</i>	Clou de girofle	2.57%
	<i>Eucalyptus globulus</i>	Eucalyptus	0.46%
Oleacées	<i>Olea europaea</i>	Olive	0.46 %
Papavéracées	<i>Papaver rhoeas</i>	Coquelicot	0.46%

Pinacées	<i>Pinus sylvestris</i>	Pin sylvestre	0.46%
Pteridacées	<i>Adiantum capillus-veneris</i>	Capillaire de Montpellier	0.93%
Poacées	<i>Stipa tenacissima</i>	Alfa	0.46%
Ranunculacées	<i>Nigella sativa</i>	Nigelle	1.16%
Rhamnacées	<i>Rhamnus</i>	Nerprun	0.93%
	<i>Zizphus lotus</i>	Jujubier sauvage	0.46%
Rosacées	<i>Prunus persica</i>	Pécher	0.46%
Rubiacees	<i>Rubia peregrina</i>	Garance des teinturiers	0.93%
Rutacées	<i>Ruta graveolens</i>	Rue des jardins	1.16%
Urticacées	<i>Urtica dioica</i>	Grande ortie	0.46%
Verbénacées	<i>Verbena officinalis</i>	Verveine	0.70%
Viscacées	<i>Viscum album</i>	Gui	1.86%
Violacées	<i>Viola odorata</i>	Violette odorante	0.46%
Zingiberacées	<i>Curcuma longa</i>	Curcuma	1.16%
	<i>Zingiber officinalis</i>	Gingembre	2.80%
Zygophyllacées	<i>Peganum harmala L</i>	Harmel	1.40%

This ethnobotanic contribution brought us to deduct the following observations: the survey allowed us to count 77 species of plants belonging to 44 botanical families.

The most represented were: Apiacées (10species), Lamiacées (11species) and Asteraceae (03 species) and Fabacées (4species) (table 1), it can be explained by the fact that these families are the most spread in Algeria and that they are an important part of its flora [10]. Results from data processing have shown that the most commonly used species in the treatment of digestive tract diseases have been tabulated (table 2).

Table 2 Medicinal plants most commonly used in digestive affections care

Plant species	Frequency of use
<i>Juniperus communis</i>	16
<i>Mentha pulegium</i>	14
<i>Trigonella foenum</i>	14
<i>Pimpinella anisum</i>	14
<i>Foeniculum vulgare</i>	13
<i>Glycyrrhiza glabra</i>	11
<i>Rosmarinus officinalis</i>	11
<i>Salvia officinalis</i>	10
<i>Punica granatum</i>	08

Juniperus communis is the most medicinal plant used to treat the gastrointestinal problems, bays and startups, prepared in infusion have diuretic, stomachics it treat the intestinal gases also, juniper berries are preventively added during the preparation of the slightly heavy dishes to favor their digestion [11]. Also the seeds of *Foeniculum vulgare* very often used to treat the same affections, dried, prepared in herb tea is a very popular preparation to handle the gastrointestinal disorders, the diarrhea, the poisoning and the digestive system infections [12].

IV. CONCLUSION

Since Antiquity, the humanity used diverse plants found in its environment, to deal and look after any sorts of diseases. This day, plants play worldwide a major role in the art of cure. The medication by plants is an ancestral therapy. This Ethnobotanical study realized in the region of Ain Temouchent allowed us to highlight the important place of the herbal Traditional medicine. The present work had for objective to estimate the frequency of using medicinal plants by the population and to gather all the informations on their traditional practices, in the region of Ain Temouchent.

The survey results revealed a big diversity of plants (77 species identified belonging to 44 botanical families), very widely used by the studied population, the most frequently mentioned being *Lamiaceae*, *Apiaceae* and *Fabaceae*. The leaves are the most used part with a percentage of (29%). The Preparation mode the most common was infusion. Similarly, on all the diseases treated, digestive system diseases represent the most cited diseases (42%).

Finally, this work is an important source of information that contributes to knowledge of the medicinal flora.

The results obtained constitute an information base which serves for the valuation of medicinal plants in the field of pharmacology.

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