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## Plants used in traditional medicines by the human population of the Gharb plain (morocco)

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#### Abstract

Moroccan flora is one of the richest flora of North Africa. However, little information is available for certain Moroccan plants, especially Medicinal and Aromatic Plants (MAP). Thus, by this work, we contribute to the compilation of a data bank on plants used as medicinal plants on one of the great Atlantic plains of Morocco, Gharb. The means of study is a questionnaire distributed to 360 individuals which we considered as a representative sample of the socio-economic and cultural structure of the population studied. The results show that all the people surveyed know the therapeutic power of the MAP and one third of them use these plants to treat some diseases. These plants are more used by the elderly especially women. The loreats of vocational schools and high schools represent, farmers and traders use more MAP. About twenty species are used to treat digestive diseases, headaches and to a lesser extent microbial infections. The two thirds of the population prefer to use MAP than chemical drugs. However, one-tenth of the surveyed population had counter-effects after this use. Similarly, 80 per cent of the surveyed population uses a dozen species as herbal tea. A dozen species are used as cosmetic species, 75% of the population knows the cosmetic power of the MAP, and 70% of the latter prefer their direct use.

**Keywords:** Aromatic and medicinal plants, use, Gharb plain, Morocco

#### 1. Introduction

Man has always sought in his environment elements to remedy his diseases. The plants are the most exposed elements for this purpose. Indeed, by some observations on nature, on experimentation on animals or on himself, man has managed to select the plants that nourish, those who care for him, those that are toxic. So, the people who formerly called "Healers" are those who have accumulated some knowledge about the usefulness and medicinal role of certain natural substances and especially plants. Thus, based on the accumulated knowledge, Man began to foresee the medical use of plants and explanatory theories of the world and more particularly conceptions of the health of the disease were elaborated. So, a medicine based on analogy was born, that is interested in on the relations between these plants, the environment and the patient, and gradually this type of medicine began to develop and is transmitted from father to father, often through verbal means. To note it should be noted that this way of transmitting information verbally cannot be carried out without risk of losing a quantity of this information or of modifying it from where interest in the documentation of these types of information. A further objective of this documentation is the spread of these information to a more large geographic area, because knowledge of the characteristics of medicinal plants is often local.

Moreover, according to the World Health Organization, phytotherapy, considered such as traditional medicine, is still massively used in many countries. In Morocco, for example, traditional therapeutic practices, sometimes very old, are based on the use of plants according to empirically discovered virtues. As in all oral societies, knowledge of plants is generally transmitted from generation to generation through learning or initiation. Medicinal plants occupy so, an important place in traditional medicine and play a major role in the national economy. Fortunately, as has been recommended by the institutions and the international organizations on the interest of the knowledge of the biodiversity and the medicinal interest of the plant, many works on the phytotherapy and the inventories of the plants used were realized such as those of Salhi *et al.* [1], Benkhniqie *et al.* [2], Ouziki [3]. Also, it should be noted that Morocco, by its biogeographic position, offers a very wide ecological and floristic diversity. It is one of the Mediterranean countries having a long tradition of medicine and a traditional know-how to use medicinal plants [4].

## 2. Materials and Methods

### 2.1 Geographical area studied: the Gharb plain

Located in the north-west of the country, the Gharb region (Figure 1) covers an area of 8805 km<sup>2</sup>, or almost 1.23% of the area of Morocco. It is bounded to the north by the region of Tangier -Tétouan, to the west by the Atlantic Ocean, to the east by the two regions of Taza Al Hoceima-Taounate and Fès-Boulemane, and to the South by the regions of Meknès-Tafilalte and Rabat-Salé-Zemmour-Zaer. Its population is estimated at 1 859 540 inhabitants in 2004 (6.2% of the national population) and is distributed in the two provinces of the region (Kenitra and Sidi Kacem) to 62.8% for the first against 37.2% for the second [5].



Fig 1: Studied geographic area

### 2.2- Study methodology

The ethnobotanical study of medicinal plants in the Gharb Plain is carried out according to a sampling plan using a questionnaire to clearly identify the problem and to have an overview of the local uses of medicinal plants and on the floristic diversity of the pharmacopoeia of this city.

### 2.3 Sampling

The sample is developed using a probabilistic (random) sampling method, it was divided into groups or strata according to the heterogeneity of the characteristics of the population (distribution according to gender, age, family situation, Academic level, etc.). Sampling is therefore carried

out by proportional stratified random sampling. Thus, subsamples were formed for each distinguished group. The proportion of the number of persons in each subsample is the same (40 people).

#### 2.3.1 Study tool

The study tool is a questionnaire consisting of a series of structured questions that allow the methodological collection of information in the course of an inquiry either directly or through an investigator. The composition of the pre-established questionnaire is structured around four axes:

- The description of the sample (information about the profile of the informant: gender, age, family situation and academic level);
- Choice between types of medicines (traditional medicines, modern medicine, and mixed medicines);
- Information on plant material used to treat diseases;
- Information on the use of medicinal plants in the care of diseases.

#### 2.3.2 Processing the collected data

The data collected and quantified by the questionnaire used are very rich and very diverse. For plant material, the vernacular name is known in the majority of cases. For this, we have used the following documents for the determination of the scientific nomenclature:

- The pharmacopoeia of Bellkhdar [6],
- Moroccan medicinal and aromatic plants by Hmammouchi [7];
- Contribution to an ethnobotanical study of medicinal plants in the town of Kenitra of Salhi [8].

In addition, the computer processing of the data collected during our study was carried out using the SPSS software, the results obtained are represented by number or percentage and are illustrated in table and graph form.

## 3. Results and Discussion

The results are shown in Table 1.

Table 1: Qualitative and quantitative uses of aromatic and medicinal plants by the population of the Gharb Plain (Moroc)

years	< 20 years	[20-25] years	[25-30] years	[30-40] years	[40-50] years	50 years<		
	12,5	14	15,5	16	19	23		
Sex	Man			Men				
	38			62				
Cultural level	Illiterate	Koranic School	Primary study	Professionional School	High school	University studies		
	19	21,1	7	17	22	13,9		
Occupation	Officials in active employment	Retiredofficials	Farmers	Tradespeople	Students	Without occupation		
	18	11	23	20	15	13		
Do you know the therapeutic properties of medicinal plants?					Yes	No		
					100	0		
How many medicinal plants with therapeutic properties do you know?				0 à 5	6 à 10	11 à 15	16 à 20	Plus de 20
				11,5	45	19,5	12	12
Did you use herbal medicines to treat a condition?					Yes	No		
					69,33	30,67		
What are the most commonly used medicinal plants?	<i>Pistaciaatlantica</i> Desf. (Btem), <i>Pistacialentiscus</i> L. (Drou), <i>Ammodaucusleucotrichus</i> Coss. et Dur. (Kammûnsoufi), <i>Artemisia herba-alba</i> Asso (Chih el khrissi), <i>Ormenismixta</i> (L.) Dumort, <i>Opuntiaficus-indica</i> (L.) Mill. (Hendiya), <i>Herniariaglabra</i> L. (Hraslehjar), <i>Chenopodiumambrosioides</i> L. (Mkhinza), <i>Cistusmonspeliensis</i> L. (Tuzzalabéda), <i>Tetraclinisarticulata</i> (Vahl) Mast. (Ar'âr), <i>Euphorbia falcata</i> L. (Hayat ennufûs), <i>Trigonellafoenum-graecum</i> L. (Helba), <i>Juncusacutus</i> L. et <i>Juncusmaritimus</i> Lam. (Smar), <i>Lavandulastoechas</i> L. (Halhal), <i>Marrubiumvulgare</i> L. (Merrîwa), <i>Menthapulegium</i> L. (Fliyu), <i>Lawsoniainermis</i> L. (Henna), <i>Myrtuscommunis</i> L. (Rayhan), <i>Nigella sativa</i> L. (Sanûj), <i>Daphne gnidium</i> L. (Lezzâz).							
Specify the medicinal herbs most used and the type of condition being treated		Digestive diseases	Headache	Parasitic infections	Microbial infections			

		51		28		14		7	
In what form have you used medicinal plants?		HerbalTea	Dyeing		Ointment	Maceratedproducts		Otherproducts (specify)	
		50,3	monthly		monthly	17		5,4	
What is the frequency with which you use medicinal plants in the form of herbal tea, tincture, etc?		Daily	monthly	Monthly	When I amsick		Very rare	Ever	
		2	5	3,9	65		15	9,1	
Do you give up medicines for medicinal plants?							Yes	No	
							69	31	
What is the reason why you do not give up drugs?		I have confidence in chemically synthesized drugs		I do not trust the therapeutic properties of medicinal plants		I want to discover the therapeutic properties of medicinal plants			
		48		33		19			
If you knew that the use of medicinal plants for curative purposes had the same effect as the use of medicines, did you use them or not?						Yes	No		
						55	45		
Where do you get medicinal plants?		Directly from the nature	From naturalist pharmacies		From the market	From district Herbalist			
		33,5	5		49,5	12			
Do you have a producer of medicinal herbal products?			Yes	No	If yes, whichones ?				
			15	85	Essential oils		Essential essences		
			83		17				
Are you used to using herbal teas?		Yes	No	If yes, whichones ?					
		80	20	<i>Mentha pulegium</i> L. (Fliyu), <i>Mentha viridis</i> L. (Na'na'), <i>Aloysia citriodora</i> L. (Lwiza), <i>Ormenis mixta</i> (L.) Dumort. (Hellâla), <i>Thymus sp</i> (Zaatar), <i>Salvia officinalis</i> L. (Selmiya), <i>Tanacetum balsamita</i> L. (Balsam), feuilles d' <i>Olea europea</i> , feuilles de <i>Mespilusgermanica</i> L. (Neflier), fruit du citronier, <i>Citrus limon</i> (L.) (Citronier)					
For what purpose do you use herbal teas?		To treat a disease	For its taste	Such as a tonic	I consider it better than another liquid	Otherreasons (specify)			
		52	24	20	7	- As a hypoglycemic agent, - To lower blood pressure, - To remedy the diarrhea, - To remedy abdominal pain - To soothe the cough.			
How do you prefer herbal tea?					In bag	In vrac			
					30	70			
Have you ever had any discomfort after taking treatment with medicinal plants?						Yes	No		
						9,3	90,7		
What are the repercussions that you have had after using medicinal plants and what are the medicinal plants that have caused you these repercussions?		Vomiting	Itching of the skin	Abdominal pain	Vertigo	Headache			
		34,5	15,5	20	5	25			
What is the method of use of the medicinal plants you used?				Internal use		External use			
				48		52			
Do you use herbal cosmetics?						Yes	No		
						32	68		
Did you know of medicinal plants used to make cosmetic products?		Yes	No	If so, mention them					
		15	75	<i>Lawsonia inermis</i> L. (Henna), <i>Cucumis sativus</i> . L. (Concombre), <i>Citrus limon</i> (L.) Burm. f., 1768 (Citron), fruit de <i>Persea americana</i> Mill., 1768 (Avocat), Fruit de <i>Malus domestica</i> Borkh., 1803 (Pomme), huile d' <i>Oleaeur opaea</i> (olivier), Fruit de <i>Fragaria ananassa</i> (Duchesne ex Weston) (Fraise), huile d' <i>Argania spinosa</i> L. (Arganier), farine d' <i>Hordeum vulgare</i> L., farine et germe de <i>Triticum turgidum</i> L. <i>Triticumaestivum</i> L. (blé dure et blé tendre). Farine de <i>Cicer arietinum</i> L. (Pois chiche).					
Are you replacing cosmetic products based on chemical components with medicinal plant products that have the same effect?			Yes	No	If not specify				
			70	30	- I do not know the therapeutic virtues of the plant or plants used - I do not trust the method of preparation of the therapeutic recipe - Other				

The results show that the use of medicinal and aromatic plants in the elderly increases according to the age of the individuals, and that of those over the age of 50 years (23%) use these plants with 62% of these users are female. In a study of Hmamouchi *et al.* [7] the result was similar; the average age of MAP users was 54 years. 85% was female. 189 patients were illiterate (54%), 232 were married (66%) and 249 were unemployed (71%). 100 patients (28.6%) use Moroccan medicinal plants in rheumatological pathology. This percentage varies according to the region: 60% of patients in Oujda, 32% in Rabat, 29% in BeniMellal, 22% in Fez and 8% in Sefrou and Tetouan. Bammi and Daira [9] reported that in

the Zaers, 60-79% of individuals use medicinal plants, 70% of whom are over 50 and 67-70% of females. In addition, Ben Khnigue *et al.* [2] reported that the use of medicinal plants in the Mechraâ BelKsiri Circle, a town close to Kenitra, is widespread in all age groups, with predominance among people aged 30 to 45 (54, 91%). However, for the 18-30 age group, there is a rate of 25.45% and for the oldest only 19.64% use these plants, so for them, the use of medicinal plants is not a Great therapeutic interest. The same authors reported that in this town near Kenitra, women use much more medicinal plants than men: 87.76% of the women questioned use traditional medicine against 61.90% of the

male population. The use of medicinal plants by women in cosmetics and their responsibility as mothers could explain this difference.

Depending on the cultural level of the users, apart from the individuals at the "primary school" or "university" level, which have low utilization rates, the lorates of vocational schools and lycées represent have 40% of users. These findings are consistent with the findings of a study by Bammi and Douira <sup>[9]</sup> in the Zaer region, which found that the majority of patients who give phytotherapy are females of the illiterate (54%). However, according to the results of other studies, this percentage varies from region to region: 60% of Oujda patients, 32% of Rabat patients, 29% of BeniMellal patients, 22% of Fez patients and 8 % of patients in Sefrou and Tetouan. For the city of BelKsiri, according to Ben Khnigue *et al.*<sup>[2]</sup>, the vast majority of users of medicinal plants are illiterate, with a percentage of 60.27%, those with primary school education constitute 25.89%, while those having a secondary and those having university education (respectively 8.48% and 5.36%).

Depending on the occupation or occupation of the person, it is the farmers and traders who presented respectively 23% and 20%, even if the results showed that all the persons surveyed have singled out their knowledge of the therapeutic power of the MAP. In addition, 45% of these people have between 6 and 10 plants of therapeutic interest. 69.33% of users used these plants to treat conditions.

Primarily, the plants used for these conditions are: *Pistacia atlantica* Desf. (Btem), *Pistacia lentiscus* L. (Drou), *Ammodaucus leucotrichus* Coss. et Dur. (Kammûnsoufi), *Artemisia herba-alba* Asso (Chih el khrissi), *Ormenis mixta* (L.) Dumort. (Hellâla), *Opuntia ficus-indica* (L.) Mill. (Hendiya), *Herniaria glabra* L. (Hrraslehjar), *Chenopodium ambrosioides* L. (Mkhinza), *Cistus monspeliensis* L. (Tuzzalabéda), *Tetraclinis articulata* (Vahl) Mast. (Ar'âr), *Euphorbia falcata* L. (Hayat ennoufous), *Trigonella foenum-graecum* L. (Helba), *Juncus acutus* L. et *Juncus maritimus* Lam. (Smar), *Lavandula stoechas* L. (Halhal), *Marrubium vulgare* L. (Merrîwa), *Mentha pulegium* L. (Fliyu), *Lawsonia inermis* L. (Henna), *Myrtus communis* L. (Rayhan), *Nigella sativa* L. (Sanûj), *Daphne gnidium* L. (Lezzâz). 51% of these plants are used to treat digestive diseases, 28% to treat headaches, 14% to treat microbial infections.

The forms of use of MAP differ from one person to another. However, in 50% of the cases, these herbs were used as herbal teas and in 65% of the cases, these herbs are consumed only when the person is sick. Similarly, the use of herbal teas is only daily for 2% of cases, and is only weekly for 5% of the cases. It should be noted that in order to facilitate the administration of the active ingredient, several methods of preparation are used, namely decoction, infusion, fumigation, poultice. According to Ben Khnigue *et al.* <sup>[2]</sup>, decoction and the poultice are the two most usable methods of preparation with a rate of 26.80% and 25.25%.

Also, the results showed that 69% of people give up chemicals to MAP, 48% of the latter types of users it is because they have no confidence in chemical medicines. In addition, even if these people are confident that a synthetic drug has the same therapeutic effect as a PMA, they prefer the use of the latter. The reasons for this choice are therefore the confidence that patients given to the use of MAP in the treatment of their diseases. These results corroborate those performed by Hmamouchi *et al.* <sup>[10]</sup>. These authors reported that about two-thirds (66%) of patients felt that the adverse effects or interaction between conventional medicine and

herbal medicine were absent, and that is the main reason for their preference for medicinal plants. Pharmacological treatment was that they would be more effective against pain (62%).

Similarly, Ben Khnigue *et al.* <sup>[2]</sup> have reported that in Belksiri, 40% of people believe that medicinal plants can heal treated diseases. 52% believe that medicinal plants only allow an improvement of the state of health.

Similarly, the results showed that 49% of the plants used are obtained from the market and 33.5% come directly from nature. For those who purchase basic commodities from the MAP, only 15% of these individuals have their own producers and in 83% of these products are in the form of essential oils.

These results do not corroborate those of Ben Khnigue *et al.* <sup>[2]</sup> who worked in Belksiri and who reported that 12.7% of the population refer to herbalists and 23.77% of people refer to themselves either by consulting the books of traditional Arab medicine or by following Television programs or based on their own experiences through the existence of many medicinal plants in their surroundings

For people accustomed to herbal teas, 80% of the plants used are: *pulegium* L. (Fliyu), *Mentha viridis* L. (Na'na'), *Aloysia citriodora* L. (Lwiza), *Ormenis mixta* (L.) Dumort. (Hellâla), *Thymus sp* (Zaatar), *Salvia officinalis* L. (Selmiya), *Tanacetum balsamita* L. (Balsam), feuilles d'*Olea europea*, feuilles de *Mespilus germanica* L. (Neflier), fruit du citronier, *Citrus limon* (L.) (Citronier).

Moreover, the results of our study show that 52% of these teas are used to treat diseases, 22% to improve the taste of the drink, 20% for their tonic power and 4% of users consider that a tea is Rather than a liquid to drink on its own. Other therapeutic motifs are the basis of the use of herbal teas especially as hypoglycemic drinks, to lower high blood pressure, to soothe the cough.

It should also be noted that Moroccans often use MAP to treat certain diseases responded to in the country. Hmamouchi *et al.* <sup>[7]</sup> reported that in the study of people using MAP, of the 100 patients, 28.6% use Moroccan medicinal plants in rheumatological pathology. In addition, the prevalence of use found in the Lebanese study of 250 patients suffering from polyarthritis, rheumatoid or osteoarthritis, the frequency of use of complementary medicine not exceeding

Moreover, the results showed that 9.3% of those surveyed and using MAP had counter-effects after this use: Vomiting (34.5%), skin lesions (15%), abdominal pain (20%), dizziness (5%), headaches (25%). Traditional medicine therefore carries risks: toxicity of certain plants, interaction with pharmacological drugs <sup>[10]</sup>. In addition, as reported by Tahiri *et al.* <sup>[11]</sup>, the danger is that some sellers amplify the therapeutic indications of the plants, do not indicate precautions of use, do not know the side effects and the toxicity of the plants. Note that Ben Khnigue *et al.* <sup>[2]</sup> have reported that in BelKsiri 8% of the local population believe that medicinal plants cause side effects.

For the use of the MAP, 42% of those surveyed used it for internal treatment, compared with 52% for extensive use. In addition, 75% of these people know plants with which cosmetic products can be made, and 70% of these people prefer direct use of these plants in cosmetics instead of using them in synthetic form.

Moreover, the cosmetics sector is characterized by a very wide variety of products, relatively small quantities and often high prices. Plant essential oils are the most commonly used as the basis of its products <sup>[12, 13, 14]</sup>.

#### 4. Conclusion

All the persons surveyed expressed their knowledge of the therapeutic power of the MAP. 69.33% of users used these plants to treat some diseases. The use of medicinal and aromatic plants is becoming more and more important in the elderly, especially among women. The lorates of vocational schools and lycées represent 40% of users. Respectively, farmers and traders account for 23% and 20%. 51% of these plants are used to treat digestive diseases, 28% to treat headaches, 14 % to treat microbial infections. 42% of respondents use MAP for internal treatment. Around twenty species are used for these purposes. 69% of those surveyed give up chemical medicines for MAP, 48% of whom have no confidence in chemical medicines. However, the results showed that 9.3% of those using MAP had counter-effects after this use.

For people accustomed to herbal teas, in 80% of the cases use as plants a dozen species. In addition, 75% of these people know plants with which cosmetic products can be made, and 70% of them prefer direct use of these plants in cosmetics instead of using them in synthetic form.

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