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## Ethnobotanical survey of plants used in treatment of oral diseases in the city of Meknes, Morocco

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### Abstract

An ethnobotanical study of plants used in treatment of oral diseases was conducted among herbalists operating traditional medicine sector in the city of Meknes, Morocco. This study was carried out for 3 months, with 50 herbalists in 15 different neighborhoods by using questionnaire forms. The most severe oral pathologies found are periodontal disease (100%), microbial infections (97.52 %) and caries (38.70%). the treatment is done by a daily multiple rinsing of the oral cavity until healing. Most respondents confirmed the importance to use Phytotherapie to cure dental diseases.

**Keywords:** Ethnobotany, Meknes city, oral affections, medicinal plants

### 1. Introduction

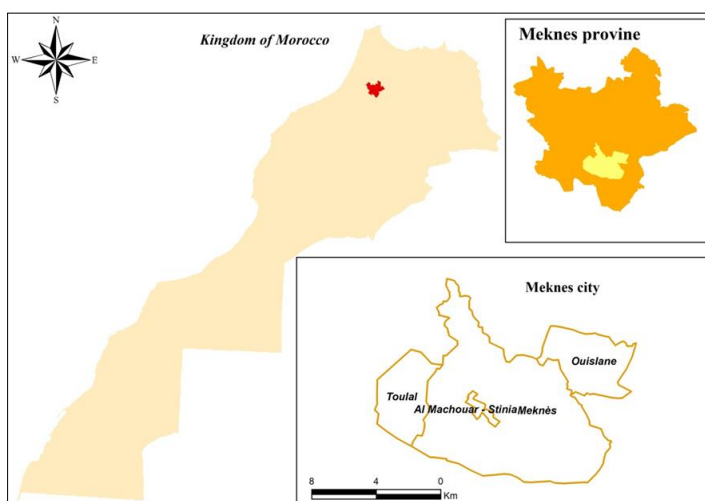
Oral diseases represent the third global scourge after heart problems and cancerous diseases [1]. The main oral diseases are periodontal diseases and caries and, constitute a worldwide health problem. They affect all population segments and remain a cause of morbidity very related to the difficulty for access to care and socioeconomic problems, cultural and environmental. In Morocco, since 1990, the Ministry of Health has implemented a national oral health program which, in collaboration with its partners, has developed a strategy focused primarily on the implementation of oral disease prevention programs, including the integration of oral health awareness in schools [2].

The main objective of this work is to carry out a survey with to the herbalists of Meknes city on the common oral diseases and investigate about dose, duration treatment, side effects, precautions use, formulation and toxicity of the recipes used.

### 2. Material and Methods

#### 2.1 Study Area

Meknes city in Morocco stretches over an area of 1786 square kilometers, it occupies a strategic geographical position because on the one hand, it is located between two sets of mountains: the Pre Rif and the Western Middle Atlas and, on the other hand, thanks to the positioning of Meknes city, at the intersection of major communication arteries between the different cities of the Kingdom of Morocco (figure 1) [3].



**Fig 1:** Location map of Meknes city-Morocco

### 2.2 Ethnobotanical Survey

By using questionnaire sheets, a field campaign spread over 3 months (January-March 2018) was carried out in Meknes city with herbalists.

At first, snowball procedure is our sampling method with “s” steps and “k” names; a random draw is made in the target population. Then, each of the individuals selected in this first draw is asked to include k «friend (s)» in the survey. The respondent is admitted in the survey if he is not already present, that he is not part of the initial draw. Finally, we can iterate this operation “s” times [4].

In the second phase, field visits were initiated to the city's herbalists. Each respondent was interviewed more than 45 minutes; at each interview, all information about the respondent was noted, also for the plants, the data collected include; mode, dosage form, administration route, treatment duration, use state, preservation method, used dose, side effects, use precautions, formulation and toxicity. While clients sex, age, the satisfaction rate of this traditional practice, social level and the most frequent dental diseases in the population were recorded during our interviews.

## 3. Results and discussions

### 3.1 Respondents profile

#### 3.1.1 Age classes, sex and educational level

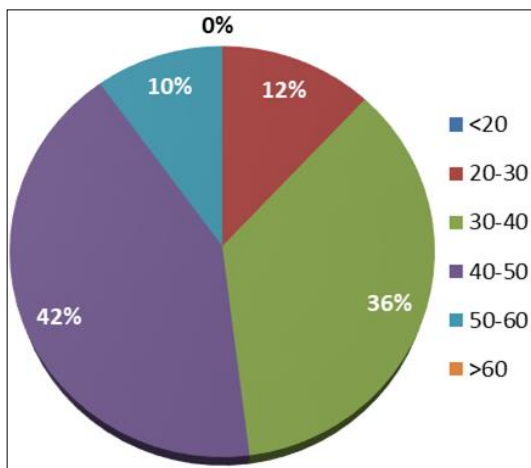


Fig 2: Respondents Age

The respondents aged between 40 and 50 (figure 2) have a 42%, compared to 36% for those aged between 30 to 40; if we add the age group between 20 and 30 years (12%), this shows a clear trend towards the rejuvenation of physiotherapists profession.

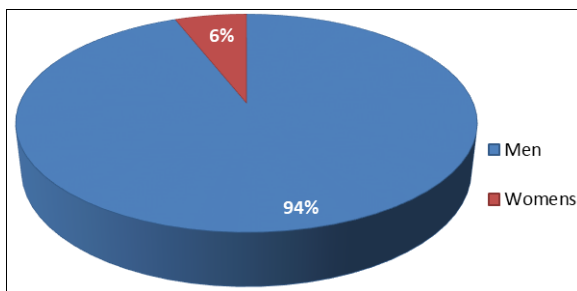


Fig 3: Respondents gender

The male gender has a percentage of 94% (figure 3) this shows that herbal medicine and traditional medicine remains a man dominated field. However, women tend to harvest medicinal plants and dry them.

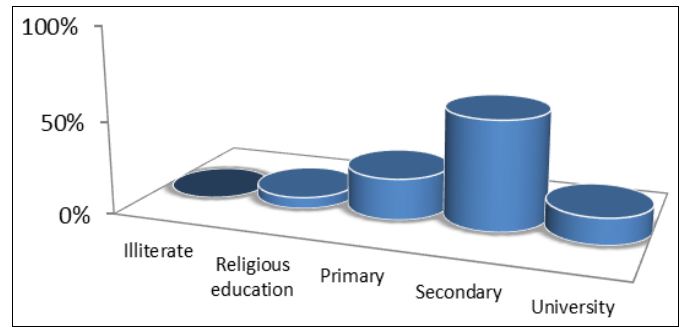


Fig 4: Education level of Surveyed herbalists

According to figure 4 the vast Respondents majority has a secondary level (58%), followed by those with a primary level (22%); Unfortunately, this presents a danger to the population health given the education lack and the awareness lack of the side effects of traditional practice.

### 3.2 Frequent dental diseases at patients according to the herbalist

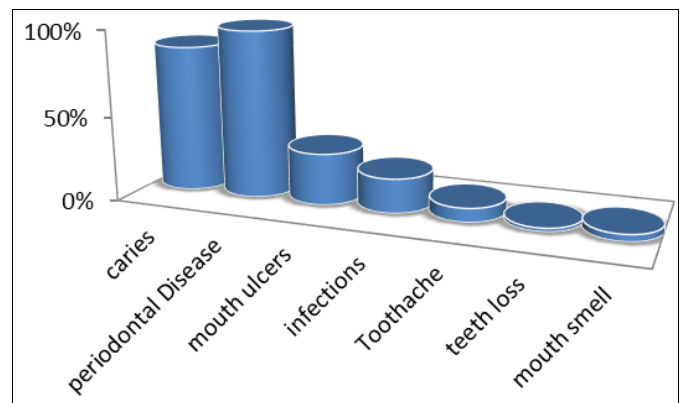


Fig 5: Frequent dental diseases in patients according to the herbalists

The most frequent diseases in patients, according to the herbalists (figure 5) are in decreasing order: parodontopathies, caries, canker sores, microbial infections, toothache, bad breath and the tooth loss. Dental caries is therefore the main dental disease in the city of Meknes this disease is also remains a major public health problem in many industrialized countries. It affects 50 to 90% of school-age children and the vast majority of adults, according to the Institute of Health Surveillance (InVS) [5]. While the onset of periodontal is caused by bacteria such as Actinobacillus, Porphyromonas, Prevotella, Bacteroids, Campylobacter and Fusobacterium, gram-negative anaerobes [6].

### 3.3 Treated Dental Diseases

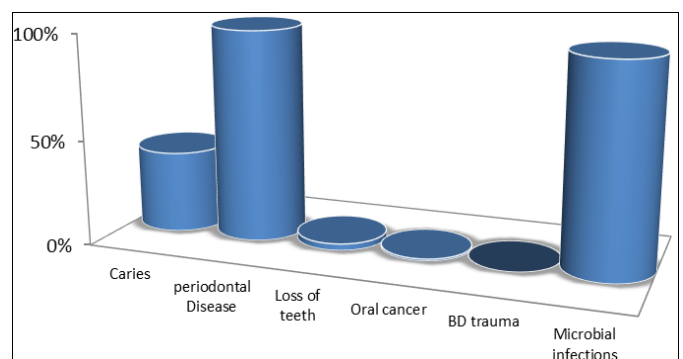


Fig 6: Treated dental diseases

According to Figure 6 the most treated oral diseases by medicinal plants in the local population are the gums (parodontopathy) in the first time (100%) followed by microbial infections (97.52%) and caries (38.70%), this confirms the results of the epidemiological survey carried out in Morocco in 2012: [2] on the state of oral health in Morocco. Indeed the main oral diseases, namely caries and periodontal diseases, constitute worldwide and in Morocco a health problem. They affect all segments of the population and remain a cause of morbidity very much related to the difficulty to access to care and socio-economic, cultural and environmental problems.

### 3.4 Dosage and treatment duration

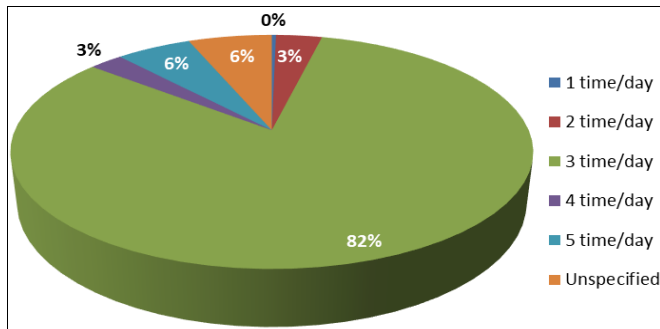


Fig 7: Dosage used

The number of times of use per day was reported by almost of respondents at 3 times per day 82% followed by unspecified use or 5 times per day 6% (Figure 7), until healing 56% or for a week on average (Figure 8). These unspecified dose results confirm the work of Zakariya and al in 2012, which states that traditional practice is sometimes irrational, anarchic and uncontrolled [7].

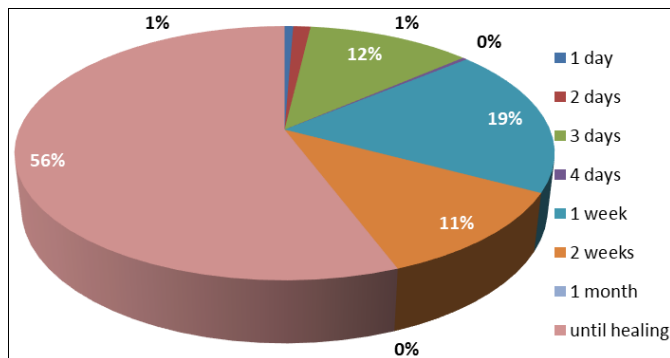


Fig 8: Treatment duration

### 3.5 Dose and volume used

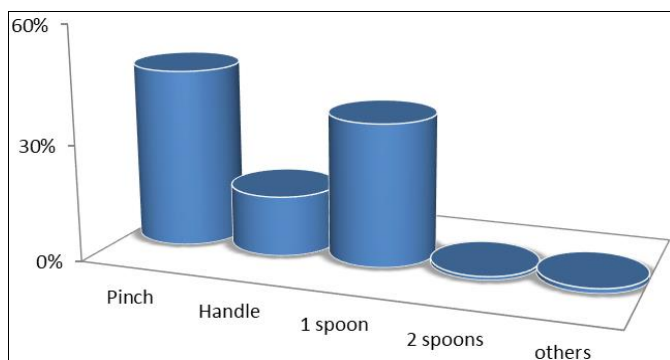


Fig 9: Used dose

A pinch of each plant (figure 9) by quantity of water (figure 10) is the most common dose used in the preparation of recipes to dental effect followed by a spoon of each plant per liter of water or sometimes a handful of each plant per 500ml, this means that the question of dose according to the practitioners of traditional medicine is it seemingly absent. This is what will present a very dangerous problem for human health.

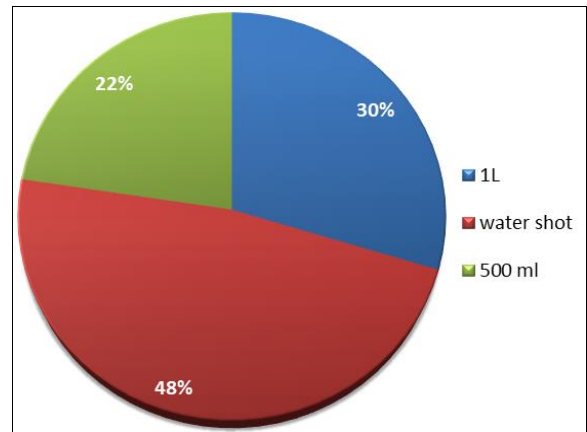


Fig 10: Used water volume

### 3.6 Side effects, precautions, formulation and toxicity

Table 1: Side effects, use precautions, formulation and toxicity

Side Effects	Yes	5,88%
	No	94,12%
Use precautions	Yes	27,55%
	No	72,45%
Formulation	Yes	4,64%
	No	95,36%
Toxicity	Yes	8,67%
	No	91,33%

According to table 1 and to our work about diversity of medicinal plants used on oral disease in the city of Meknes, Morocco [8] most of the interviews indicated that there are no side effects, and that precautions must not be taken as the treatment is used in the form of rinsing or by external application except herbal teas that are already consumed in our traditions. As most of the plants are not poisonous, something that favors more and more this treatment, the formulations were very small compared to the natural use of the species mentioned before. So; A plant that, in low doses and under harsh conditions of use is medicinal, can become a threat to human health if it is not used properly [9]. Moreover, *Salvia officinalis* L. (salmia), *Artemisia herba-alba* Asso. (achih), both are effective medicinal herbs at low doses but very toxic at high doses [10].

### 3.7 Satisfaction rate, gender, age and customers social level

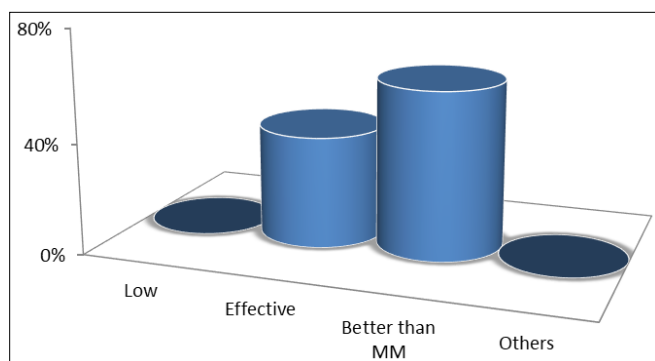
Most respondents report that their clients are satisfied and sometimes very satisfied (table 2) by dental treatment based on medicinal plants. This shows the therapeutic power of medicinal plants for the dental treatment, men they use more this treatment because they have more dental diseases than women since they smoke a lot and consume more drugs, the patients are adults (100%) followed by older people (94%), while the children are absent; it proves that the lack of sensitization in the population is really absent until the patient loses their teeth with age or he arrives at more advanced

stages of the disease. And belong to middle (100%) and poor (94%) social classes, this means that the high cost of natural toothpastes favors this traditional practice.

**Tab 2:** Satisfaction rate, gender, age and customers social level

Satisfaction rate	<b>Disappointed</b>	<b>0,00%</b>
	Unsatisfied	0,31%
	Satisfied	51,70%
Customers Sex	Very satisfied	47,99%
	Men >50%	98,00%
Customers Age	Women >50%	32,00%
	Children	0,00%
	Adults	100,00%
Customers social level	The Elderly peoples	94,00%
	Poor	96,00%
	Middle	100,00%
	Rich	18,00%

### 3.8 Phytotherapy power according to the herbalists



**Fig 11:** Phytotherapy power on dental diseases according to the herbalist

The herbalists confirm the customer satisfaction and they declare that this practice is better compared to modern medicine (figure11). This is because each plant used in herbal medicine contains between 200 and 250 families of active ingredients. Some of which can act between it, either by synergy, or by antagonism. Thus, the overall resulting action of herbal medicine plants is due to this set of active substances, sometimes called the "totem", which are present in the plant, and which gives it a pharmacological profile different from that of each substances taken individually<sup>[11]</sup>.

### 4. Conclusion

The present study allowed us to inventory the various aromatic and medicinal plants sold and prescribed by the herbalists of Meknes city-Morocco, for the traditional use against oral diseases in the populations of the studied region. Almost all of the interviewees are men aged between 40 to 50 years married and have a secondary school level, we have inventoried 42 medicinal plant species spread over 24 families, the most represented were Lamiaceae, Myrtaceae and Juglandaceae, foliage, these are the most commonly used parts in the form of a decocted mixed solution.

The most commonly treated diseases are periodontal disease, microbial infections and caries. This survey can be considered as a source of information contributing to a better knowledge of the Moroccan flora and the local popular know-how, moreover, these data can constitute a database for the valorization of the recipes based on the medicinal plants used against oral diseases and the development of a toothpaste or a natural product based on medicinal plants.

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