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RESEARCH ARTICLE

CATALOGUE OF MEDICINAL PLANTS USED IN THE REGION OF AL-HAOUZ RHAMNA (CENTRAL MOROCCO) AS A DIURETIC AND ANTI-GALLSTONE

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ABSTRACT

This study fits into the framework of the valorisation of the resources of the region of Al Haouz-Rhamna (central Morocco), medicinal plants and their traditional uses. Also, this ethnobotanical study of medicinal plants has been carried out in this region, with a view to establishing the catalog of medicinal plants to diuretic property anti-gallstones and used in traditional medicine in the said region. The information requested have focused on the plant, its local name, its parts used, its toxicity and medical practices relating in the region studied. Has the help of 1700 sheets questionnaires which have been carried out of the field during two campaigns (2012 and 2013). The results allowed us to identify 100 Medicinal plants divided into 84 genera and belonging to 41 families among which four predominate including *Apiaceae* (14 species), the *Lamiaceae* (10 species), the *Fabaceae* (7 species) and the *Rosaceae* (6 species). Among the species surveyed, 61 species are traditionally used as anti-gallstones, 12 are used as diuretics and 27 are used both as diuretics and anti-gallstones. The results also show that among these species, 35 are toxics and 11 species are more used in the region namely: *Petroselinum sativum, Zea mays*, *Opuntia ficus-indica*, *Herniaria hirsuta*, *Lavandula dentata*, *Citrus limetta*, *Ziziphus Lotus*, *Cynodon dactylon*, *Hordeum vulgare*, *Crocus sativus* and *Juncus maritimus.* Also, the results showed that the leaves (31%), the roots (25%) and seeds (23%) are the main parties used to prepare the recipes. Alone or in combination, these parties are involved in the development of revenue by processes using mainly the decoction. The revenues are administered by the oral route via the water. Furthermore, the diversity of therapies identified in the region concerned is a cultural wealth. The data reported by this study could constitute a source of information that is very valuable to this region and they could be a basis for a comprehensive study in the field of phytochemistry in order to produce and identify new natural drug that could be endowed with therapeutic properties interesting in the prevention of the formation of the urinary lithiasis.

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INTRODUCTION

The urinary lithiasis is one of the oldest human diseases. The bladder lithiasis, for example, was found on the skeletons dated more than 7000 years (1). It is a disease that is linked to the presence of calculation or stone in the whole of the Urinary device (2); it is very frequent and affects approximately 10% of the population in the industrialized countries. In France, 5 million to 10 million people will a lithiasis during their life. In addition, this condition is recurrent with 50% of recidivism to 5 years in the absence of preventive treatment (3). In Morocco, unfortunately, we do not have a statistics on the urinary lithiasis. The lithiasis constituents can be divided in three major affiliations: the constituent minerals (calcium oxalate, calcium phosphate, magnesium phosphate), organic (oxypurines, xantine and cystine) and drug (4). The lithiasis of calcium represents more than 80% of the urinary lithiasis. Its prevalence is increasing probably the fact of nutritional factors, case, in particular, of the increase in the consumption of animal protein. Other types of urinary lithiasis are the calculations of uric acid (10%), calculations infectious (5%), and the calculations Rare: cystine, xanthine, drug (3). The data of the antiquity and the middle ages show that the lithiasis was very widespread. However, its distribution has changed significantly as a function of time and from one country to the other. In effect, all epidemiological enquêtes aimed to explain

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the variations in the frequency of the urinary lithiasis in such or such countries, such or such socio-economic group, show that the supply is one of the main factors modulating the risk of formation of urinary calculated (5 , 6, 7, 8, 9). In Morocco, the studies carried out on the urinary lithiasis remain few in number, they concerned the determination of the composition of the calculations collected in some regions (10, 11, 12, 13), but only a single study was interested in to elaborate a catalog of the medicinal plants used in the treatment of renal lithiasis in the region of Tan-Tan (14). Note that in Morocco, as in most countries, the renal lithiasis is characterized by a predominantly male with a report rights by women (H/F) of 2.10 (4). The treatment of renal lithiasis, is largely, depends of the type of the lithiasis. There are several types of treatments: curative and preventive (15):

- *The curative treatment* is intended to avoid the crystalline precipitation, promote the expulsion spontaneously and extract the nephrolithiasis who cannot be expelled. It includes the medical and surgical treatment (15)
- *The preventive treatment* has for objective the obtaining of the judgment of the training of new calculations through the correction of the insufficient volume of urine and a readjustment of nutritional habits accompanied by a drug treatment in the event of need (16, 17 and 18).

When these treatments are not available or inaccessible or may not be applied and in the case where the risk of recidivism is to fear, the recourse to traditional medicine, particularly in the herbal medicine, is needed. Of this fact, many works have been carried out for the research of the natural substances used as a remedy for the curative treatment and/or preventive measure of the disease lithiasis (19).

In Morocco, thanks to the wealth of its flora, the populations have recourse, in the majority of cases, to certain medicinal plants, sometimes to their mixture, for the treatment of several diseases including the lithiasis renal impairment. In addition, the region of Al Haouz-Rhamna has not been the subject of an ethnobotanical study. This work is part of the framework of the research and the identification of elements that could be endowed with therapeutic properties interesting in the prevention of urinary lithiasis based on herbal medicine.

MATERIALS AND METHODS

Description of the area of study

The region of Al Haouz-Rhamna is located in the center of Morocco to the west, it is limited in the north by the Chaouia-Doukkala region, in the north-east by the region means Oum-Errabiâ, to the east by the Mgoun region, to the south by the region of the central High Atlas and to the west by the Abda-Haha region. Phyto geographically, the region of Al Haouz-Rhamna, Morocco Average Atlantic 4 (Figure 1), is homogeneous of a point of a floristic view.

It is characterized by a geographical framework very varied composed of four natural areas:

- The area of plates: it includes the plateaus of Rhamna and Bahira, a moderate altitude less than 1000 m;
- The area of the Plains: it brings together the Plains of the Haouz, Rhamna Tassaout and upstream and downstream. The major part of the agricultural land is located in this zone;
- The areas of the basins: it is of the basin of Essaouira-Chichaoua characterized by depressions and elevations in the form of land to grain farming or routes;
- The chain of Jbilets: it is a mountain zone of moderate altitude very limited.

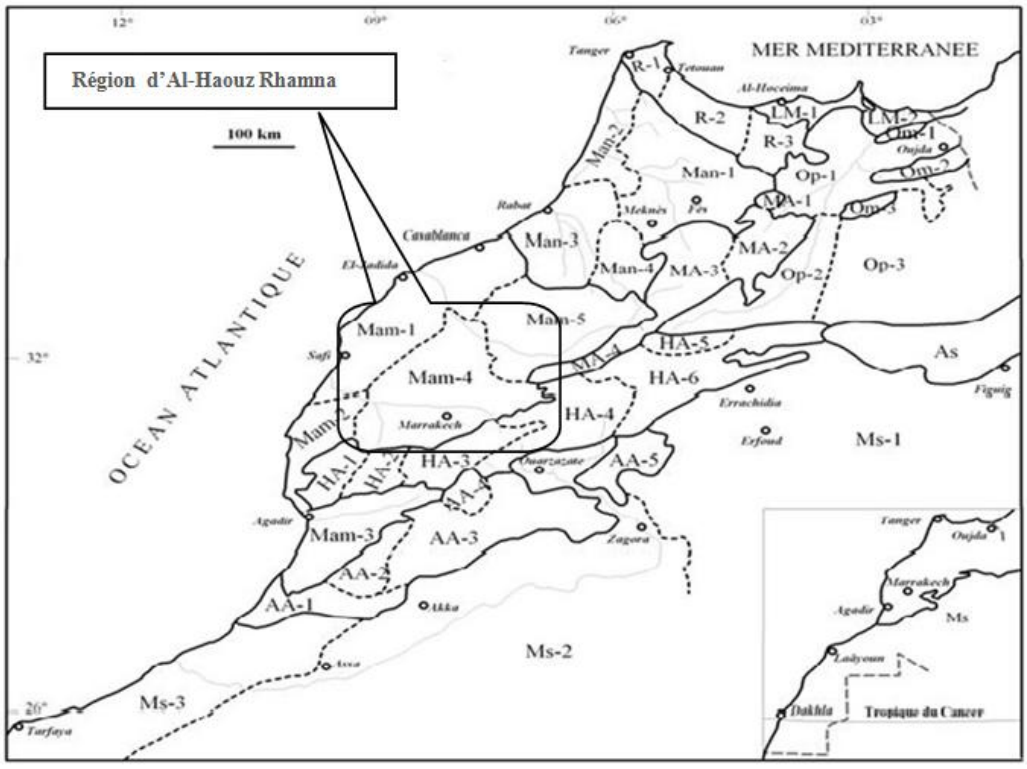

Figure 1. Map of phytogeographical divisions of Northern Morocco (20)

The climate of the region is arid or semi-arid in general, with a cold winter and a hot summer and dry (average of the maxima: 38°C). The region knows a rainfall low and irregular, 800 mm in the mountainous area and 190 mm in the plain (21). With regard to water resources, the region has a surface water and important enough groundwater. Indeed, we note the existence of a large watershed, the Tensift, formed of several sub-basins. The volume of the water in it is assessed to 24 m ^{3} /s. In addition to this basin, there is the watershed Oum Rabiaa, located in the eastern part of the region which includes the Oued Tensift (11,7m ^{3} /s) and the Oued Lakhdar (16.1 m ^{3} /s). The different soils of the region are as follows:

- Isohumic ground (Fluvisols, Regosolic, and Lithosols) locally called "Requane"; it covers 75% of the surface.
- Calcimagnesic ground (Rendzians, Yermosols, Xérosols) locally called "Biad", covers approximately 15% of the surface area. This type of soil exists at the north-west of N'Fis, south-east of the central region and north of El Kalaa of Essraghna.
- Untapped ground locally called "Hach", it covers a small part of the area (10%): along the rivers of the Plain of Al-Haouz and at the foot of the mountains of the Atlas (22).

In the study area, the plant cover is generally poor. Three-quarters of the area are almost naked. The types of vegetation vary depending on the altitude and the nature of the land. In the Haouz-Tadla, the climate-vegetation of the floor arid Mediterranean is a bush of *Ziziphus lotus*, *Withania frutescens* and *Pistacia atlantica*, to which is added, in the Haouz and among Rhamna, Le Gommier of Morocco *Acacia gummifera*; *Pistacia atlantica*, here, is very rare. The Palm Tree- Nain lack completely, it only penetrates in the border areas of the floor where it is located in the wet sites. This vegetation is much degraded and it is very difficult to know its primitive composition. A large number of species more or less nitrophilous, indicate that grazing y is important, and immense clear prairies of *Stipa tortilis*, accompanied by a crowd of therophytes, occupy the deforested land. The trees above are accompanied *of Ephedra altissima*, *Asparagus stipularis*, *Lavandula multifida*, *Ballota hispanica*, *Bryonia dioica*, *Peganum harmala*, *Mantisalca salmantica*, *Scolymus hispanicus*, *Carduus leptocladus*, *convolvulus althaeoides*, *Melica ciliata* sbsp. *Magnolii*, *Phalaris tuberosa*, and of many thérophytes *: Stipa tortilis*, *Lamarckia aurea*, *Calendula algeriensis* and *C.aegyptiaca*, *Bromus madritensis*, *B.rubens*, *B.macrostachius*, *Diplotaxis tenuisiliqua*, *D.assurgens* (E), *D.berthautii* (E), *Reseda battandieri* (E), *Astragalus maroccanus* (E) and *A.schizotropis* (E), *Ononis polysperma* (E), etc. (23). Salty soils are very frequent. The jujubiers and his companions are eliminated or are rare. The vegetation is bushy formed mainly of a set of halophilic species: *Atriplex halimus* and *Lycium intricatum* dominate in the stations most saline *Salsola vermiculata* and *Suaeda fruticosa*, *Sphenopus divaricatus,* etc, are associated with them. The chain of Djebilets who form the dorsal edge of any this arid zone of Morocco is covered, up to 700-800m of the same vegetation at *Ziziphus-Acacia* which covers the plains. On some points, there is still small wood fairly well preserved. The altitude in excess of 800m belongs to the Mediterranean floor semi-arid. There is the Olivier, the carob tree and the palm tree-Nain, vestiges most likely old Callitriaies. The bedrock of the Djebilets brings a wide variety in the herbaceous flora of the bush of *Acacia* such as *Andropogon laniger*, *Forskohlea tenacissima*, *Pennisetum ciliare*, *Notochlaena vellea*, *Fumaria ballii* (E), *Rumex papilio*, *Ceterach officinarum*, *Cheilanthes fragrans*, *Boerhavia repens*, etc (23). The (E) follows the names of the endemic plants Moroccan.

MATERIALS AND METHODS

Has the help of 1700 sheets questionnaires, an ethnobotanical investigation on the field was been conducted while two campaigns 2012 and 2013. The location of the different environments of ethnobotanical surveys and surveys of flora, in the study area, has been marked by the sampling techniques "probabilistic stratified" (24); (25), to carry out investigations ethnobotanical varied from one area to another in the region studied. In this work, the territory studied is divided into 34 homogeneous strata: Marrakech, Ait-ourir, Ksiba, Tamensourt, El-Kelaâ des Sraghna, Laattaouia, Sidi Rahhal, Tamellalt, Chichaoua, Sid El-Mokhtar, Benguerir, Sebt Brikyn, Imintanoute, Youssoufia, Echemmaia, Sidi Bou Othmane, Oulad hassoune, Si Thami, Sid Zouine, Jemaat-Ghmate, Tahennaout, Tameslouht, Lamzoudia, Majjat, Assahrij, Tnin Bouchane, Mtal, Jaidate, Mguedgua, Ras Ain Rhamna, Sidi Ghanem, Skhour Rhamna, Tlat Ouelad-Dlim, and Mechraa Ben-Aabou. The selected stations reach the main entries north, south, east and west of the region (Figure 2).

By proceeding in a simple random sampling, samples of small numbers (50 people) are then trained for each of the 34 strata which were grouped together to form an aggregate sample (1700 people). The ethnobotanical study has been carried out following a series of surveys carried out with the aid of a pre-established questionnaire with specific questions on the informant, the vernacular not of each species, the part used, the method of preparation and administration, the dose and the toxicity . This study has for objective the development of a catalog of the most comprehensive possible of medicinal plants to diuretic property anti-gallstone and used in the study area and in order to have the maximum of information concerning the use of medicinal plants by the local population . The time devoted to each interview was approximately half to three hours. The determination of the scientific nomenclature has been carried out at the level of the species, thanks to the following documents:

- Small flora of the regions arides of Morocco-Western Négre (26), Volumes I and II;
- New flora of Algeria and of the desert regions of southern Quézel & Santa (27), Volumes I and II;
- -Medicinal Plants of Morocco to Sijelmassi (28);
- -The Pharmacopoeia traditional Moroccan of Bellakhdar (29);
- -Practice flora of Morocco to Fennane *et al* (30, 31, 32) Volume 1, 2 and 3;
- -Medicinal and Aromatic Plants Moroccan Hmamouchi (33) 2 nd edition;
- -Catalogs of vascular plants in the north of Morocco include identification keys of Valdés *et al* (34);
- -Vascular flora of Morocco: inventory and chorology of Fennane and Ibn Tattou (35, 36).

RESULTS AND DISCUSSION

This ethnobotanical study has allowed us to elaborate a catalog of 100 medicinal species divided into 84 genera and belonging to 41 botanical families, among which four are more

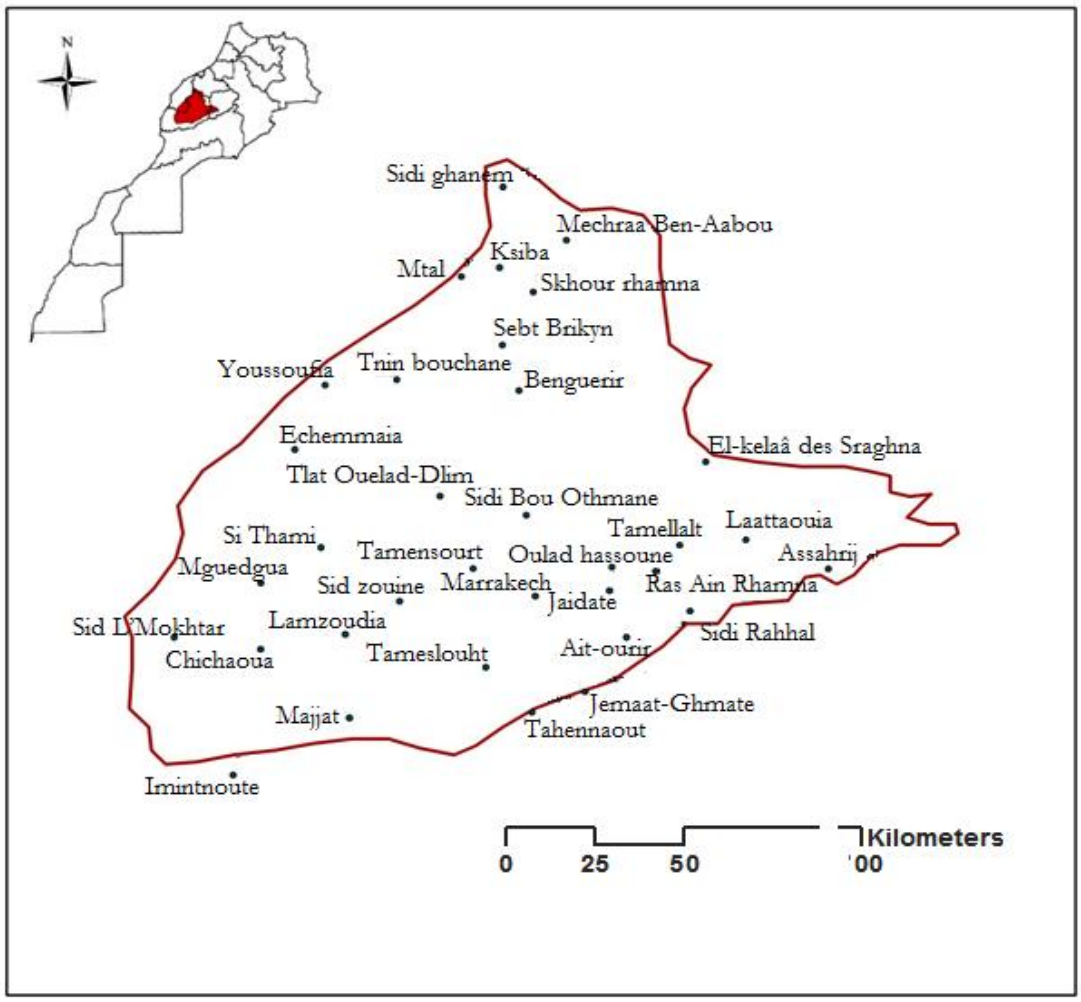

Figure 2. Map of the study area indicating the stations studied

Table I. List of plants used the most in the area of Al Haouz-Rhamna, the activity who are associated with them and the ethnobotanical studies similar in other regions in Morocco and the experimental studies which prove their use (D: diuretic; A: anti-gallstones)

Scientific name	Ownership	Reference of ethnobotanical studies	Reference of the experimental studies
Petroselinum sativum Hoffm	A	(37), (38), (39), (14), (40)	
	D	(41, (39).	
Zea mays L.	D and A	(42), (39)	(69)
	A	(14)	
Opuntia ficus-indica L.(Mill)	A	(43), (14)	(69)
	D	(42).	
Herniaria hirsuta L	D	(42)	(4), (68), (69)
	A	(44), (45), (14)	
Lavandula dentata L.	D	(14), (46)	
	A	(39)	
Citrus limetta Risso	A	(14), (40)	(4)
Hordeum vulgare L.	A	(14).	
Ziziphus lotus L.	A	(43), (45), (14), (40)	
Cynodon dactylon (L). Pers	A	(29).	
Crocus Sativus L.	A	(14).	
Juncus maritimus Lamk.	A and D	(43), (14)	

represented in the study area to know: the *Apiaceae* (14 species), the *Lamiaceae* (10 species), the *Fabaceae* (7 species) and the *Rosaceae* (6 species). The meaningful comparison of these results with those obtained by other related study, (14) shows the great wealth of medicinal plants in this region. On the 100 medicinal species encountered, 61 being employed against the renal lithiasis, 12 are very appreciated by men due to its diuretic and 27 species are used both as anti-gallstone and diuretic. The analyzed data collected shows that 11 medicinal plants are more used in said area and they are believed to be effective against the renal lithiasis namely: *Petroselinum sativum*, *Zea mays*, *Opuntia ficus-indica*, *Herniaria hirsuta*, *Lavandula dentata*, *Citrus limetta*, *Ziziphus lotus*, *Cynodon dactylon*, *Hordeum vulgare*, *Crocus sativus* and *Juncus maritimus*. Indeed, their effectiveness was reported by the people of the area and they are cited in several associations. In addition, the activity antilithiasique and diuretic of these resources was reported in previous ethnobotanical studies in several regions of Morocco except four species: *Citrus limetta*, *Herniaria hirsuta*, *Opuntia ficus-*

Table II. Species to toxicity not known by the population of the area of Al Haouz-Rhamna and references which proved their toxicity

Family	Common Name	References that indicate their toxicity
Amaryllidaceae	*Allium sativum* L.	(28)
Apiaceae	*Ammi visnaga* L.	(47)
	Carum carvi L.	(48)
	Foeniculum vulgare L.	(29), (48)
	Petroselinum sativum Hoffm.	(49)
	Pimpinella anisum L.	(50)
Asparagaceae	*Asparagus albus* L.	(51), (52), (29)
Asteraceae	*Artemisia absinthium* L.	(50), (28)
	Artemisia herba alba Asso.	(29), (53)
Brassicaceae	*Lepidium sativum* L.	(29)
Camelliaceae	*Camellia thea* Link.	(29)
Cucurbitaceae	*Bryonia dioica* Jacq.	(29)
Euphorbiaceae	*Euphorbia falcata* L.	(29)
	Mercurialis annua L.	(54)
Fabaceae	*Glycirrhiza glabra* L	(55), (48)
Lamiaceae	*Ajuga iva* (L.) Schreb.	(56)
	Lavandula angustifolia Mill	(28)
	Menta pulegium L.	(57) (48)
	Origanum compactum Benth.	(58)
	Origanum majorana L.	(48)
	Rosmarinus officinalis L.	(59), (48)
Linaceae	*Linum usitatissimum* L.	(54), (50)
Myrtaceae	*Eucalyptus globulus* Labill.	(60)
	Myrtus communis L.	(54)
Nitrariaceae	*Peganum harmala* L	(29)
Poaceae	*Cynodon dactylon* (L) Pers	(51), (60)
Polygonaceae	*Rumex ecetosa* L.	(61)
Portulacaceae	*Portulaca oleracea* L	(70; 71), (33)
Ranunculaceae	*Nigella sativa* L.	(29)
	Ranunculus muricatus L.	(55)
Thymelaeaceae	*Thymelaea hirsuta* L.	(54), (67)

indica including *Zea mays* whose activity anti-gallstones has been proven experimentally by in vivo and in vitro studies (4, 68, 69) (Table I). The results also show that the population of the three stations among the 34 sites studied is more affected by renal lithiasis, it is Youssoufia, Benguerir and Echemmaia because of the poor quality of drinking water and this shows a strong relationship between the formation of kidney stones and the nutritional habits and environmental concerns in this area. As regards the toxicity, the pharmacological analysis of plants identified, has allowed us to identify the toxic plants (35 species) used in traditional pharmacopeia (anti-gallstones and diuretic) in the study area. Among these toxic species, only four toxic species are known by the local population to know: *Ferula communis*, *Euphorbia Echinus*, *Lupinus pilosus* and *Myristica fragrans*, while the toxicity of thirty-one species remains ignored by the surveyed (Table II). In the final analysis, the self-medication by these plants is not recommended by what it can affect the health of the population. The plants inventoried are presented in the catalog according to the family, the scientific name, the french name, the vernacular name local, the use reported and the toxicity. It is to be noted that the leave constitutes the most used in local therapeutic in the area studied; then come the seed and the root. The frequency of high use of leaves may be explained by the fact that they are at the same time central units of photochemical reactions and fears of organic materials that derive from it. They provide the majority of alkaloids, glycosides and essential oils (62). The revenue and dosages are described and the remedies are administered to patients by oral route via the water up to the healing.

Catalog of medicinal plants

AMARYLLIDACEAE

- ***Allium cepa*** L.

French name: Oignon rouge
Vernacular name: L-bessla El hamra El Hamra
Used part: The bulb and the seed

Local use: A remedy, at basis of a glass of juice of *Allium cepa*; a glass of olive oil; half a glass of juice of *Citrus limetta* and half a glass of pure honey, then heat the mixture for five minutes, is advised against the renal lithiasis and as herbal tea diuretic by reason of three glasses a day: a glass in the fasting state and the other two outside of meal. The seeds of *Allium cepa,* powder (a teaspoon), crushed in a half- glass of honey, and they are shown against the renal lithiasis in reason of a teaspoon in the fasting state.

- ***Allium porrum*** L.

French name**:** Poireau
Vernacular name **:** El-Korrâte, Poireaû
Used part **:** The bulb

Local use: A recipe on the basis of equal quantities (two bouquuets) of bulbs of *Allium porrum* and stems leaf shoots of *Petroselinum sativum* and a kg of *Allium cepa*, in decoction in a 1.5 liter of mineral water of Sidi Harazem up to the obtaining of two glasses of initial volume, is indicated as an effective treatment against the renal lithiasis in reason of two glasses a day: in the morning on an empty stomach and the evening.

- ***Allium sativum*** L.

French name **:** Ail
Vernacular name **:** Touma
Used part **:** The bulb

Use local: The consumption of *Allium sativum* (two to four bulbs) in nature is recommended in case of oliguria and as a diuretic.

A decoction of *Allium sativum* (ten bulbs in half a liter of mineral water) is indicated as anti-gallstones by reason of two glasses a day.
Toxicity: A high dose the garlic causes heartburn, irritation of the urinary tract, which can cause cystitis and fever (28).

ANACARDIACEAE

- ***Pistacia atlantica*** Desf.

French name: Pistachier de l'atlas
Vernacular name: El-yegue, Qwawêch, Lebtem, Assel
Used part: The seed
Use local: The seeds, decoction in the water, are used against the renal lithiasis in reason of two glasses a day.

APIACEAE

- ***Ammi visnaga*** L.

French name : Khella
Vernacular name: Bechnikha
Used part: The fruit
Local use: the fruits of *Ammi visnaga*, in decoction (a soup spoon in a liter of mineral water), are often prescribed against the renal lithiasis in reason of two glasses per day: in the morning after breakfast and in the evening at bedtime.

Toxicity: In high dosages, the khellin (chemical component) causes nausea, dizziness, allergic reactions and collapse (47).

- ***Ammodaucus leucotrichus*** Coss and DR

French name: Cumin velu
Vernacular name: El Kamoun essôfi
Used part: The seed

Local use: A preparation with a basis of seeds of' *Ammodaucus leucotrichus, Petroselinum sativum,* styles of *Zea mays*, of the flowers of *Opuntia ficus-indica* and the fruits of *Ziziphus lotus* , in decoction in water, is recommended as an effective treatment against the urinary lithiasis in reason of two glasses a day before meals.

- ***Anethum graveolens*** L.

French name: Aneth.
Vernacular name: El karweya el aamya
Used part: The seed

Use local: The seeds of *Anethum graveolens* in association with those of *Carum carvi*, in decoction in water, are employed against the renal lithiasis in reason of two glasses a day.

- ***Apium graveolens*** L.

French name: Céleri, Ache
Vernacular name: Krafes
Used part: The fruit, leafy stem and the root

Local use: The fruits are recommended in decoction (One teaspoon in a liter of water) as a diuretic to reason of three glasses per day before each meal.

A recipe to base of stems leaf shoots of *Apium graveolens* and those of the *Herniaria hirsuta* and *Petroselinum sativum,* fruits of *Ziziphus lotus* and *Prunus domestica,* the floral buds of *Rosa centifolia and Opuntia ficus-indica* In decoction in water of Sidi Harazem, then mix the result of a decoction the juices to *Citrus limetta,* is indicated as an effective remedy against the renal lithiasis to reason to four glasses a day.

The roots, in powder (a soup spoon in a liter of water), are used in an infusion for the same purpose in reason of three glasses a day before meals.

- ***Carum carvi*** L.

French name: Carvi
Vernacular name: El-Karwiya
Used part: The seed
Local use: See the association with *Anethum graveolens.*
Toxicity: The ingestion of a large quantity causes drowsiness, dizziness and liver and kidney damage (48).

- ***Coriandrum sativum*** L.

French name: Coriandre
Vernacular name: El Kosber
Used part: The seed
Local use: An association in equal quantity (a soup spoon in a liter of water) on the basis of seeds of *Coriandrum sativum* and those of *Carum carvi, Daucus carota* and *Petroselinum sativum*, the sheets of *Centaurium erythraea* in decoction, is recommended to treat renal lithiasis in reason of two glasses per day: in the morning on an empty stomach and the evening.

- ***Cuminum cyminum*** L.

French name: Cumin
Vernacular name: El Kamoun
Used part: The seed
Local use: The dried seed of *Cuminum cyminum,* alone or in association with *Nigella sativa, Coriandrum sativum, Ammodaucus leucotrichus* , *Petroselinum sativum,* of *Trigonella foenum-graecum* and nuts of *Juglans regia*, are very used (in decoction in the water during a half-hour) against the renal lithiasis in reason of three glasses a day before meals.

- ***Daucus carota*** L.

French Name: Carotte cultivée
Vernacular Name: Khizou
Used part: The seed and the leave
Local use: A recipe to the base of the leaves of *Daucus carota* (half a bouquet), the juice of a single fruit of *Citrus limetta*, and then mix the mixture with two glasses of water, is very used as a diuretic to a reason of two glasses a day. See the association with *Coriandrum sativum*.

- ***Eryngium triquetrum*** Vahl.

French name: Panicaut
Vernacular name: Chuka Zerqa, El mghizla, Karess aanou
Used part: The sheet and the root
Local use: The leaves in infusion or well the roots in decoction are shown against the renal lithiasis and as a diuretic to the reason of two glasses a day.
Fragmented roots in small fragments of two cm and dried in the sun, reduced in powder and then triturate in honey, are used as a diuretic.

- ***Eryngium ilicifolium*** Lamk.

French name: Panicaut
Vernacular name: Zerriqa
Used part: The root
Local use: Roots in powder (half a teaspoon in two glasses of water), are used as a diuretic to reason of two glasses a day.

- ***Ferula communis*** L.

French name: Férule, Faux fenouil, Férule commune
Vernacular name: El-kelkha, l-besbas la-hrami, El-boubale, El fassoukh
Used part: The gum resin
Local use: an infusion of the head of a teaspoon of powder in the milk is indicated against the renal lithiasis, in reason of a glass a day.

Toxicity: The toxicity of the plant is known by populations. In humans, the symptoms are marked by a great weakness accompanied by pallor, shortness of breath, diarrhea abundant, ecchymotic plates, especially on the members. Quickly a great state of torpor installs and Walking becomes difficult (64). The inner side of the legs and feet covers by a bloody serosity. The weakness increases and then, 8 days approximately after the first signs, the death occurs in subjects very achieved or already weakened at the start of the disease (65), (66).

- ***Foeniculum vulgare*** L.

French name: Fenouil sauvage
Vernacular name: Nafaâ El-Beldi, Bessbass
Used part: The seed and the root
Local use: An association on the basis of roots of *Foeniculum vulgare* and those of *Ranunculus muricatus*, the rhizomes of *Zingiber officinalis*, in powder and mixed with the same quantity of olive oil, is used against the renal lithiasis. A decoction in the water of the seeds alone or in association with those of *Hordeum vulgare*, the styles of *Zea mays* and the leaves of *Herniaria hirsuta,* is indicated as anti-gallstone (nephrolithiasis) and as a diuretic to reason of three glasses a day.

Toxicity: The anetol, principle of the essential oil of fennel, is used by Moroccan Jews to flavor the alcohol. Poorly dosed, it has caused in the past a few accidents (hébétude, hallucinations, convulsions) among people already poorly in point of fact the éthylisme (29). The essence is allergenic, it causes phytodermatoses, vertigo, dizziness, liver and kidney damage (48).

- ***Petroselinum sativum*** Hoffm.

French name: Persil
Vernacular name: Maâdnous
Used part: The leafy stem, the seed and the root
Local use: A decoction of the leafy stem shoots of *Petroselinum sativum,* alone or in association with those of *Thymeleae hirsuta,* rhizomes of *Cynodon dactylon* and Seeds of *Hordeum vulgar,* in decoction in two liters of water, is recommended as an effective treatment against the urinary lithiasis and also used as a diuretic to condition of a liter a day.
A recipe to basis of six bouquets of stems leaf shoots of *Petroselinum sativum*, one gram of the stigmas of *Crocus sativus,* in decoction in three liters of water of Sidi Ali during one hour, is emploiyée as an effective treatment against the renal lithiasis, in reason of a liter per day divided in three taken. The patient is advised to delay the breakfast. The decocted roots in water, associated with the juice of *Citrus limetta,* olive oil and honey, is indicated as an effective remedy against the renal lithiasis and in the case of the containment of urine. See the association with *Artemisia herba-halba, Origanum compactum* and *Cicer arietinum.*
Toxicity: A long-term treatment, at doses very strong, can cause severe inflammation of the nerves and also a risk of abortion during pregnancy (49).

- ***Pimpinella anisum*** L.

French name: Anis vert
Vernacular name: Habat hlawa
Used part: The seed
Local use: Seeds, in powder or decoction in water, are recommended as a diuretic to reason to a half-teaspoon with a glass of water twice a day and after meals.
Toxicity: In high doses, the essential oil of anise, by its anetol, causes of neurological disorders: first a general excitation, quickly followed by dullness, hallucinations and epileptic seizures. The anetol, used to flavor of the Waters of Life has caused in the past a few accidents (50).

ASPARAGACEAE

- ***Asparagus albus*** L.

French name **:** Asperge
Vernacular name **:** Ssekkûm, Hmisso
Used part**:** The root and young shoots
Local use: young shoots, in decoction in water, or well the roots (a teaspoon of powder in half a liter of water), are indicated against kidney stones and also recommended as a diuretic to reason of two glasses per day before meals.
Toxicity: The arrays would not be totally devoid of toxicity, due to the presence of a saponoside likely to cause gastrointestinal disorders of variable severity (51).
In humans, the manipulation of the asparagus may cause dermatitis called "gale of asparagus" (52) and excessive consumption may be irritating for the kidneys (29).

- ***Asparagus stipularis*** Forsk.

French name **:** Asperge
Vernacular name **:** Ssekkûm, Hmisso
Used part**:** The root and young shoots
Local use: Presents the same use that *Asparagus albus.*

ASTERACEAE

- ***Artemisia absinthium*** L.

French name: Absinthe vraie
Vernacular name: Chiba
Used part: The leafy stem
Local use: an infusion of dry leaves of *Artemisia absinthium* in water is recommended as effective against the renal lithiasis.
Toxicity: The essential oil of absinthe is indeed highly convulsive. The presence of β-thuyone explains the toxicity of the plant. According to Garnier *et al.* (50), 12g of essential oil are sufficient to cause convulsions, the construction of the jaws and the appearance of foam to the lips.
The essential oil of the wormwood is toxic as soon medium doses. It causes convulsions, crises epileptiform and tetaniform (28).

- ***Artemisia herba alba*** Asso.

French name: Armoise blanche
Vernacular name: Chih dwidi
Used part: The aerial part and the leafy stem
Local use: An association to base of stems leaf shoots or well of the aerial parts of *Artemisia herba alba* and those of *Lavandula officinalis, Petroselinum sativum* and *origanum compactum,* in decoction in the macerate of *Cicer arietinum* , is prescribed as effective against the renal lithiasis and as a diuretic to reason a glass in the fasting state.
Toxicity: The high doses of the plant have caused cases of poisoning, especially in the infant, the child, and the pregnant

woman. The symptoms of intoxication are similar to those observed during an intoxication by absinthe as: dizziness, convulsions (29).
There are intolerances such as visual disorders and gastrointestinal (28). A strong dose, sagebrush is neurotoxic abortive, hemorrhagic, (53).

- ***Cichorium intybus*** L.

French name: Cichorée sauvage
Vernacular name: Boaggad
Used part: The leave and the root
Local use: the leaves in infusion or well the roots in decoction (a soup spoon in a liter of water) are indicated as a diuretic to reason two cups a day.

- ***Cynara scolymus*** L.

French name : Artichaut cultivé
Vernacular name: L-qôq
Used part: The leave and the root
Local use: The decoction of roots or well of the sheets is prescribed as a diuretic to the reason of three glasses a day.

- ***Echinops spinosa*** L.

French name: Echinops
Vernacular name: Tassekra
Used part: The root and the leave
Local use: The leaves or roots, powder, are used as a diuretic to reason to a half-teaspoon in a glass of water after each meal.
A preparation with a basis of the roots of *Echinops spinosa,* pods of *Ceratonia siliqua* , of the leafy stems of *Herniaria hirsuta* and those of the *Euphorbia falcata* , the branches of' *Eucalybtus globulus*, in decoction in water, is recommended against the renal lithiasis in reason of three glasses a day.

BORAGINACEAE

- ***Echium horridum*** Batt

French name: Vipérine
Vernacular name: lissan tur
Used part: The leave
Local use: The leaves, in decoction in the water, are used against the renal lithiasis in reason of two glasses a day.

BRASSICACEAE

- ***Lepidium sativum*** L.

French name: Cresson alénois, Cressonnette
Vernacular name: Habb-Errechâd, Habb-Errajeae
Used part: The seed
Local use: The seeds in association with those of *Nigella sativum* , dried fruits and sprayed of *Capparis spinosa,* crushed in the pure honey and olive oil, are shown against the renal calculations because of a teaspoon a day. See the association with *Trigonella foenum-graecum.*
Toxicity: By their essential oil, the seeds, taken in large quantity, can cause irritation of the mucous membranes. The poultices can cause skin inflammations (29).

- ***Nasturtium officinalis*** R. Br.

French name: Cresson des fontaines
Vernacular name: Guernûnech
Used part: The leafy stem
Local use: Leafy stems fresh, consumed in salads or well-cooked to the water vapor, are shown as a diuretic.

- ***Raphanus sativus*** L.

French name: Radis cultivé
Vernacular name: Lefjel
Used part: The root
Local use: The roots only, in decoction in water, or in association with the bulbs of *Allium cepa*, the juice of *Citrus limetta* and olive oil, are consumed as a salad against renal lithiasis.

CACTACEAE

- ***Opuntia ficus-indica*** L. (Mill).

French name: Figuier de Berber
Vernacular name: Aknarî, Handiya, Karmôs en-nsârâ
Used part: The racket, the flower and the root
Local use: The flowers in infusion are shown as a diuretic.
A decoction in water of a mixture (at the same quantity) of dried flowers of *Opuntia ficus-indica*, of leaflets of *Cassia angustifolia*, leaves of *Tetraclinis articulata* and those of the *Herniaria hirsuta, rosmarinus officinalis*, of young leaves of *Eucalyptus globulus* and *Mentha pulegium,* of the fruits of *Ziziphus lotus* and those of *Capparis spinosa*, styles of *Zea mays*, is recommended as effective in the case of renal lithiasis to condition of three glasses per day. See the association with: *Ammodaucus leucotrichus, Zea mays, Herniaria hirsuta* and *Thymelaea hirsuta.*

CAMELLIACEAE

- ***Camellia thea*** Link.

French name: Thé vert
Vernacular name: Atây
Used part: The leave
Local use: An association on the basis of leaves of *Camellia thea* and fruit of *Illicium verum*, in decoction in water, is recommended as a diuretic and against the kidney stones.
Toxicity: The regular consumption, frequent and prolonged of Tea can create a chronic intoxication, theism, manifested by insomnia, anorexia, weight loss, constipation and nervous disorders (29).

CAPPARACEAE

- ***Capparis spinosa*** L.

French name: Câprier
Vernacular name: Kabâr, taylult
Used part: The fruit and the capers (floral button)
Local use: See the association with *Lepidium sativum*.

CARYOPHYLLACEAE

- ***Herniaria hirsuta*** L.

French name: Herniaire
Vernacular name: Herrasse lehjar
Used part: The leafy stem
Local use: An association to base of stems leaf shoots of *Herniaria hirsuta* and the roots of *Petroselinum sativum,* in decoction in water, is used as an effective remedy against the renal lithiasis and herbal tea diuretic.
A recipe to basis of *Herniaria hirsuta*, the seeds of *Petroselinum sativum* and fruits of *Opuntia ficus-indica,* in decoction in water, is used against the kidney stones by reason of two glasses per day: in the morning on an empty stomach and the evening . See the association with: *Opuntia ficus-indica*, *Apium graveolens, Mentha pulegium, Mercurialis annua, ceratonia siliqua, Eucalyptus globulus, Ziziphus lotus* and *Thymelaea hirsuta.*

- ***Paronychia argentea*** (L.) DC

French name: Paronyque
Vernacular name: Atay dial blad, Hayduret er-rai, Tahidurt, Frîricha
Used part: The Flower
Local use: The decoction of the flowers in the tea is used as diuretic herbal tea to the reason of three glasses a day.

COMBRETACEAE

- ***Combretum micranthum*** G.Don

French name: Kinkéliba vrai
Vernacular name: Kinkiliba
Used part: The leave
Local use: The leaves, in infusion in the water, are shown as a diuretic to reason of two glasses a day.

CUCURBITACEAE

- ***Bryonia dioica*** Jacq

French name: Bryone dioïque
Vernacular name: Adil n-wuchchen, lowaya
Used part: The bay
Local use: Small red berries are employed, in decoction in water as a diuretic to reason a glass a day.
Toxicity: the ingestion of all parts of the plant causes of diarrhea and violent colic with severe inflammation of the mucous membranes gastrointestinal, vomiting, delusions, seizures, stupor. At higher doses, occur respiratory disorders, a coma, and death by asphyxiation (29).

- ***Citrullus colocynthis*** (L.) Schrad.

French name: Coloquinte
Vernacular name: L-hdeja, taferzizt
Used part: The seed
Local use: The whole seeds (two to three in decoction in a liter of water) are employed as a diuretic, by reason of two glasses a day.
Toxicity: The plant is very toxic to man and the animal. At higher doses, are added of delirium, weakness, hypothermia, a slowdown of the weight, sometimes a cerebral followed by collapse and death (54).

- ***Citrullus vulgaris*** Schrad.

French name: Pastèque, Melon d'eau
Vernacular name: Dellah
Used part: The fruit
Local use: The consumption of fruit pulps is considered as a diuretic.

CUPRESSACEAE

- ***Juniperus phoenicea*** L.

French name: Genévrier de Phénicie
Vernacular name: Al-ar'ar finiqui, Araar el hor
Used part: The leave and the aerial part
Local use: The leaves dried, in maceration in the water during a night, are used as a diuretic, a reason of two glasses per day. It is advisable to decant the macerate to eliminate the leaves.

ERICACEAE

- ***Arbutus unedo*** L.

French name: Arbousier
Vernacular name: Assassno, Bakhanou
Used part: The leave and the root
Local use: Dried leaves in the shade or well the roots in decoction (a soup spoon in a liter of water) are indicated as diuretic and against the renal lithiasis in reason of two glasses a day.

EUPHORBIACEAE

- ***Euphorbia Echinus.*** Coss and Hook

French name: Euphorbe cactoïde
Vernacular name: Ddaghmûss, Zakkoum
Used part: The Flower
Local use: A preparation with a basis of flowers of *Euphorbia Echinus*, in infusion in the water, in which you add the juice of a single fruit of *Citrus limetta,* then sweeten the mixture with honey of *Euphorbia Echinus,* is used against the renal lithiasis.
Toxicity: The resin powder, breathed accidentally, causes of sneezing, rhinitis with abundant flow and coryza, tingling of the throat, laryngitis, lung irritation with a cough and bronchial hemorrhage. These symptoms are accompanied by tearing with eye pressure and photophobia, a copious salivation, burns of the lips and a bitter taste persistent in the mouth (63).

- ***Euphorbia falcata*** L.

French name: Euphorbe en faux
Vernacular name: Hayat en-nufûss, Rbeat el-kemya
Used part: The leafy stem
Local use: Leafy stems dried are prescribed, in infusion in the water, against the renal lithiasis in reason of two glasses a day.
Toxicity: The plant, in internal use, leads to gastroenteritis more or less severe whose responsible for both the seed oil and the latex. The symptoms of intoxication are burned oral-oesophagitis, vomiting, convulsions.
On the skin, the plant causes skin ulceration (erythema, blistering). Of keratitis cornea have also been reported when the latex arrives accidentally on the eyes (29).

- ***Mercurialis annua*** L.

French name: Mercuriale annuelle
Vernacular name: Harriga el malssa
Used part: The leafy stem
Local use: An association, decoction, basis of *Mercurialis annua* , the styles of *Zea mays* , the flowers of *Opuntia ficus-indica,* the leaves of *Lavandula officinalis,* is very recommended in the region as an effective treatment for the calculated renal reason of three glasses per day.
A preparation, in decoction in the mineral water of Sidi Ali, a basis of *Mercurialis annua, Herniaria hirsuta, Petroselinum sativum* and the juice of *Citrus limetta,* is indicated as effective against the renal lithiasis in reason of two glasses a day.
A decoction in water of *Mercurialis annua,* rhizomes of *Cynodon dactylon* seeds and *Juncus maritimus*, is recommended as effective against the calculated renal reason of three glasses a day.

Toxicity: A high dose, it sometimes causes the hematuria and the Cylindruria (54).

FABACEAE

- ***Cassia fistula*** L.

French name: Caneficier, Grande casse
Vernacular name: Aud ssalib
Used part : the pod
Local use: a recipe in the form of the syrup to a basis of 1/4 kg of *Cassia fistula*, of 1/2 kg of *Prunus domestica*, 1g of *Crocus*

sativus and 1/2 kg of pure honey, is recommended as an effective remedy against the renal lithiasis in reason of a soup spoon by day. It is recommended that the patient takes 1.5 liters of mineral water of Sidi Ali before the treatment.
The decoction of the pods in the water is deemed to be against the renal lithiasis in reason of two glasses a day. See the association with *Prunus domestica*.

- ***Senna alexandrina Mill (Cassia angustifolia*** Vahl, ***Cassia senna*** L).

French name: Séné, Séné d'Alexandrie, Séné de Khartoum
Vernacular name: Sanna haram, Sanna mekkî
Used part: The seed
Local use: An association on the basis of seeds of *Cassia angustifolia*, styles of *Zea mays*, rhizomes of *Zingiber offocinalis* and flowers of *Opuntia ficus-indica*, in decoction in water, is used against the renal lithiasis in reason of two glasses a day.

- ***Ceratonia siliqua*** L

French name: Caroubier
Vernacular name: El-kharrôb, Tikkida, Salghoua
Used art: the Pod
Local use: an association on the basis of kids of *Ceratonia siliqua*, sheets of *Lavandula dentata* and those of the *Herniaria hirsuta,* of the fruits of *Ziziphus Lotus,* flowers of *Opuntia ficus-indica* and seeds of *Trigonella foenum-graecum*, in decoction in water, is used against the renal lithiasis to condition of three glasses a day.

- ***Cicer arietinum*** L.

French Name: Pois-chiche
Vernacular name: El hommess, El kiker
Used part: The seed
Local use: seeds, in maceration during the night, are recommended against the renal lithiasis in reason of three cups a day. See the association with *Glycirrhiza glabra.*

- ***Glycirrhiza glabra*** L.

French name: Reglisse
Vernacular name: Aarq ssous
Used part: The root
Local use: an association on the basis of roots of *Glycirrhiza glabra* , styles of *Zea mays* , of the flowers of *Opuntia ficus-indica* , of the seeds of *Petroselinum sativum* and those of the *Urtica pilulifera* , of the fruits of *Ziziphus Lotus* , in decoction in the macerate (during the night) of *Cicer arietanum* , is indicated as against the renal lithiasis. It is advisable to drink the maximum treatment during the day instead of the water.
Toxicity: The abuse of consumption of licorice can cause severe hypokalemia with high blood pressure and sometimes ventricular fibrillation. These disorders are due to the acid glycyrrhétique which disrupts the metabolism of the cortisone (55). The excess consumption of licorice presents dangers, there appears hypertension, edema accompanied by various disorders and resistant to treatment, followed of phenomena paralytics and disorders of heart rate (48).

- ***Lupinus pilosus*** L.

French name: lupin sauvage
Vernacular name: Bû-zghayba
Used part: The seed
Local use: The powdered seeds and in small quantity (the head of a teaspoon) crushed in the honey for preparing of the pellets to the size of peas-chiche, are shown against the kidney stones by reason of a dumpling a day.
Toxicity: The intoxication in Morocco occurs mainly in animals that have grazed of wild species. All the parts of the plant contain the toxic agent. The intoxication is manifested by neurological signs: imbalance, seizures, paralysis of the central nervous system and particularly the respiratory center, centers engines, of the muscles and the heart. Death occurs by asphyxiation, ten days after the onset of the first symptoms (29).

- ***Trigonella foenum-graecum*** L.

French name: Fenugrec
Vernacular name: L-halba, Tifidass
Used part: The seed
Local use: The seeds of *Trigonella foenum-graecum* associated with those of *Nigella sativa* and *Lipidum sativum,* powder and crushed to honey, is recommended in case of renal lithiasis and as a diuretic to reason of a teaspoon a day.

GENTIANACEAE

- ***Centaurium erythraea*** Rafn.

French name: Petite centaurée
Vernacular name: Gusset-el-hayya
Used part: The flower and the aerial parts
Local use: See the association with *Coriandrum sativum.*

IRIDACEAE

- ***Crocus Sativus*** L.

French name: Safran vrai
Vernacular name: Zaafran el hôrr
Used part: The stigma of flowers
Local use: A maceration of a gram of *Crocus sativus* in the juice of any single fruit of *Citrus limetta* and sweet by honey, is prescribed as an effective remedy against the renal lithiasis.
A recipe to basis of a gram of *Crocus sativus,* leafy stems of *Lavandula officinalis,* two fruit of *Malus communis,* the juice of two fruits of *Citrus limetta,* in decoction in a 1.5 liter of mineral water of Sidi Ali during a half-hour, is recommended as effective against kidney stones by reason of a stress in the fasting state.
See the association with *Cassia fistula*, *Petroselinum sativum* and *Prunus domestica.*

JUNCACEAE

- ***Juncus maritimus*** Lamk

French Nname: Jonc maritimus
Vernacular name: Ssemar
Used part: The seed
Use Local: The seeds alone or in association with the rhizomes of *Cynodon dactylon*, the sheets of *Lavandula dentata* and those of the *Herniaria hirsuta*, the styles of *Zea mays*, the flowers of *Opuntia ficus-indica*, in decoction in the mineral water, are prescribed as an effective treatment against the renal lithiasis and as a diuretic to reason of two glasses a day. See the association with *Mercurialis annua.*

LAMIACEAE

- ***Ajuga iva*** **(**L.) Schreb.

French name: Bugle, Ivette
Vernacular name: Chendgûra, Tûf tolba
Used part: The leafy stem

Local use: A decoction to basis of leaves of *Origanum majorana, Petroselinum sativum*, *Coriandrum sativum*, *Allium cepa*, and *Allium sativum* are recommended against renal lithiasis in reason of two glasses per day.
Toxicity: *Ajuga iva* (originating in Morocco) is not toxic, but seems to be blessed with a certain power sedative (56).

- ***Lavandula dentata*** L.

French name: Lavande à feuilles dentées
Vernacular name: El-khzama el beldiya, Ja'da
Used part: The leafy stem and the aerial part.
Local use: The aerial parts, in infusion, or leafy stems, in decoction are administered as a diuretic and also against the renal lithiasis in reason of two glasses per day (in the morning on an empty stomach and the evening).

- ***Lavandula angustifolia*** Mill ***(L officinalis*** Chaix, ***L. Vera*** DC).

French name: Lavande officinale, Lavande vraie
Vernacular name: El-khzama zerqa, el-khzama El-fassiya, el-khezama rûmiya
Used part: The flowering top
Local use: An infusion (a soup spoon in a liter of water) of floral luminaries of *Lavandula officinalis* alone or associated with those of *Mentha pulegium* and *Origanum vulgare* is indicated as a diuretic and in the case of renal lithiasis in reason of two glasses a day.
The leaves of *Lavandula officinalis,* in powder, are consumed with the hard-boiled egg against the renal lithiasis. See the association with *Juncus maritimus, Crocus Sativus, ceratonia siliqua, Mercurialis annua* and *Thymelaea hirsuta.*
Toxicity: A high dose, the essence of lavender is astounding (28).

- ***Menta pulegium*** L.

French name: Menthe pouliot
Vernacular name: Flyou
Used part: The flowering tops and the leafy stem
Local use: Leafy stems in association with those of *Herniaria hirsuta*, the flowers of *Opuntia ficus-indica*, the fruits of *Ziziphus lotus*, in decoction in water, are recommended against the renal lithiasis in reason of a liter per day during a month.
Toxicity: A high dose, pennyroyal is a plant abortive and highly neurotoxic (57). Idem for the essential oil (48).

- ***Origanum compactum*** Benth.

French name: Origan
Vernacular name: Za'tar tadlawî
Used part: The flowering tops and the leafy stem
Local use: an association on the basis of leaves of *Origanum compactum*, *Thymus broussonetii* and those of *Thymus satureioides, Thymus vulgaris*, *Mentha pulegium, Origanum majorana,* of *Artemisia herba-alba,* in decoction in water, is used against the renal lithiasis in reason of three glasses per day.
A recipe to basis of *Origanum compactum,* the bark of *Punica granatum* and *Herniaria hirsuta,* in decoction in water is administered against the renal calculations to reason a glass per day in the fasting state.
Toxicity: A high dose, the oregano is toxic and narcotic (58).

- ***Origanum majorana*** L (***Majorana hortensis*** Moench).

French name: Marjolaine à coquilles, marjolaine vraie
Vernacular name: Merdedûche
Used part: The leafy stem and inflorescences
Local use: Leafy stems or well the inflorescences in infusion in the tea are employed against the renal lithiasis to condition of three glasses per day.
A decoction of the leafy stems with the tea without sugar is used against the renal lithiasis in reason of three cups a day outside of meal. See the Association of *Origanum compactum*.
Toxicity: A high dose, either in infusion or in fumigation, the plant exciterait the heart. Its essence is an excito-sensory and causes depression with anesthesia, numbness and somnolence (48).

- ***Rosmarinus officinalis*** L.

French name: Romarin
Vernacular name: Yazir
Used part: The leafy stem
Local use: Leafy stems in association with those *of Artemesia herba Alba*, *Hernairia hirsuta, Eucalyptus globulus, Lavandula dentata and Petroselinum sativum*, styles of *Zea mays,* Seeds of *Hordeum vulgare*, fruit of *Ziziphus lotus* and the rhizomes of *Cynodon dactylon*, *Fraxinus angustifolia* in decoction in water, is used as a traitemet effective against the renal lithiasis in reason of a glass in the fasting state. Patients take a glass of warm water to facilitate the vasodilatation of vessels before the treatment.
Toxicity: The essential oil is neurotoxic saw the presence of camphor in its composition. The use of sheets, in infusion, is not recommended in pregnant women (risk of abortion) (59). The chronic intoxication is manifested by hemorrhage in the stomach, albuminuria and stéatomes of the liver (48).

- ***Thymus broussonetii*** Wood

French name: Thymus de Broussonet
Vernacular name: Zaîtra
Used part: The leafy stem and inflorescences
Local use: See the Association of *Origanum compactum*.

- ***Thymus satureioides*** **Coss .** and Bal.

French name: Thym-sariette du Maroc, Thym saturéoïde
Vernacular name: Ziîtra
Used part: The leave
Local use: See the Association of *Origanum compactum*.

- ***Thymus vulgaris*** L.

French name: Thym cultivé, Thym commun
Vernacular name: Azouknni, Adouchen
Used part: The leave
Local use: A recipe to the base of the leaves of *Thymus vulgaris* and those of the *Herniaria hirsuta,* in decoction, is used against the renal lithiasis in reason of two glasses per day. See the association of *Origanum compactum*.

LINACEAE

- ***Linum usitatissimum*** L.

French name: Lin cultivé
Vernacular name: Zarîaate El- Ketan
Used part: The seed
Use Local: The seeds only, in infusion in the water, are shown against the renal lithiasis.
Toxicity: A few rare cases of poisoning have been reported in animals fed with a cake of seeds. These animals exhibited the following symptoms: mydriasis, colic, numbness, acute nephritis, pulmonary edema, accelerated respiration, cerebral hemorrhage, (54) et (50).

LYTHRACEAE

- ***Punica granatum*** L.

French name: Grenadier
Vernacular name: Rommân
Used part: The fruit
Local use: The juice is recommended as a diuretic to a reason of two glasses per day: in the morning on an empty stomach and the evening. See the association with *Origanum compactum.*

MALVACEAE

- ***Malva sylvestris*** L.

French name: large purple
Vernacular name: El-Baqûla, El-Khobbiza
Used part: The leave
Local use: An association to base of the leaves of *Malva sylvestris* and those of *Lavandula officinalis, Salvia officinalis, Mentha pulegium, Myrtus communis, Herniaria hirsuta,* in decoction in water, is shown against the kidney stones a reason of three glasses per day. See the association with *Rumex acetosa.*

MYRISTICACEAE

- ***Myristica fragrans*** houtt.

French name: Muscadier
Vernacular name: El-gousa, Gozat cherq, Gozat attib, Bssibissa
Used part: The nuts and the nutmeg flower.
Use Local: The grated nutmeg and mixed with the hot milk is used against the renal lithiasis.
Toxicity: The Nutmeg is dangerous: a single nuts is sufficient to cause drowsiness, stupor and delirium (29).

MYRTACEAE

- ***Eucalyptus globulus*** Labill.

French name: Eucalyptus
Vernacular name: Kalybtus
Used part: The fresh young leave
Local use: A recipe to the base of the leaves of *Eucalyptus globulus,* those of *Herniaria hirsuta,* styles of *Zea mays,* decoction, is used as an effective treatment against the renal lithiasis, on condition of a glass per day for seven days. People say that the sick person evacuates the calculations during urination. Track the association with *Echinops spinosa.*
Toxicity: The toxicity is manifested by a neurotoxicose (48). A very high dose, the essence of the Eucalyptus causes headache, drunkenness, prostration and the ollapsus (60).

- ***Eugenia caryophyllata*** Thunb**.**

French name: Girofle, clou de girofle
Vernacular name: The-kronffel, Úod nuwwâr
Used part: The cloves
Local use: The decoction of cloves is prescribed against the renal lithiasis and also as a diuretic to reason a glass a day.

- ***Myrtus communis*** L.

French name: Myrte commun
Vernacular name: Rayhane
Used part: The leave
Local use: An association, on the basis of leaves of *Myrtus communis*, *Lavandula officinalis*, *Salvia officinalis*, *Mentha pulegium*, *Herniaria hirsuta*, *Rosmarinus officinalis*, styles of *Zea mays*, flowers of *Opuntia ficus-indica*, rhizomes of *Cynodon dactylon*, rhizomes of *Zinjiber officinilis*, seeds of *Pimenta officinalis,* roots of *Ranunculus maricatus* and *Glycirrhiza glabra*, in decoction in the mineral water, is used as an effective treatment against the renal lithiasis in reason of two glasses of hot result of a decoction by day.
Toxicity: The Myrte is low toxic, but his gasoline can cause a headache and the abatement (54).

- ***Pimenta officinalis*** Lindl.

French name: Poivre de la Jamaique, Piment âcre
Vernacular name: Nwiwira
Used part: The seed
Local use: See the association with *Myrtus communis.*

NITRARIACEAE

- ***Peganum harmala*** L.

French name: Harmel
Vernacular name: El Harmel
Used part: The seed
Local use: A preparation in decoction in the water on the basis of seeds of *Peganum harmala* (6 seeds), leaves of *Artemisia herba-alba* and those of *Rosmarinus officinalis* and *Herniaria hirsuta,* is recommended against the renal lithiasis in reason of two glasses per day. It is very advisable to do a fumigation of the body during ¼ hour by the same preparation (powder) to facilitate the vasodilation of blood vessels.
Toxicity: These are the alkaloids that are responsible for the toxicity**.** In Morocco, poisonings in harmala are observed especially in the child, because of the absorption of mixtures thèrapeutiques surdosées traditional, and they are manifested by a state of anuria and of uraemia important, the paralysis of the system central nervous and death by judgment of the respiration.followed by a death (29).

OLEACEAE

- ***Fraxinus angustifolia*** Vahl.

French name: Frêne oxyphylle
Vernacular name: Lssan et-tîr, Derdare
Used part: The leave
Local use: An association called result of a decoction of kettle (Tabkha dial ghelay) to base of the leaves of *Fraxinus angustifolia*, *Illicium verum*, flowers *of Opuntia ficus-indica*, styles of *Zea mays*, *Lavandula dentata*, *Artemisia herba-Alba*, former Seeds of *Hordeum vulgare*, *Ziziphus Lotus, Olea europaea and Rosmarinus officinalis*, in decoction in water, is recommended as an effective treatment against the renal lithiasis in reason of a cup a day during the night until the healing.

- ***Olea europaea*** L.

French name: Olivier cultivé
Vernacular name: Zaytûn
Used part: The leave
Local use: See the association with *Fraxinus angustifolia.*

PLUMBAGINACEAE

- ***Armeria mauritanica*** Wallr.

French name: Armeria
Vernacular name: Earq awadmî, el-aarq lahmer
Used part: The root

Local use: The roots in decoction in water are used against the renal lithiasis in reason of two glasses a day.

POACEAE

- ***Agropyron repens*** L ((***Elymus repens*** (L.) Gould, ***Elytrigia repens*** L).

French name: Chiendent officinal (petit chiendent)
Vernacular name: Njem
Used part: The rhizome
Local use: The rhizomes in decoction in the water, are used as a diuretic and against the renal lithiasis in reason of a 1.5 liter a day.

- ***Cymbopogon Schoenanthus*** (L) Spreng. (***Andropogon laniger*** Desf).

French name: Schoenanthe, straw of Mecca
Vernacular name: Chaarate trabe, Ennadkher
Used part: The leafy stem
Local use: Leafy stems in infusion in decoction are indicated as a diuretic to the reason of two glasses a day.

- ***Cynodon dactylon*** (L.) Pers.

French name: Gros chiendent (Dactyle, chiendent pied de poule)
Vernacular name: Nnjem lakbir
Used part: The rhizome
Local use: The rhizomes alone or in association with those of *Petroselinum sativum*, of the flowers of *Opuntia ficus-indica* and styles of *Zea mays*, in decoction in water, are shown as an effective treatment against the renal lithiasis in reason of two glasses per day: in the morning to fasting and in the evening.
Toxicity: The Cynodon dactylon would have a certain activity cyanogénitique due to the probable presence of a glucoside of the hydrocyanic acid (51).
A high dose (as fodder), it has a cyanogen activity (60).

- ***Hordeum vulgare*** L.

French name: Orge
Vernacular name: Chaâir
Used part: The seed
Local use: The seeds alone or in association those of *Coffea arabica* (coffee of Saudi), are used in maceration or by decoction in the water, against the renal lithiasis to condition of two drinks a day for seven days.
A preparation with a basis of semolina of barley (Tchicha) and stems of *Thymus vulgaris*, in decoction in water, associated with honey, is used against the renal lithiasis, by reason of two glasses a day. See the association with: *Zea mays*, *Fraxinus angustifolia, Rosmarinus officinalis* et *Petroselinum sativum*.

- ***Zea mays*** L.

French name: Maïs
Vernacular name: Dra
Used part: The seed and the style
Local use: The styles of *Zea mays* alone or in association with *Cynodon dactylon*, of the flowers of *Opuntia ficus-indica,* the fruits of *Juncus maritimus* and flowers of *Lavandula dentata*, in decoction in the macerat of *Hordeum vulgare*, are used as an effective treatment against the renal lithiasis. See the association with: *Cynodon dactylon, Fraxinus angustifolia, Myrtus communis, Eucalyptus globulus*, *Rosmarinus officinalis, Juncus maritimus*, *Glycirrhiza glabra, Cassia senna*, *Mercurialis annua, Opuntia ficus-indica, Ammodaucus leucotrichus* et *Asphodelus microcarpus*.

POLYGONACEAE

- ***Rumex acetosa*** L.

French name: Oseille cultivée, Oseille commune
Vernacular Name: Homayda
Used part: The leave
Local use: The leaves (a bouquet) cooked to the steam with those of *Malva sylvestris* (two bouquets), then chopped in half a glass of olive oil and the juice of a single fruit of *Citrus limetta* , are used against the renal lithiasis, with two tablespoons per day.
Toxicity: Consumed in excess by the livestock, rumex can cause a few accidents, usually mild, attributable to the richness of these plants in oxalate of potassium (61).

PORTULACACEAE

- ***Portulaca oleracea*** L.

French name: Pourpier potager
Vernacular name: Rejla
Used part: the leafy stem
Local use: Leafy stems, in decoction, are recommended in case of renal lithiasis in reason of two glasses a day.
Toxicity: The sign and symptoms observed before the death of the animals include micturation, muscle weakness, dypsnoea, sedation and diarrhea, which were all observed to be dose dependent. The increased micturation resulting from increased diuresis observed can be attributed to the presence of the flavonoides and the diarrhoea might be due to the anthraquinones and its derivatives (70; 71).
Aqueous extracts of the leaves and stems presentment some toxicity in mice with a dose corresponding to 1 g of dry product. In man the action of leaf extracts consist of a stronger contraction of the heart with a decreased vasoconstriction (33).

RANUNCULACEAE

- ***Nigella sativa*** L.

French name: Nigelle
Vernacular name: Haba ssawda, Ssanûj, Habat al-Baraka
Used part: The seed
Local use: A remedy on the basis of seeds of *Nigella sativa* and those of *Allium cepa*, in powder and trituées in the pure honey, is used to treat renal lithiasis for a half-spoon by a glass of warm water. See the association with *Lepidium sativum*.
Toxicity: The poisoning by the Nigella are demonstrated by the dryness of the mouth, irritation oral-pharyngeal, inflammations of the language, the palate, the tonsils and the nasopharynx (29).

- ***Ranunculus muricatus*** L.

French name: Renoncule muriquée
Vernacular name: Wedene El halouf
Used part: The root
Local use: The roots washed, dried and crushed are shown against the renal lithiasis, due to a head of a coffee spoon in a cup of water. See the association with *Myrtus communis*.
Toxicity: This species is known to be irritating, to the state of charge, for the skin and mucous membranes (erythema, pruritus, edema, eczema, blisters). Ingested, it can cause stomatitis, burns, ulcers (55).

RHAMNACEAE

- ***Ziziphus lotus*** L.

French name: Jujubier

Vernacular name: Ssedra, Nbeg. Azogar
Used part: The fruit, the young branches
Local use: fruit, powder and crushed in the pure honey are used as an effective treatment against the urinary calculations, with two teaspoon a day.
The décocté of young branches, sweetened by a small spoon of honey of *Euphorbia Echinus,* is used as an effective treatment in the case of renal lithiasis.
The fruits alone or in association with those of *Juncus maritimus*, leaves of *Lavandula officinalis*, styles of *Zea mays*, rhizomes of *Cynodon dactylon* and flowers of *Opuntia ficus-indica*, powder and mixed with the true Honey, are indicated in case of kidney stones. See the association with *Herniaria hirsuta, Ammodaucus leucotrichus, Opuntia ficus-indica, Rosmarinus officinalis, Fraxinus angustifolia, Mentha pulegium, Apium graveolens, Mercurialis annua, Seratonia siliqua, Cassia senna.*

ROSACEAE

- ***Crataegus monogyna*** Jacq.

French name: Aubépine
Vernacular name: Azzaarour, admam
Used part: The leave and fruit
Local use: A decoction, in water of the fruits or leaves, is used as a diuretic and against the renal lithiasis, by reason of two glasses a day before meals.

- ***Malus communis*** DC.

French name: Pomme
Vernacular name: Teffâh
Used part: The fruit
Local use: A decoction of the cuticles is considered as a diuretic.
A preparation with a basis of the cuticles of two apples in decoction in a 1.5 liter of mineral water up to the obtaining of three glasses, and then add the juice of a single fruit of *Citrus lemitta,* is used as an effective remedy against the renal lithiasis in reason of three glasses a day.
The cuticles of two fruit of *Malus communis* , associated with the stigmas of *Crocus sativus* (1 g) , leaves of *Lavandula dentata* , in decoction in a 1.5 be of mineral water is used against the renal lithiasis in reason of two glasses per day: in the morning on an empty stomach and the night at bedtime.

- ***Prunus domestica*** L.

French name: Prunier, Prunier cultivé
Vernacular name: El barkouk
Used part: The fruit
Local use: See the association with *Cassia fistula*. and *Apium graveolens.*

- ***Prunus cerasus*** L (***Cesarus vulgaris*** Mill).

French name: Cerisier acide
Vernacular name: Habb El-Molok
Used part: The stalk and the fruit
Local use: The stalks, decoction, are used as an effective treatment against the renal lithiasis, in reason to take 80 g of stalks in a 1.5 liter of mineral water (Sidi Harazem). The fruits, in its nature, are used as a diuretic.

- ***Rosa canina*** L.

French name: Eglantier
Vernacular name: Bûssrûd, Tighferte
Used part: The fruit, flower
Local use: Dried fruit or well the flowers are used in decoction in the water against the renal lithiasis in reason of two glasses per day.

- ***Rosa centifolia*** L.

French Name: Rosier cent-feuille
Vernacular name: El ward Beldi
Used part: The floral button
Local use: See the association with *Apium graveolens.*

RUTACEAE

- ***Citrus Amara*** L.

French name: Bigaradier
Vernacular name: Ranj, Zenboue
Used part : The fruit
Local use: The juice of any single fruit of *Citrus Amara,* mixed with the true Honey and diluted by half a glass of water, is used against the renal lithéase.

- ***Citrus Limetta*** Risso

French name: Bergamotier
Vernacular name: L-hamed beldî
Used part: The fruit
Local use: The juice of *Citrus limetta* (¼ liter), mixed with the true Honey and in association with the leaves of *Petroselinum sativum* (40 handles), in decoction in 10 liters of mineral water, is used as an effective treatment against the renal lithiasis.
A mixture on the basis of equal quantities of the juice of *Citrus limetta* and the true honey is prescribed as an effective remedy against the renal lithiasis to reason to take 6 tablespoons per day: three spoons in the fasting state and three in the evening at bedtime.
A preparation with a basis of a glass of juice of *Citrus limetta*, a glass of olive oil and a glass of pure honey, and then complete the volume by the mineral water until the 1.5 liter, is administered as an effective treatment for the kidney stones to reason a glass in the morning on an empty stomach.

- ***Citrus× paradisi*** Macfad.

French name: Pomelo
Vernacular name: Pamblamûs
Used part: The fruit
Local use: The juice of *Citrus×paradisi (*hybridization between *Citrus maxima* and *Citrus sinensis* a glass of sweet juice by a small spoon of honey at bedtime.

SOLANACEAE

- ***Physalis alkekengi*** L.

French name: Alkékenge, Lanterne
Vernacular name: Kakenj, habb el hawa
Used part: The bay
Local use: The dried berries, in decoction or in infusion in the water (20 g in one liter of water), are used as a diuretic.

THYMELAEACEAE

Thymelaea hirsuta L.
French name: passerine fraught
Vernacular name: El-mathnân
Used part : The leave
Local use: The dried leaf shoots in association with those of *Herniaria hirsuta*, *Lavandula officinalis*, styles of *Zea mays*, flowers of *Opuntia ficus-indica*, fruit of *Ziziphus lotus*, in

decoction in the water, are used against the renal lithiasis in reason of two glasses per day. See the association with *Petroselinum sativum*.

Toxicity: The symptoms of intoxication are beginning to ¼ of an hour after the ingestion: there is the prostration, of the hebetude (stupor), headache, chills, pallor, dilated pupils, hypersalivation, swelling of the mouth and lips, difficulties of regulation, the winding, nausea. Then appear of diarrhea with abdominal pain and digestive spasms violent, convulsions, respiratory disorders. In severe cases, death can occur in atrocious suffering (54, 67).

URTICACEAE

- ***Urtica dioica*** L.

French name: Grande ortie
Vernacular name: L-hurrîga
Used part: The leafy stem and the seed
Local use: Leafy stems or seeds, in decoction in the water, are used as a diuretic and also as an effective treatment against the renal lithiasis.

- ***Urtica pilulifera*** L

French name: ortie romaine
Vernacular name: L-hurrîga
Used part : The seed.
Local use: A decoction of the seeds in water ménirale préscite is in the case of kidney stones, by reason of two glasses a day.

XANTHORRHOEACEAE

- ***Asphodelus. Microcarpus*** Salzm. ***(A. ramosus*** L).

French name: Asphodèle à petits fruits
Vernacular name: El berwague, Blalouz
Used part: The bulb
Local use: An association on the basis of bulbs of *Asphodelus microcarpus,* sheets of' *Herniaria hirsuta* and those of *Lavandula officinalis* and *origanum compactum*, styles of *Zea mays*, of the flowers of *Opuntia ficus-indica*, in decoction in water, is used as an effective treatment against the renal lithiasis to reason to take 20 glasses per day.

ZYGOPHYLLACEAE

- ***Zygophyllum gaetulum*** Emb. et Maire

French name: Zygophylle
Vernacular name: L'aagâya
Used part: The seed and the flowering top
Local use: A decoction of the seeds (a soup spoon in a liter of water) is shown against the kidney stones, by reason of two glasses a day.

Conclusion

The constitution of the calculations in the urinary tract constitutes a critical public health problem for many industrialized countries or in the process of development. This is a reason of changes in nutritional habits, in the absence of dietary measures adopted, to its character relapsed and the cost expensive to its treatment. In the region of Al Haouz-Rhamna, we have achieved an ethnobotanical study and the results obtained show that the population of Youssoufia, Benguerir Echemmaia and are the most affected by renal lithiasis. This study also reveals that the population of this region often has recourse to the traditional medicine for the treatment of the lithiasis disease despite the revolution in medical technology and it has accumulated a real knowledge on the virtues of medicinal plants. Also, the Investigations ethnobotanical that we conducted with the people of this region have helped to identify 100 species belonging to 41 families and divided into 84 genera. Among these species, 61 are used against the renal lithiasis, 12 have properties diuretics and 27 have on both the properties anti-gallstones and diuretics. The results obtained have also shown that the leave the body part of the plant the most used and that the decoction represents the more common mode in phytotherapy traditional in this region. Among the species cited in this region, 11 species are more effective against the renal lithiasis namely: *Petroselinum sativum*, *Zea mays*, *Opuntia ficus-indica*, *Herniaria hirsuta*, *Lavandula officinalis*, *Citrus limetta*, *Ziziphus Lotus*, *Cynodon dactylon*, *Hordeum vulgare*, *Crocus sativus* and *Juncus maritimus.* The bibliographical study of ethnobotanical studies prior in different regions of Morocco can justify the traditional use Statement of these species and shows a good knowledge of medicinal species by the population of that region. The goal of this study was to discover other species unknown, to know the traditional practices used in the study area, to assess the risks to the use of certain toxic plants and to enhance and safeguard natural resources Moroccan. However, it is interesting to extend this kind of study to other regions of the country in order to establish comprehensive monographs. Finally, it would be more interesting to validate the effectiveness of the plants listed in this study by experimental studies appropriate for that the use of these plants is more scientifically based and also to search for and isolate new active principles, which could have preventative properties to the formation of kidney stones.

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