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Research Article

ETHNOBOTANICAL STUDY OF MEDICINAL PLANTS USED IN TRADITIONAL MEDICINE IN THE PROVINCE OF SIDI KACEM, MOROCCO

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ABSTRACT

Objective: It's an ethnobotanical study to establish a floristic catalog of medicinal plants harvested from the province of Sidi Kacem (Morocco), which are used in traditional therapy for respiratory, digestive and skin infections

Methods: We carried out a field survey using a questionnaire sent to 200 people spread over four studied areas, previously determined by stratified sampling techniques. This survey includes a section on the informant's therapeutic practices, and another on the varieties of plants used by the population

Results: The analysis of the information found that 40% of the people surveyed practice herbal medicine. It enables us to establish a floristic catalog of 73 identified species. They belong to 39 families, the most dominant being Lamiaceae, Apiaceae and Asteraceae. The leaves are the most used part of the plant as a decoction

Conclusion: These results are new; they allowed us for the first time to create a database on the floristic characteristics and the traditional therapy of this region. They will be useful for valorizing and rationalizing them by extending studies on their chemical properties and biological activities.

Keywords: Province of Sidi Kacem (Morocco), Phytotherapy, Ethnobotanical survey, Infections, Catalogue of plants.

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INTRODUCTION

From dawn, humans had recourse to its environment and especially the plants to relieve his pain, cure his disease and hunt their prey. In time, he learned to identify the properties, virtues, and toxicity of several species. He inherited about information plant parts the most effective and their preparation methods. This traditional knowledge is passed from one generation to another.

Currently, despite the development of scientific research, which aims to study the properties of these medicinal plants, identifying their bioactive molecules and determining their biological and toxic activity, antimicrobial and antioxidant efficacy; traditional medicine persists universally and particularly in the developing countries among others Morocco.

The long medicinal tradition and interesting know-how of the Moroccan phytotherapy could be explained by its geographical location and the many civilizations that have followed over time. Similarly, the Mediterranean bioclimate and geographical and geological diversity allow for foster a great floristic richness, and even endemic. About 7000 species, subspecies, and varieties existing, 537 are endemic to the country, and 1625 are rare or endangered [1].

However, ethnobotanical studies that have been carried across Morocco show that the searches for medicinal plants nationwide remain regional and fragmentary [2]. Similarly, now, know-how is held by few people [3]. Under these conditions, this precious heritage of knowledge is threatened and the Moroccan floristic richness and virtues will not be valued, because, Moroccan medicinal flora is still little known until today, onto the few thousand of plant species, medicinal species recorded do not exceed 356 [4,5] and 600 species [6,7].

To participate in the identification, enrichment of the Moroccan flora and its valuation, our ethnobotanical study focused on the area of Sidi Kacem, which is rich in floral varieties and knowledge of traditional medication, but scientific studies are still not achievable. Our first objective is to inventory of the medicinal plants in the region, and especially those used against cutaneous, respiratory, and digestive infections. The second objective is to maintain this popular know-how, enhance and rationalize their use based on the traditional heritage of the local population and the recent and practical scientific studies.

METHODS

Geographic and socioeconomic framework of the study area

The study area, province of Sidi Kacem, is located at the extremity of the Gharb plain Chrarda Beni Hssen. It is located at 84 km east of the city of Kenitra, 82 km North-West of the city of Fez and 46 km north of the city of Meknes (Fig. 1).

The province of Sidi Kacem extends over a geographical area surface of 199,909 ha with 40 municipalities whose six urban (Dar Gueddari, HAD KOURT, Jorf el Melha, Mechraâ Bel Ksiri and Sidi Kacem) and 34 rural (Babtiouka, Birtaleb, Khnichet, Zaggota, Zirara). According to the census of the year 2005, the population of Sidi Kacem was about 74,062 inhabitants and people from central Zirara were approximately 6.707 inhabitants.

The climate of the province of Sidi Kacem is continental semi-arid of temperate winter with a relatively long dry period that usually lasts from May to September. Climatic parameters of the region can be summarized in the regional office of agricultural development (Office Régionale de la Mise en Valeur Agricole ORMVAG) [9].

Maximum temperatures vary from 16°C to 38°C, for minimum temperatures vary between 4°C and 20°C.

- Average annual rainfall is about 420 mm.
- Atlantic winds coming from the west and causing a decrease in the air temperature of a few degrees and an increase in the relative

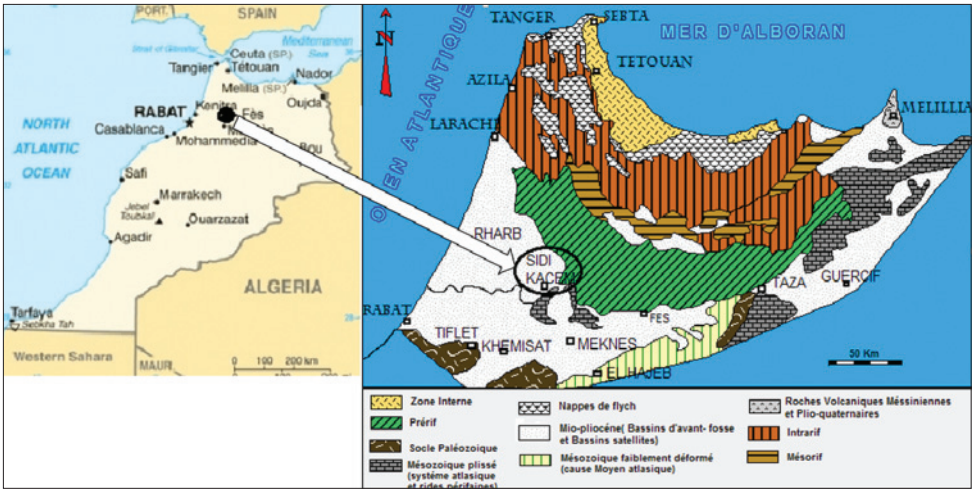

Fig. 1: Map of the geographical location of Sidi Kacem's province (Morocco) (Suter, 1980: Geological Map of the Rif 1/500000) [8]

humidity of 30-40%. The East winds or Chergui the most dominant are dry and hot thus leading to an increase in the air temperature and a decrease in the relative humidity of 10%.

The soil composition of the province of Sidi Kacem is of two types: The first one governs the developed raw mineral soils known by the name Dehs. They are well drained and have a generally satisfactory fertility. The second type is presented in the vertisols little evolved called the Tirs, they cover most of the area of the province (over 92%), as they have a difficult to work them.

The hydrographic network of the study area is important; it includes surface waters, which consist of five Oueds: R'dom Oued, Ourgha Oued, Rdat Oued, and Sebou Oued. Groundwater presented in two layers, one in the South East to a depth of 350 m, formed from clay sediments and sandy clay. The other is shallow with a level of mediocre quality, consisting of silty and sandy clays.

Given its geographical position, its economic activity, the province of Sidi Kacem is dominated by agriculture, and according to the general of population and housing census (Recensement Général de la Population et de l'Habitat, RGPH) [10], it presents 58.6% of the total. The main agricultural products of the region are grain, and vegetable gardening with their large share (tomatoes, potatoes, artichoke, melon, watermelon, pepper, and eggplant). The industrial sector has an average of 8.3% activity with a variety of stakeholders.

- Food industry is in first class order; it cites flour mills, sugar mills, oil mills, industrial Maâsras, and operating dairy cooperatives (One large modern unit production capacity of 200,000 L/day).
- Petroleum industry is represented by gasoline service stations and lubrication, depositing plant petroleum products, recent plant of deposit petroleum products (Community Storage Company CSC), wash plant and fill small bottles gas.

Ethnobotanical study method

Our ethnobotanical study includes two parts: The first on the field and the second in the laboratory. The first took place from April to December 2015. Initially, we located the various ethnobotanical surveys locations by stratified sampling techniques "probabilistic stratified" (Kahouadji, 1986) [11], which aim to have a floristic inventory as complete as possible and to conduct surveys in different parts of the study area [12].

The tool of this study is a survey of 200 records to fill from the direct interrogation of the local population. It allowed us to collect important information about the informant and the plants used for the treatment of skin, respiratory, and digestive infections. Thus, the data for each investigated include age, sex, academic level, family status, and type of medication. The information collected for each plant contain the common name, type (wild, cultivated, weed), uses, the part used, method of preparation.

As regards sampling selected, it is a simple random type. The area was divided into four layers corresponding to the number of municipalities (city Sidi Kacem, Maachraâ Bel Ksiri, Dar Gaddari, Jorf El Melha). Each stratum is represented by 50 people, and the aggregate sample of 200 people.

The data collected on the records are then entered into a database and processed by Excel spreadsheet software.

The second part of this ethnobotanical study is the taxonomic identification of species collected during the floristic surveys. It was realized later in the laboratory (Laboratory of Plant Biotechnology and Molecular Biology), Faculty of sciences in Meknes, using botanical books available [13-17].

RESULTS

The results of this study are collected and classified according to the following aspects:

Sociodemographic data of respondents

Use of medicinal plants by age

Practitioners of traditional medicine of the region of Sidi Kacem were classified into three groups according to age intervals. Fig. 2a shows that people who have exceeded the age of 45 years have a high frequency of use of medicinal plants (45.36%), followed by people who aged between 30 and 45 years (34.02%), whereas young people from 16 to 30 years old are in last place class (20.62%).

Use of medicinal plants according to sex

The survey of the local population in the region of Sidi Kacem revealed that both women and men all practice traditional medicine. They use herbs to heal various skin, digestive or respiratory infections. However, we note the dominance of women by 78% compared to men 22% (Fig. 2b).

Use of medicinal plants according to the academic level

At region-wide of Sidi Kacem, we note from Fig. 2c, that good portion of people who use medicinal plants against the three studied infections, they are illiterate with 42.11%. However, people who have a secondary level, have a significant (32.63%) followed by those of primary level (13.68%). Finally, the academic training who uses very little medicinal plants is about 10.53%.

Choice of herbal medicine and modern medicine

Thirty-nine percent of citizens of the province of Sidi Kacem treat skin, respiratory, and digestive infections by herbal medicine. While more than half (56%) use traditional and modern medicine and just 5% who believe in medicine (Fig. 2d).

Ethnobotanical and pharmacological data

Used parts of the plants selected

Analysis of the information collected, reveals that the most used part of medicinal plants is the foliage with a 44.89%, followed by the whole plant (23.46%) and seeds (14.28%) (Fig. 3). While other parts of the plant, namely, stem, fruit, bark, rhizome, root, bulb, and flower, are represented by a cumulative 17.37%.

Method of preparation of the plant

In the study area, the most frequent method of preparation (Fig. 4) for the treatment of skin infections is cataplasm (48.15%), followed by raw preparation (22.22%), and finally infused the decoction and cooked presenting (29.62%). As for digestive infections, traditional practitioners often use the decoction (41.18%), raw (27.45%), and infused (25.49%). Other preparation methods are cumulative (5.88%). As for respiratory infections, the method of treatment is almost divided between the infused (47.06%) and the decoction (41.18%), while raw reached (11.76%).

Dose used

The ethnobotanical study revealed that the local population does not use a precise dose when preparing their phytodrugs. More than half of users (55%) weighed with the spoon, then come weighed handle (33%), pinched and glass respectively (7%) (5%) (Fig. 5a).

Source of information

Although the variety of sources of information about the species of medicinal plants and their modes of preparations the inherited form constitutes dominance: 85.57% of the population of Sidi Kacem, to relieve their pain, refers to the experiences of antecedents as the origin of the information. The second origin is presented in the media, especially radio with a frequency of 9.28%. Other ways citing books and herbalists are represented by a cumulative 5.15% (Fig. 5b).

Floristic analysis

In general, the analysis of the collected information floristic allowed identifying 73 plant species distributed in 39 botanical families.

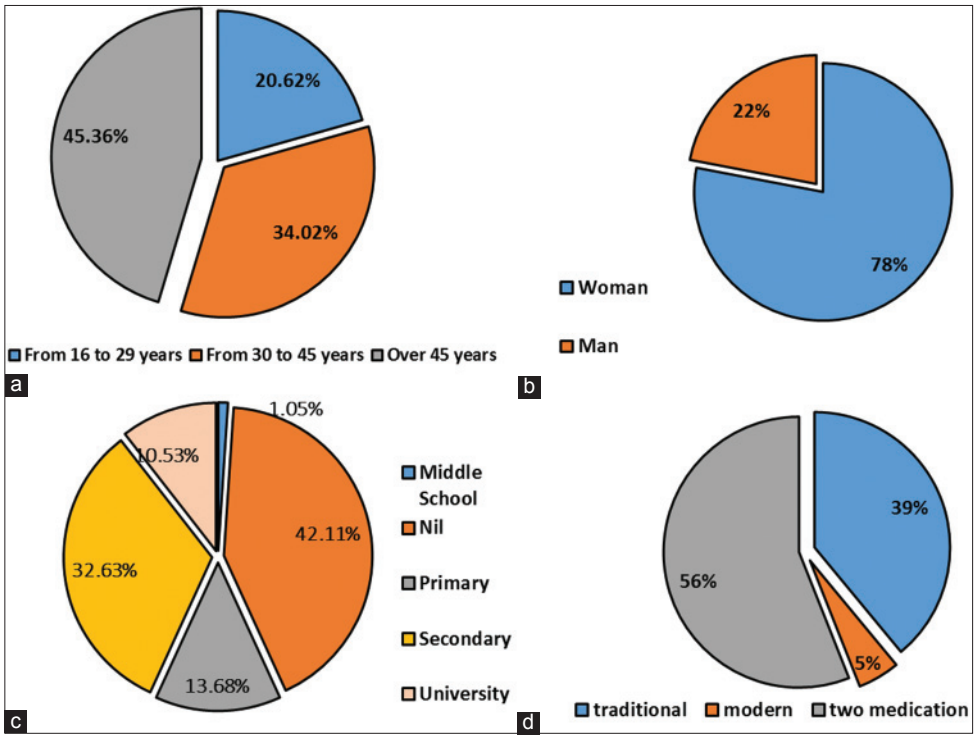

Fig. 2: Distribution of respondents according to: (a) Age; (b) Sex; (c) Academic level; (d) Type of medication

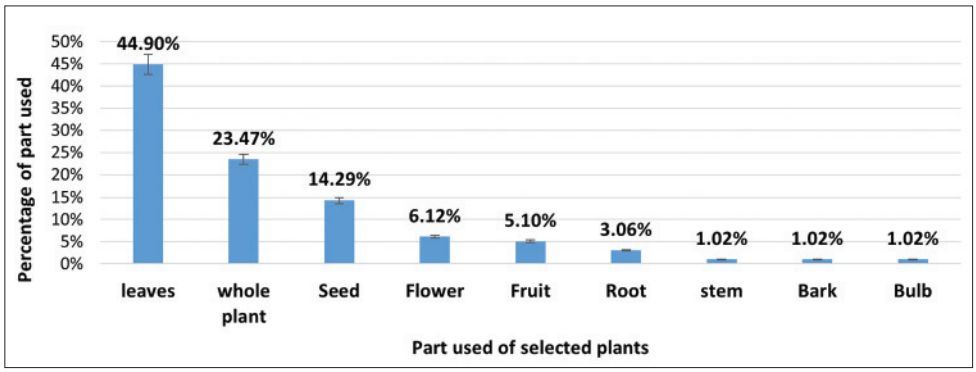

Fig. 3: Distribution of parts used selected plants

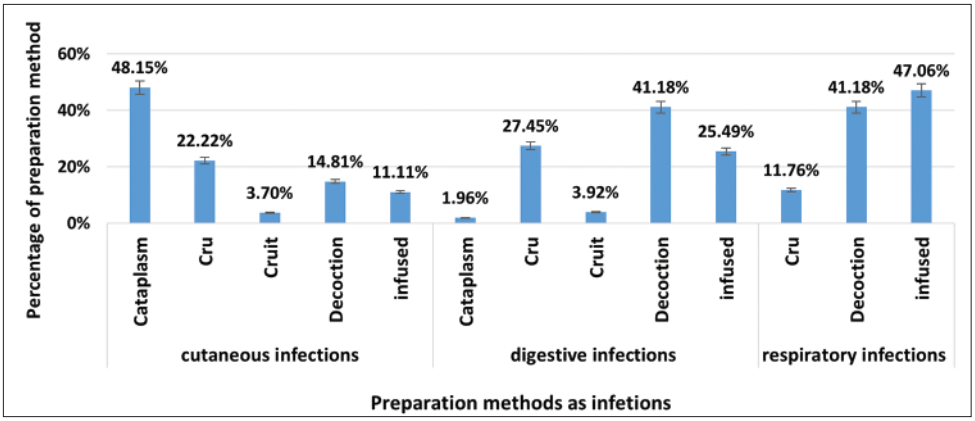

Fig. 4: Distribution of preparation methods as infections

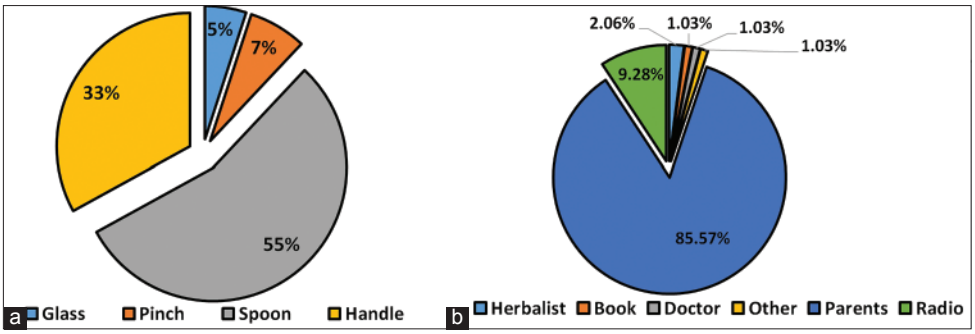

Fig. 5: Distribution of: (a) Dose used; (b) Source of information

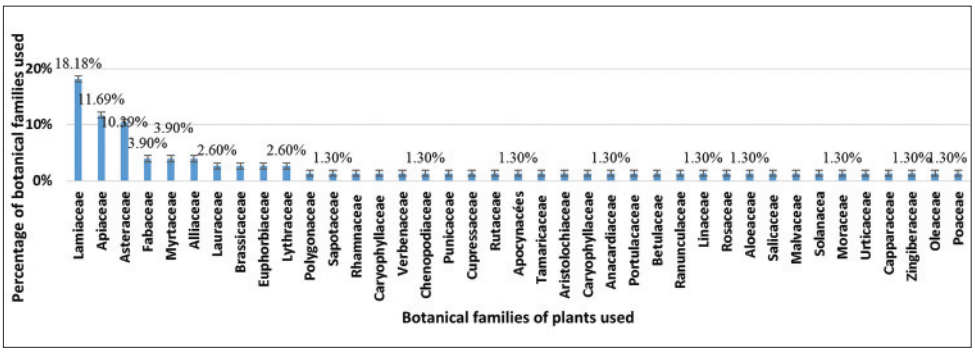

Fig. 6: Distribution of families of plants used

The most represented families are the Lamiaceae (14 species) Apiaceae (9 species) and Asteraceae (8 species) with 17.95%, respectively, 11.54% and 10.26% of the inventory (Fig. 6).

As for the floristic study of medicinal species used against each of the three types of infection, it revealed the diversity of medicinal plants of the region and the wealth of herbal medicine in this region.

Skin infections

The analysis, of the information collected, shows that skin infections in the region of Sidi Kacem are treated by 37 species divided into 22 families, of which five are the most dominant. They include 19 species representing 86.36% of the total workforce.

The five dominant botanical families are listed as follows:

- The Lamiaceae (20.00%), they bring together seven species forming 18.91%;
- The Asteraceae (11.43%) with four species: 10.81%;
- The Apiaceae (8.57%) with three species: 8.10%;
- The Alliaceae (8.57%) with three species: 8.10%;
- The Lythraceae (5.71%)with two species: 5.4%;

Other botanical families used against this type of infection have <5% and are grouped in Fig. 7.

Respiratory infections

The information acquired from the questionnaire sheets and statistical processing, helped us to establish a graph (Fig. 8). This shows that the most used botanical families to relieve respiratory infections by respondents are four in number. They are classified according to their importance:

- The Lamiaceae (26.67%) 8 species
- Asteraceae (13.33%) 4 species
- The Alliaceae (6.67%) 2 species
- The Myrtaceae (6.67%) 2 species.

The other 13 families represent a cumulative frequency of 43.33%.

Digestive infections

The exploitation of survey data identified and designated in Sidi Kacem 24 botanical families used to treat digestive infections. Apiaceae and Lamiaceae

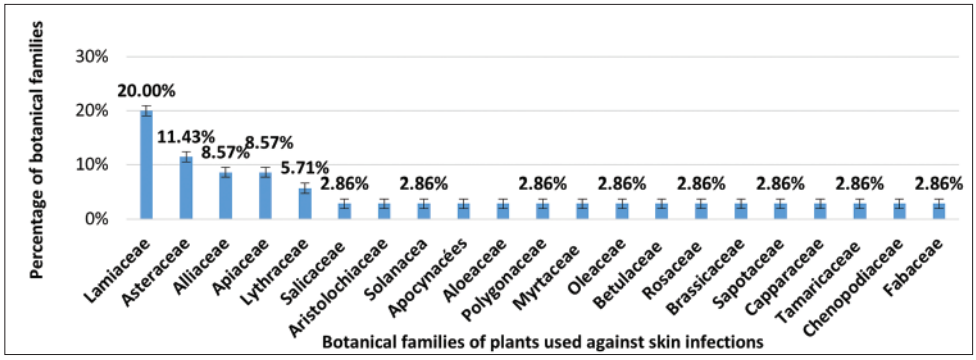

Fig. 7: Distribution of families of plants used against skin infections

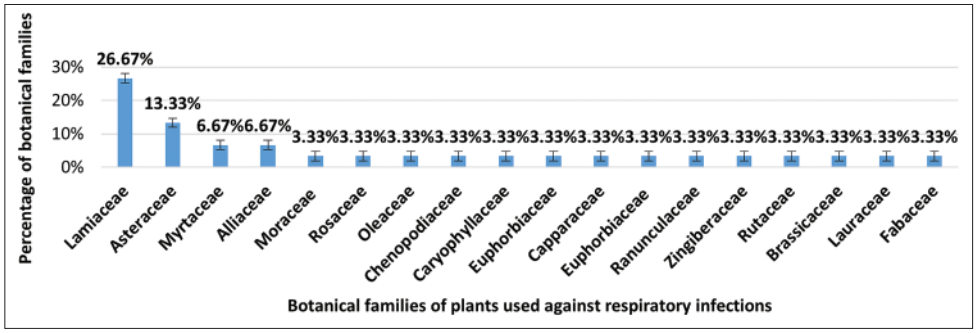

Fig. 8: Distribution of families of plants used against respiratory infections

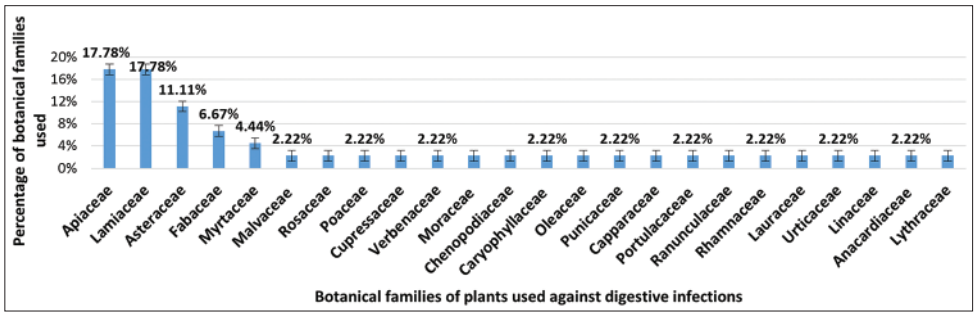

Fig. 9: Distribution of botanical families used against digestive infections

are two families predominantly used (8 species, 17.78%) for each, then comes the Asteraceae (5 species, 11.11%) and Fabaceae (3 species, 6.67%), and finally the Myrtaceae (2 species, 4.44%). Other families intervene by a single species and have a cumulative 42.18% (Fig. 9).

DISCUSSION

This study had for objective to identify the plants used in the treatment of skin, respiratory and digestive infections. The ethnobotanical survey was carried out involving 200 traditional practitioners in the region, who were predominantly women and mature over 45 years old. This profile is observed in most studies of the same type. The case of ethnobotanical study in the eastern High Atlas [7], in the Prefecture of Agadir Ida Outanane Morocco [2], in the region of Mechraâ Bel Ksiri [3], and forest Amsittène (Province of Essaouira) [18]. These results are explained, on the one hand, by the family status of women and its culinary and health responsibility of all household members. Women are traditionally the custodians of the secrets of medicinal plants [7]. On the other hand, it can be explained by the mistrust of young people, who tend to not believe in the medicinal effect of plants. As well as, in Warangal district, Telangana, and India, the young people have no interest to use traditional medicine and are unable to mention a large number of medicinal plants compared with to the elders [19]. Thus, it is clear that the traditional knowledge is acquired with the repetitive experience and the transmission of information from parents to children.

As many of the citizens of the study area resort to traditional medicine and especially the category of illiterates, they use more medicinal plants, compared to those with university academic level who have a tendency towards a prescribed therapy staff modern medicine. This reflects the special place of medicinal plants in their lives. In addition, the socioeconomic side, can also include in this context, a large portion of the population, of the study area, does not have a sufficient income that allows them to cover the costs of medical care. These results confirm the ethnobotanical study carried nationwide, at the prefecture of Agadir Ida Outanane [2], at Mechraâ Bel Ksiri [3], and the forest Amsittene of the province of Essaouira [18].

Despite the diversity of medicinal plants and the variety of diseases, the leaves are the part most used by the population. This result is the same as in many studies established in morocco [2,3,7,18,20] and the South of Côte d'Ivoire [21]. The high use of this organ of the plants by the population can be explained by its major role in photosynthesis, its relevant secondary metabolites. Since the concentration of a large number of groups of bioactive molecules tannins, alkaloids, flavonoids,

Table 1: Catalogue of main medicinal plants used by the population of Sidi Kacem against skin, respiratory and digestive infections

Family	Scientific name	Common name	Vernacular name	Skin infection			Respiratory infection			Digestive infection		
				Part used	Method of preparation	Frequency %	Part used	Method of preparation	Frequency %	Part used	Method of preparation	Frequency %
Alliaceae	*Allium cepa*	Onion	Bassala	Bulb	Raw	1.14	Bulb	Raw	4.60	-	-	-
	Allium sativum	Garlic	Touma	-	-	-	Bulb	Cooked	5.75	-	-	-
	Aloesocotrin	Aloe	Ssabra	Leaves	Raw	2.27	-	-	-	-	-	-
Aloeaceae	*Aloe vera*	Aloe vera	Alyo vera	Leaves	Raw	1.14	-	-	-	-	-	-
Anacardiaceae	*Pistacia atlantica*	Atlas mastic tree	Btam	-	-	-	Bark	Infused	1.16	-	-	-
	Pistacia lentiscus	Mastic	Drou	-	-	-	-	-	-	Leaves	Decoction	0.63
Apiaceae	*Ammi visnaga*	Toothpickweed, bisnaga, and khella	Bechnikha	Umbel	Decoction	4.55	Umbel	Decoction	1.15	-	-	-
	Ammodaucus leucotrichus	Cumin	Kamoune ssoufi	-	-	-	-	-	-	Seeds	Raw	2.52
	Carum carvi	Persian cumin	Karwiya	-	-	-	-	-	-	Seeds	Decoction	1.26
	Coriandrum sativum	Coriander	Kasbour	-	-	-	-	-	-	Seeds	Decoction	0.63
	Daucus carota	Carrot	Khizou	Fruit	Juice	1.14	-	-	-	Fruit	Juice	0.63
	Foeniculum vulgare	Fennel	Nafaâ	-	-	-	-	-	-	Seeds	Infused	0.63
	Petroselinum sativum	Parsley	Maâdnous	Leaves	Decoction	2.27	-	-	-	Leaves	Decoction	0.63
	Pimpinella anisum	Anis	Habathlawa	-	-	-	-	-	-	Seeds	Infused	0.63
Apocynaceae	*Nerium oleander*	Oleander	Dafla	Branch	Fumigation	4.55	-	-	-	-	-	-
Aristolochiaceae	*Aristolochia baetica*	Aristolochia	Berez'tem	Rhizome	Cataplasm	2.27	-	-	-	-	-	-
Asclepiadaceae	*Caralluma europaea*	European Caralluma	Daghmous	-	-	-	Leaves	Decoction	1.15	-	-	-
Asteraceae	*Artemisia absinthium*	Absinthe	Chiba	Leaves	Raw	1.14	Leaves	Cooked	1.15	-	-	-
	Artemisia herbaalba	White wormwood	Chih	-	-	-	-	-	-	Leaves	Infused	1.26
	Atractylis gummifera	Stemless Atractylis	Addad	Root	Cataplasm	1.14	-	-	-	-	-	-
	Carthamus tinctorius	Safflower	Tavra	-	-	-	Leaves	Cooked	2.30	Leaves	Cooked	0.63
	Cynara humilis L.	Arcyna Wiklund	Timta	Roots	Cataplasm	3.41	-	-	-	Root	Decoction	0.63

(Contd...)

Table 1: *(Continued)*

Family	Scientific name	Common name	Vernacular name	Skin infection			Respiratory infection			Digestive infection		
				Part used	Method of preparation	Frequency %	Part used	Method of preparation	Frequency %	Part used	Method of preparation	Frequency %
	Dittrichia viscosa	Woody fleabane	Terrehla, magrama-ne, Amril	Leaves	Raw/ Cataplasm	4.55	Leaves	Decoction	1.15	Leaves	Decoction	0.63
	Matricaria camomilla L.	Camomile	Babounje	-	-	-	Leavesand Flower	Decoction	1.15	Leaves and Flowers	Decoction/ Infused	5.03
Betulaceae	*Corylus*	Hazel	Louz	Fruits	Oil	1.14	-	-	-	-	-	-
Brassicaceae	*Lepidium sativum*	Cress	Habrechad	Seeds	Raw	1.14	-	-	-	-	-	-
	Brassica	Birdrape	Left	Leaves	Cataplasm	1.14	Stem	Raw	1.15	-	-	-
Capparaceae	*Capparis spinosa*	Caper bush	Kbar	Fruits	Cataplasm	5.68	Fruits	Cooked	1.15	Fruits	Cooked	1.26
Caryophyllaceae	*Herniaria cinerea*	Hairy rupturewort	Harass elha-jer	-	-	-	Whole plant	Decoction	1.15	Whole plant	Decoction	0.63
Chenopodiaceae	*Chenopodium ambrosioides*	Wormseed, epazote	Mkhineza	Whole plant	Infused/ Raw/ cataplasm	4.55	Whole plant	Decoction	1.15	Leaves/ Stems	Raw/ Infused/ Decoction	6.92
Cupressaceae	*Tetraclinis articulata*	Thuja articulata	el'ar'ar	-	-	-	-	-	-	Fruits	Decoction	0.63
Ericaceae	*Arbutus unedo*	Irish strawberry tree	Sasnu	-	-	-	-	-	-	Ecorce	Decoction	0.63
Euphorbiaceae	*Euphorbia falcata*	Kingdom	Hayat noufous	-	-	-	Leaves	Decoction	1.15	-	-	-
Fabaceae	*Senna alexandrina*	Alexandrian senna	Sana makki	-	-	-	-	-	-	Leaves	Infused	0.63
	Trigonella foenumgraec	Fenugreek	Halba	Seeds	Infused	3.41	Seeds	Decoction	3.45	Seeds	Raw/ Decoction/ Infused	13.84
	Vicia faba	Broad bean	El-fûl	-	-	-	-	-	-	Seeds	Raw	0.63
Lamiaceae	*Lavandula officinalis*	Lavender	Khezama	Leaves	Decoction	2.27	Leaves	Decoction	1.15	-	-	-
	Lavandula stoechas	French lavender	Lhalhal	-	-	-	-	-	-	Leaves	Decoction	0.63
	Origanum majorana	Sweet marjoram	Merdadou-ch	-	-	-	Leaves	Decoction	2.30	-	-	-
	Marrubium vulgare	white horehound	Mreout, Ifzi, Ferkzouz	Leaves	cataplasm	6.82	Leaves	Raw	4.60	Leafy steme	Cooked	2.25
	Mentha pulegium	Penny royal	Fliou	-	-	-	Leaves	Infused	27.59	Leaves	Decoction	2.52

(Contd...)

Table 1: ***(Continued)***

Family	Scientific name	Common name	Vernacular name	Skin infection			Respiratory infection			Digestive infection		
				Part used	Method of preparation	Frequency %	Part used	Method of preparation	Frequency %	Part used	Method of preparation	Frequency %
	Mentha rotundifolia	False apple	Merssita, Imchichtro	-	-	-	-	-	-	Leaves	Cooked	1.26
	Mentha viridis	Spearmint	Na'anaâ, Liqamâ	-	-	-	Leaves	Infused	1.15	-	-	-
	Origanum compactum	Oregano	Zaatar	Leaves	Raw	2.27	Leaves	Infused	4.60	Leaves / Whole plant	Decoction/ Infused	22.01
	Rosmarinus officinalis	Rosemary	Azir	Leaves	Infused	2.27	Leaves	Cooked	1.15	Leaves	Decoction	1.89
	Salvia officinalis	Common sage	Salmia	Leaves	Infused	1.14	Leaves	Infused	3.45	Leaves	Infused	0.63
	Salvia verbenaca	Wild sage	Khiyatta	Whole plant	cataplasm	11.36	-	-	-	-	-	-
Lauraceae	*Cinnamomun zeylanicum*	Cinnamon	Karefa	-	-	-	Ecorce	Raw	2.30	Ecorce	Decoction	0.63
	Laurus nobilis L.	Laurel	Warkat sîdna mûssa	-	-	-	-	-	-	Leaves	Decoction	0.63
Linaceae	*Linumus itatissimum*	Linseed	Zeriaatktan	-	-	-	-	-	-	Seeds	Raw	1.26
Lythraceae	*Lawsonia inermis*	Henna	L-henna	Leaves	Infused	6.82	-	-	-	Leaves	Decoction	1.26
Malvaceae	*Malvasyl vestris*	Cheeses, high mallow	L-khobiza, El baqûla	-	-	-	-	-	-	Leafysteme	Cooked	0.63
Moraceae	*Ficus carica*	Fig	El karmôss	-	-	-	Fruits	Cooked	1.15	Fruits	Raw	0.63
Myrtaceae	*Eucalyptus globulus*	Tasmanian bluegum	Kalitto	-	-	-	Leaves	Decoction	5.75	-	-	-
	Myrtu scommunis	Myrtle	Rihan	Leaves	Raw	2.27	-	-	-	Leaves	Infused	0.63
	Syzygium aromaticum	Cloves	Krenefel	-	-	-	Flower	Cooked	2.30	Flowers	Raw	0.63
Oleaceae	*Olea europaea*	Olive	Zitoun	Oil	Raw	2.27	Oil	Cooked	1.15	Oil	Raw	2.52
Poaceae	*Panicum miliaceum*	Common millet	Ilane	-	-	-	-	-	-	Seeds	Raw	0.63
Polygonaceae	*Polygonum aviculare*	Common knotgrass	Wâdmou, Bouakad, Bethbat	Whole plant	Raw/ cataplasm	5.68	-	-	-	-	-	-
Portulacaceae	*Portula caoleracea* L.	Common Purslane	Rejla	-	-	-	-	-	-	Leafysteme	Cooked	2.52
Punicaceae	*Punica granatum*	Pomegranate	Rommane	-	-	-	-	-	-	Fruit	Decoction	3.14
Ranunculaceae	*Nigella sativa*	Black-caraway	Sanouj	-	-	-	Seeds	Decoction	5.75	Seeds	Raw	6.29
Rhamnaceae	Ziziphus lotus	Jujube	Ssedra	-	-	-	-	-	-	Seeds	Raw	0.63

(Contd...)

Table 1: *(Continued)*

Family	Scientific name	Common name	Vernacular name	Skin infection			Respiratory infection			Digestive infection		
				Part used	Method of preparation	Frequency %	Part used	Method of preparation	Frequency %	Part used	Method of preparation	Frequency %
Rosaceae	*Rosa damascena*	Damask rose	El-ward	Flowers	Hydrolat	1.14	Flower	Cooked	1.15	Flowers	Infused	1.26
Rutaceae	*Citrus*	Citrus	Lhamad	-	-	-	Fruit	Raw	1.15	-	-	-
Salicaceae	*Populus alba*	Abele	Safsaf	Leaves	Decoction	1.14	-	-	-	-	-	-
	Populus nigra	Black poplar	Safsaf	Leaves	Decoction	1.14	-	-	-	-	-	-
Sapotaceae	*Argania spinosa*	Argan	Argane	Oil	Raw	6.82	-	-	-	-	-	-
Solanaceae	*Solanum tuberosum*	Potato	Batâta	Tuber	Raw	1.14	-	-	-	-	-	-
Tamaricaceae	*Tamarix aphylla*	Athel tamarisk	Takawet	Leaves	Cataplasm	1.14	-	-	-	-	-	-
Urticaceae	*Urtica dioica*	Stinging nettle	L-hurrîga.	-	-	-	-	-	-	Whole plant	Decoction	0.63
Verbenaceae	*Aloysia triphylla*	Lemon verbena	Louiza	-	-	-	-	-	-	Leaves	Infused	1.26
Zingiberaceae	*Zingiber officinale*	Ginger	Zanjabil	-	-	-	Rhizo-me	Infused	3.45	-	-	-

glycosides … are within the leaves. However, unconsciousness and ignorance of most popular party and their bad actions when they practice the total harvest of the plant can lead to deforestation and the destruction of ecosystems.

As for the dose used and the method of preparation of phytodrugs, we found no notion of unit of measurement for dose, with mode decoction in most of the consumer population in the province of Sidi Kacem. However, we must note that on the one hand, the absence of accurately dose of the plant used, can have serious consequences on the health of consumers, this has been confirmed in Bel Ksiri [3]. On the other hand, the population generally grows at decoction mode. It thinks that it's adequate to warm the body and disinfect the plant [12,20]. This result is similar to that of ethnobotanical study in Côte d'Ivoire that indicated that decoction (19.04%) is the mode the most used by his population, to treat respiratory diseases [21].

Furthermore, this technique can collect the most active ingredients and reduces or cancels the toxic effect of certain revenues [20]. The population, however, adopts the two modes infused and decoction against respiratory infections. This finding was mentioned in a study of treating skin infections in the central plateau of Morocco [22]. While skin infections are relieved mainly by the poultice method for the plants in direct contact with the seed coat, gives good results.

For the population of Sidi Kacem, this valuable know-how is transmitted more by heredity than by radio or other means, it refers to the experience of history as a source of information for their pain. This data, confirm the results found in a study carried in Bel Ksiri [3], according to them, the parents are the primary source of information.

Analysis of the information collected during this ethnobotanical study also enriched the Moroccan regional floristic data. This last allowed identifying 73 plant species distributed in 39 botanical families. The most used by the population studied are the families Lamiaceae, Apiaceae, and Asteraceae. These results are consistent with those found by other national studies [2,3,7,20].

In addition to these three families previously cited, two other families are added for treatment of skin infections; the Alliaceae and Lythraceae. In this case, the most species reported by all informants are spontaneous like *Salvia verbenaca* with a 11.36%, *Marrubium vulgare* with a frequency of 6.82%, *Polygonum aviculare* L. and *Capparis spinosa* 5.68%, *Chenopodium ambrosioides*, *Ammi visnaga* and *Nerium oleander* L. same frequency 4.55%. The respondents did not specify prejudices in their use of these species, although they have a toxic effect. For example, the essential oil of *C. ambrosioides* used as anthelmintic, is fairly toxic, especially in children. The plant itself at high doses can cause signs of intolerance recalling symptoms of intoxication by essential oil [3].

While in respiratory infections dominant botanical families are Lamiaceae, Asteraceae, Alliaceae, and Myrtaceae. In comparing this result with that obtained by the study carried out in the Moroccan central plateau [22], it reflects the same trends. The family Lamiaceae dominant with 16 species used (24.61%), and the Asteraceae family with four species (6.14%). This type of infection is treated by a large number of informants (27.06%), by a spontaneous plant easy to collect manually. This is found much in this area during the winter season known by the Fliu. The species belongs to the family of Lamiaceae is the Pennyroyal: *Mentha pulegium* L. Three other species have become important by the population for the treatment of respiratory diseases, we quote as *Allium sativum*, *Eucalyptus globulus,* and *Nigella sativa*, and they have a 5.88% for each. According to the information collected, they have an effective effect and don't have side effects. Intoxication by Nigel is manifested by dryness of the mouth, oropharyngeal irritation, and inflammation of the tongue, palate, tonsils and nasopharynx [3].

While digestive infections are characterized by three defined dominant families Lamiaceae, Apiaceae, and Asteraceae. These diseases are

treated by a large number of species 47 in comparison with other infections. Among the five most frequently used species, we found three that do not characterize the region and are taken to the herbalist. We include *Origanum compactum* with a majority frequency of 22.58%, followed by *Trigonella foenumgraecum* of 13.55% then *N. sativa* of 5.81%. While the others two species are spontaneous and collected by traditional practitioners. They are presented in *C. ambrosioides* at a 7.10% and *Matricaria camomilla* L. at 5.16%.

The processing of information acquired from the questionnaires sheets and the floristic identification conducted in the field, have enabled us to establish an ethnofloristic catalog Table 1, containing 73 plant species used in Sidi Kacem region for the treatment of skin, respiratory and digestive infections. In this catalog, plant species are classified according to their families following an alphabetical order, determining the scientific, common and vernacular name for each species. This inventory gives information about the used part, the method of preparation of phytodrugs and the frequency of use of the species for each type of diseases belonging in cutaneous, digestive or respiratory infections.

CONCLUSION

The ethnobotany study in Sidi Kacem area has allowed us to discover its rich flora and traditional knowledge. Moreover, to establish the floristic catalog which forms a source of information of the traditional medicinal therapy of the region. This inventory should be preserved and enriched by other studies on different types of pathologies. Morocco is known for its richness in traditional medicine. So the importance of this type of studies shall be to maintain and continue to better safeguard this heritage which can be lost with the loss of the elderly.

The interest of ethnobotanical studies also is beneficial to the discovery of new bioactive molecules, to limit the misuse of chemicals, and to protect the population against the deadly toxicity of medicinal plants.

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