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# Survey of Ethnomedicinal Plants Used for the Treatment of Gastrointestinal Disorders in Seksaoua Region (Western High Moroccan Atlas)

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### Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

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## ABSTRACT

This paper represents an ethnobotanical study in Seksaoua region, which aims to identify medicinal plants used by the population of this region, and to document the different therapeutic recipes used in local traditional medicine as a cure against digestive disorders.

The study was conducted in 2014 and 2015 at 30 stations using 746 survey sheets and stratified random method for sampling. Plant samples harvested from the field were identified in the laboratory and a species inventory was developed. The results obtained reported a total of 92 plant species used against digestive disorders by the population of Seksaoua. These species belong to 44 families with a dominance of Lamiaceae and include 20 species that are endemic to Morocco, such as; *Pulicaria mauritanica*, *Thymelaea linifolia*, *Salvia taraxacifolia* and *Ononis natrix*.

The present study have shown a great diversity of medicinal species used by the local population in the Occidental High Atlas. However, the applications of these medicinal plants were found to be anarchic and uncontrolled.

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**Keywords:** *Ethnobotanical; medicinal plants; seksaoua; digestive; disorders.*

## 1. INTRODUCTION

Morocco is characterized by high vascular plant diversity with an estimated 4200 species and subspecies [1] among which 600 species are used in traditional medicine [2]. Most of these medicinal plants have been used at a local scale for their effectiveness against various digestive system disorders including diarrhea, constipation, abdominal pain or vomiting. Also, medicinal plants are found to be cheaper, available, less toxic and non resistance to disease caused organisms among others as against the synthetic drugs [3,4]. According to the Moroccan Ministry of Health, a study of hospital morbidity performed at nine public hospitals has ranked diseases of the digestive system as the first cause of hospitalization (17.3%) [5]. The increase in poverty rate and high costs of hospital care, in addition to the isolation of rural areas have encouraged research on local medicinal species and traditional hereditary medicine practiced in these areas. Within this framework, this ethnobotanical study was undertaken in Seksaoua region, which is located in the Western High Moroccan Atlas, in order to collect and document information concerning medicinal plants used to treat disorders of the digestive tract.

## 2. MATERIALS AND METHODS

### 2.1 Description of the Study Area

Chichaoua Province is bounded to the north by Safi province, to the south by Taroudant and Agadir, to the east by Haouz and Menara provinces and to the west by Essaouira, and covers an area of 6872 km<sup>2</sup>. According to precipitation, relief and soil type, the province of Chichaoua is subdivided into three homogeneous territorial units: mountain, piedmont and plain areas. The mountain area includes the region studied in this paper (Western High Atlas, Seksaoua), which is located at 31° latitude and -8.73° longitude) [6]. The population of this region was estimated in 2014 to 63 761 inhabitants and the local language is Amazigh [7].

Economic activity in Seksaoua region is mainly agro-pastoral relying on cereal farming and extensive livestock farming; Concerning crop production, cereals (23%) and fruit trees (18%) are predominant in the production system of this area. However, the yields remain low for all crops

(79.5 quintals / ha) and animal productions (2029 T). It is also important to note that 57% of Chichaoua province goats are present in this area, because of the adaptation of this species to mountain conditions and the secular breeding tradition in the area. The region is characterized by a continental and semi-desert climate marked by rainfall insufficiency and irregularity; Indeed, the average annual rainfall is 350 to 400 mm. The perennial springs present in the region supply small perimeters totaling 450 sources with a flow rate ranging from 5 l / s to 20 l / s. Regarding topography, Seksaoua is characterized by a rugged relief and skeletal soils. The economy of the population is mainly based on agriculture, livestock and crafts [6].

### 2.2 Methodology

Our field study was carried out from April 2015 to May 2016. We conducted ethnobotanical interviews with the local population of Seksaoua area. The survey was carried out in 4 rural communes: Ait hadoou yousef, Irohalen, Lalla Aziza, Sidi Ghanem. The region was divided, into 29 Douars (villages), according to variations in environment factors such as climate, soil and vegetation.

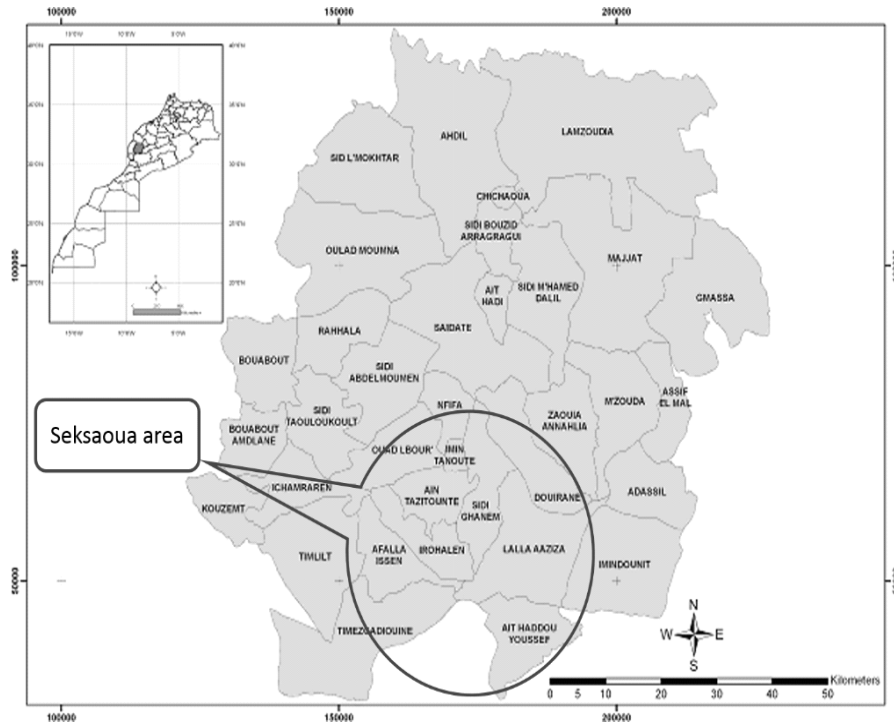
The stratified sampling method [8] allowed us to identify the different survey environments. This technique is intended to help obtain a more complete floristic inventory and conduct ethnobotanical surveys that differ from one station of the study area to another [9].

At each interview, we collected all relevant information about the respondent (sex, age, therapeutic practice ... etc.) and the medicinal plants used (vernacular name, part used, mode of preparation, type of disease treated, ...etc.).

The ethnobotanical data collected from field surveys was then organized into a database, processed, analyzed and interpreted using "Excel 2013" tool.

Taxonomic identification of plant samples collected from the different stations was subsequently carried out at Laboratory of Science and Biodiversity in Kenitra, using some botanical references such as:

- « Flore pratique du Maroc. Manuel de détermination des plantes Vol 1, 2 et 3 »



**Fig. 1. Location of Seksaoua area (western high atlas Morocco)**

- de Fennane & al. (1999, 2007 et 2014) [10-12],
- « La pharmacopée marocaine traditionnelle, médecine arabe ancienne et savoir populaire » de Bellakhdar (1997a) [13],
  - « les plantes médicinales et aromatiques marocaine » de Hmamouchi (2001) [14],
  - « étude ethnobotanique des plantes utilisées dans la pharmacopée traditionnelle à la Réunion » de Lavergne et Véra (1989) [15],
  - « Larousse encyclopédie des plantes médicinales 2ème édition » de Iserin et al., (2001) [16],
  - « Contribution à l'étude de la pharmacopée traditionnelle au Maroc : La situation actuelle, les produits et les ressources du savoir » thèse doctorale, science de la vie, université de METZ de Bellakhdar (1997b) [17],
  - « Les plantes médicinales du Maroc » de Sijelmassi (1993) [18],

### 3. RESULTS AND DISCUSSION

Seksaoua region is one hundred percent rural, and has a great medicinal plant diversity that represents an important resource for the

population to face up their daily ailments. This study enabled us to identify 92 plant species used by the population of Seksaoua against digestive disorders, which were divided into 78 genera and 44 botanical families, including 20 species that are endemic to Morocco [19].

Leaves were the most used plant part by the population of Seksaoua for the treatment of digestive diseases (26 species), followed by seeds (23 species) and the aerial part (22 species). The use of other plant parts was also reported herein for 28 species along with their respective applications in traditional herbal medicine for the treatment of digestive disorders. As shown in Table 1, most of the species reported were particularly recommended for treatments against gastrointestinal pain. The frequent use of leaves may be explained by their easy harvest [20].

The results of our survey also indicated that decoction is the most widely used preparation method for the treatment of digestive tract diseases in the studied area (67 species).

Table 1 lists the main medicinal plants used against digestive diseases in Seksaoua region and compares their therapeutic use with some traditional uses reported in literature.

Table 1. The main medicinal plants used for the treatment of digestive tract disorders in Seksaoua region

Family	Scientific name	Vernacular name (Arabe or Amazigh)	Part(s) used	Preparation methods	Associated plants	Traditional therapeutic use in Seksaoua	Therapeutic use cited by other authors
Anacardiaceae	<i>Pistacia lentiscus</i> L.	Titek, Tiwant	Bark	Decoction	<i>Cydonia oblonga</i>	Stomach pain, constipation and abdominal pain	Treatment of diarrhea and abdominal pain [9], [21].
Arecaceae	<i>Chamaerops humilis</i> L.	Agaz	Leaves	Decoction	No association	Digestive disorders	Treatment of stomach disorders [21] and diarrhea [17].
Aristolochiaceae	<i>Aristolochia longa</i> L.	Tazert, Breztem	Rhizome	Vaporization	No association	Digestive disorders, constipation	Treatment of intestinal disorders [9], diarrhea, constipation and aorta palpation (Bomezwi) [22].
Asteraceae	<i>Cladanthus arabicus</i> (L.) Cass.	Awerzit	Aerial parts	Decoction	No association	Abdominal pain	Treatment of icterus [23].
	<i>Echinops spinosus</i> L.	Taskra	Rhizome	Decoction	No association	Stomach disorders	It facilitates digestion [9].
	<i>Launaea nudicaulis</i> (L.) Hooker Fil.	Talma	Aerial parts	Powder	<i>Plantago albicans, Euphorbia falcata, Rumex papilio, Herniaria hirsuta</i> and <i>Zea mays</i>	Abdominal pain	Treatment of diarrhea [24] and digestive disorders [25].
	<i>Pulicaria mauritanica</i> Coss.	Bamghar	Aerial parts	Decoction	<i>Chenopodium album</i>	Gastrointestinal disorders	No citation for digestive disorders
	<i>Scolymus hispanicus</i> L.	Takot, Afezdad	Leaves	Cooked with egg	No association	icterus	It facilitates digestion [22] and treat hepatic and intestinal disorders [17].
Caryophyllaceae	<i>Chenopodium album</i> L.	Amelgot	Seeds	Decoction in milk	<i>Pulicaria mauritanica</i>	Gastrointestinal disorders	Treatment of stomach pain [26].
Cistaceae	<i>Cistus creticus</i> L.	Irgel	Leaves or seeds	Decoction	No association	Abdominal pain	Treatment of constipation [27].
Cupressaceae	<i>Tetraclinis articulata</i> (Vahl) Mast.	Azuka	Leaves	Powder, decoction	<i>Herniaria hirsuta, Lavandula multifida, Melissa officinalis, Salvia taraxacifolia, Urtica pilulifera, Salvia taraxacifolia</i> and <i>Opuntia ficus-indica</i>	Gastric folds, diarrhea, Abdominal pain and Digestive disorders	Treatment of abdominal pain [28], [29], severe diarrhea [17] and gastrointestinal disorders [30].
Ephedraceae	<i>Ephedra fragilis</i>	Amater	Aerial	Decoction	Thym and Origan	Intestine disorders	No citation for digestive disorders

Family	Scientific name	Vernacular name (Arabe or Amazigh)	Part(s) used	Preparation methods	Associated plants	Traditional therapeutic use in Seksaoua	Therapeutic use cited by other authors
Fabaceae	Desf. Subsp. <i>Ononis natrix</i> L.	Afezdad	parts Leaves	Cooked with egg	No association	icterus	Treatment of icterus [23], [26], constipation and difficult digestion [25].
	<i>Trigonella foenum-graecum</i> L.	Tifidas	Seeds	Powder, decoction, maceration or infusion	Chickpea	Stomach disorders	Treatment gastrointestinal disorders [30] and anti-inflammatory treatments [31].
Juncaceae	<i>Juncus maritimus</i> Lam.	Azmma	Seeds	Powder, decoction	No association	Stomach pain, constipation	Treatment of abdominal, hepatic pains [9] and diarrhea [32].
Lamiaceae	<i>Ballota hirsuta</i> Benth.	Warissma	Aerial parts	Vaporization	No association	icterus	Treatment of gastrointestinal disorders [30].
	<i>Lavandula multifida</i> L.	Igaz	Leaves	Infusion, decoction	<i>Herniaria hirsuta</i> , <i>Tetraclinis articulata</i> , <i>Melissa officinalis</i> , <i>Salvia taraxacifolia</i> , <i>Urtica pilulifera</i> , <i>Salvia taraxacifolia</i> and <i>Opuntia ficus-indica</i>	Gastrointestinal disorders	It facilitates digestion [33] and is used for treatment of gastrointestinal disorders [22], [34], stomach pain [25] and hepatic disorders [35].
	<i>Teucrium polium</i> L.	Jaadiya	Aerial parts	Decoction	No association	Abdominal pain	Treatment of abdominal pain, diarrhea, gastrointestinal and hepatic disorders [17], [2], [25], [34].
Plantaginaceae	<i>Plantago albicans</i> L.	Illoman	Aerial parts	Powder	<i>Launaea nudicaulis</i> , <i>Euphorbia falcata</i> , <i>Rumex papilio</i> , <i>Herniaria hirsut</i> , <i>Nigella sativa</i> and <i>Zea mays</i>	Abdominal pain	Treatment of colic [36].
Scrophulariaceae	<i>Scrophularia canina</i> L.	Wijjan	Aerial parts	Decoction	Onion and tae	Constipation	Treat colic of cattle [37].
Thymelaeacea	<i>Thymelaea linifolia</i> Andr.	Anawt	Latex	Uncooked	No association	Constipation	No citation for digestive disorders

#### 4. CONCLUSION

This study showed clearly the importance of traditional medicine, as well as floristic richness of Seksaoua region in terms of medicinal plants, particularly those with traditional use against digestive ailments.

As resulted from our 746 survey records and taxonomic identification of collected samples, 92 plant species were recommended for treatment of digestive tract disorders in Seksaoua. These species were identified as belonging to 78 genera and 44 families. Leaf was reported to be the most used plant part in the studied area, while decoction was the most mentioned preparation method of therapeutic recipes.

Nevertheless, the application of medicinal plants remains anarchic and not controlled especially in landlocked areas. For instance, only 0.26% of Seksaoua population claimed to use medicinal plants with caution to avoid toxicity.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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## APPENDIX

### Survey. Medicinal and herbal plants

Date:  
Region:  
Commune:  
Author:  
Place:

#### Informant:

Age:  
Profession:  
family situation: Single  Married   
Gender: Male  Female   
Education Level: primary  secondary  university   
Locality : Douar  village  city  nomad

#### Therapeutic practices:

When you feel sick, you address:  
A traditional medicine , why: effective  cheapest   
Acquisition  drug ineffective   
A modern medicine , why : effective  accuracy   
If both, what is the first one:  
Modern medicine  Traditional medicine

#### Plant material:

Vernacular name:  
Scientific name:  
Part used : Stem  Flowers  Fruits  Seed  Bark  Rhizome  Bulb  Sheets   
Whole plant  Other combinations   
Form of use : herb tea  Powder  Essential Oils   
Extract (tincture, solution, capsule)   
Mode of preparation:  
Infusion  Decoction  Cataplasm  raw  Cooked  Others   
Mode of administration :  
Oral  Massage  Rinsing  Slathering  Others   
Posology:  
number of catch per day : For the children: Once/day  Twice/day  3 times/day  Others   
  
For the elderly people: Once/day  Twice/day  3 times/day  Others   
For the Adults: Once/day  Twice/day  3 times/day  Others   
Duration of use (treatment duration): One Day  One week  One month  Until healing



**Use:**

Type of disease:

- Dermatological infections
- Respiratory affections
- Cardiovascular affections
- Genito-urinary affections
- Osteo-articular affections
- Metabolic affections
- Digestive affections
- Digestive additional glands affections
- Neurological affections

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