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The treatment of urinary diseases in Moroccan traditional pharmacopoeia
Elements of ethnology and historical epistemology

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Η θεραπεία των νοσημάτων του ουροποιητικού στην παραδοσιακή φαρμακοποιία του Μαρόκου: Στοιχεία εθνολογίας και ιστορικής επιστημολογίας

Περίληψη στο τέλος του άρθρου

This work, based mainly on ethnobotany, contributes to the knowledge of the Moroccan pharmacopoeia concerning the treatment of urinary system diseases. Our approach, both synchronic and diachronic, seeks to highlight the historical anchoring of current traditional medical practices through a comparative study of recipes of the Moroccan traditional pharmacopoeia for urinary diseases and Arabic medical reference texts. I strive to show the persistence of historical medical knowledge in traditional medical practices, posing, in this sense, the fundamental question of the legitimacy of the presumed epistemological break between traditional medical knowledge and scholarly discourse.

Key words

Arabic historical medical knowledge
Ethnobotany
Moroccan pharmacopoeia
Urinary diseases Morocco

1. INTRODUCTION

Although it has been banished from the market-place in Morocco and deprived of its official status by modern medicine, traditional medical practice continues to serve many, and its prestige in the eyes of masses remains virtually undiminished.

It should be noted that one of the strengths of traditional medicine is that it is a practical art, well rooted in the local culture, and the relationship between the patient and the therapist is simple and close.[7]

Traditional medicine deals with all the ramifications of disease and approaches health as a necessary balance between physical, mental, emotional, moral and social well-being.

It would be wrong to underestimate the role of subjective factors in the survival of traditional medicine. These arise partly from the complete integration of traditional systems of care into the socio-cultural environment, which makes patients particularly receptive to them.

When we examine social behaviour in regard to illness, we see a number of different attitudes to traditional medicine. In the first place, there are the traditionalist and cultural positions, which are often experienced with anti-colonialism and exalt the prestigious past of Arab and Islamic civilisation, art and science. They refuse depersonalisation, and show a devotion to the arts and skills of Arab scholars. The confidence with which these attitudes are held is naturally strengthened with every error of modern medicine.

The major fault in this quarrel is that it sees the relationship between traditional and modern medicine as mutually exclusive and may even present an opposition between local and foreign medicine that does not exist. Although contemporary medicine has developed mainly in the West in recent times, since the development of medicine is closely bound with the development of technology, it must not be forgotten that many civilisations have contributed to the base of modern experimental medicine. It should not be seen as Western medicine but as universal medicine. Therefore, there is no part of the world where it can be considered foreign.

The second type of position, which is characteristically found in western countries but has also filtered through to the middle and upper classes in third-World counties, is critical of modern chemotherapy and advocates a return to natural therapy, as a reaction against the over-medicalisation of industrial societies. This tendency is in the mainstream of ecological thinking but unfortunately has some extreme views.

The third group of positions, which is much more eclec-

tic and less well organised and structured than the first two groups, is taken by those who have lost the faculty of critical judgment and who see traditional medicine only in terms of its irrational and mysterious aspect, with its supernatural and miraculous elements. These positions are very common at grass-roots level but are unfortunately being propagated in some intellectual circles as well. Anything that appears to be supernatural has a great hold on people's minds in this time of moral crisis in our societies. Hence the multiplicity of stories about the "miracles" performed by traditional practitioners. At the other end of scale, but equally eclectic, there are those who see only the irrational aspect of traditional medicine and therefore condemn it out of hand just as categorically as it has been exalted by their opponents.[7]

The purpose of this paper will be to emphasise the social and cultural relevance of traditional medicine in Morocco, especially in the rural areas. We try to highlight the role of knowledge transmission in preservation of old Moroccan medicine and the intangible heritage. Taking this into account, some examples of these traditional practices will be analysed, especially in urinary diseases.

Furthermore, this study aims at showing that these social and cultural practices are enacting the transmission of knowledge, especially in rural areas.

Another aspect that will be treated is the role of traditional actors in natural medicine in rural areas as main actors of practices linked to the production and transmission of these medical traditions. Some aspects of my approach will focus on certain practices of traditional Moroccan medicine by bringing back particular recipes, which have become increasingly rare, because of the disappearance of the modes of transmission maintained for generations.

All our data are based on anthropological and fieldwork conducted in some areas of Morocco in the last years. In Morocco, there is a paradox between cities and rural areas regarding access to medical care. However, remote areas are a good reservoir of ancestral medical knowledge and country people are a very important field of study for examining the persistence of ancient medical recipes.

How to explain this possible persistence; medical history or biogeographic and cultural determinism? To try to answer these questions we used an anthropological and epistemological approach: both synchronic and diachronic analyses.

The analysis of the nature of "traditional medicine" will go through an epistemological approach. Indeed, the legitimate way to analyse popular medicine is to refer it to its historical scientific sources, not to contemporary medical science.[13]

The fact that medicinal plants are used by people, especially in remote areas, to overcome medical problems, the material support, constituted by the vegetal drugs, is the most credible way to bring out tangible information on the history and culture of local society, which requires long-term ethnological and botanical work.

MATERIAL AND METHODS

To try to approach this problem, ethno-botanic studies and historical epistemology study (critical and comparative analysis of some Arabic reference books on kidney diseases) were carried out.

The ethno-botanical studies were carried out in three regions of Morocco: Sahara (especially Draa Vall ey), Rif Mountains and High Atlas Mountains. This ethno-botanical work is part of a research project on traditional medical knowledge in different regions of Morocco; general ethno-botanical work has already been carried out.[6,9,20]

The historical epistemology approach consists of a comparative study between bookish medical recipes and the traditional recipes of pharmacopoeia. The concept of historical epistemology that I use refers in its widest meaning to the long-term study of scientific developments.[10] It is important to follow the evolution of the remedies in time and then to compare the time-resistant remedies with those of the traditional Moroccan pharmacopoeia.

The books Studied are: *Treatise on stones in the kidneys and bladder* by Abu Bakr Al-Razi (Razes) (9, 10th century) analysed by Pieter de Koning,1896 (Frankfurt); *Canon of Avicenna* (Chapter about treatment of kidney stones) (10th century); Ninth section of the first part of the complete *Book on Medicine* named *the Royal book*, by Al-Madjusi (10th century); *Viaticum* of Ibn al-Jazzar of Kairouan (10th century); *Tayssir*: the book of simplification of Avenzoar (Andalusia) (11th century); *Book of the best in medicine*, by Mohaddab-addine Ibn-al-Habal (12th century).*

Umdat-attabib (Abu lkhayr al-Ichbili)** (12th century), Jamia Al-mufradat, treatise of simples (Ibn-al Baytar) (13th century); Hadiqat al-Azhar: the garden of flowers (Al wazir al-Ghassani) (16th century),

* The Kitab almukhtar (al-mukhtarat) fi l-tibb ("Selections on medicine") was written in Mosul in 560/1164–5. This is primarily based on the Kitab al-Qanun fi l-tibb of Ibn Sina (d. 428/1037), although he also cites other authors, including Hippocrates (fl. c. 450 B.C.E.), Galen (d. c. 216 C.E.), Masarjawayh (second-third/eighth-ninth centuries), al-Kindi (d. c. 256/870), and Ali b. al-Abbas al-Majusi (d.c. 384/994). This book is extant and has been edited twice; an important, though fragmentary, manuscript copy of it (MS Marsh 379, item 2, in the Bodleian Library, Oxford) was read and collated in the presence of Ibn Habal himself (Savage-Smith) (Alasdair Watson, Encyclopedia of Islam).

** Two books on medical botany, one by Al-Ichbili (Umdat A-ttabib) and the other by Alghassani (Hadiqat al -Azhar) have already been the subject of a botanical-historical analysis by Bammi (2012).5

Tuhfat al-ahbab: A work for loved ones (anonymous) (16th or 17th century), kachf arumuz (Ibn hamadouch al-jazaïri) (18th century).

Note that the authors selected for the study belong to two different cultural fields: Maghreb and Andalusia on the one hand (Ibn al-Jazzar, Avenzoar, Al-Ichbili, Ibn-al Baytar, Al-Ghassani, Ibn Hamadouch) and the East, especially Persia (Razes, Avicenna, Ibn-al-Habal, Al-Madjusi) on the other.

RESULTS AND DISCUSSION

Before presenting the main part of my results, I would like to stress that, despite the progress made by the Arabs in the field of experimental medicine, the contribution of Greek-Latin medicine in Arab medicine is obvious. The influence of Hippocrates and Galen's medicine on Arab authors is another subject though.

After analysing the selected historical books of medicine, the therapeutic protocol about kidney diseases is summarised in:

The prescription of: diuretics, drugs against kidney stones, Anti-inflammatory oral or in the form of friction. In case of pain, the prescription of narcotics, the use of sitz baths to fight inflammation, activate circulation and stop bleeding. In case of flatulence aggravating the pains, they associate diuretics and carminatives; the use of mucilage as emollients and against irritation of the urinary tract.

According to Razes, kidney calculi would be treated with baths, dietary restriction (particularly milk) and melon pips, Indian beans, and a pill made from burnt scorpions.

The same author, after bathing, rubs loins and hypochondria with chamomile oil or dill oil (*Anethum graveolens)* if there is violent irritation. "And when he is in the sitz bath give him what is diuretic and what breaks the kidney stone".[2]

The results of the historical epistemology study are summarised in the table 1.

The main innovation is that some remedies are considered, unanimously, as effective against renal diseases. Concerning diuretics, we noticed the predominance of species belonging to the *Cucurbitaceae* family (Melon, Cucumber, pumpkin) and the *Ombellifereae* family (Parsley, Celery, Cumin, caraway, Anise, Khella, carrot); these two botanical families dominate treatment.

Concerning kidney stones, we noticed the predominance of *Cucurbitaceae, Ombilleferae* and *Malvaceae* (Marshmallow, mauve).

Table 1. Treatment of urinary diseases, according to certain Arab-Muslim authors.

Treatments according to authors	Water retention	Kidney stones	Renal inflammation	Flatulence increasing pain
RAZES	Alfalfa, marshmallow, melon, cucumber	Bark caper root, celery, melon, cucumber, pumpkin seeds, flax-seed, marshmallow	Psyllium, violets, alfalfa, chamomile, flax-seeds, sesame	Rue, anise, dill, Khella, cumin, caraway, Nigella
(IBN SINA) AVICENNA	Fenugreek carrot Khella, fennel chaste tree seed	Alfalfa, marshmallow, cumin, Parsley, Celery, Henna root, Squill, cinnamon, cucumber, Quackgrass, Rue	Rose, chamomile, flaxseed, dill, marshmallow, carrot, liquorice	Rue, Celery, Khella, anise, caraway, Nigella
IBN AL-JAZZAR	Anise, Nigella, celery, pennyroyal, Mahleb	Melon, cucumber, pumpkin seeds, marshmallow, flaxseed, bark caper root, nigella, anise, Celery, marrube, cinnamon	Myrtle, rose, Tamarind, psyllium, marshmallow, flaxseed, fenugreek, bryone	
IBN AL-HABAL		Alfalfa, marshmallow, celery, cucumber, Quagrass, chaste tree root, cumin, fennel, Rue		
AVENZOAR	Melon, Cucumber, Carrot, Celery, Fennel roots, Asparagus	Nettle seeds, carrot seeds, Celery, melon seeds	Cucumber, chamomile, celery, rose, saffron, flax seeds, pyrethrum, liquorice	
IBN ALBAYTAR	Cucumber seeds, Southern maidenhair fern	Marshmallow	Mauve, Flaxseed chamomile, fenugreek	
Al-MADJUSI		Celery, fennel, pennyroyal, Khella Marshmallow, flax seed, Mauve, melon, cucumber	Bladder inflammation: caper, Khella, Pyrethrum, Nettle, fennel, Marrube, caste tree, Harmel	

Other remedies repeated by our authors belong to minority families, such as Flaxseed *(Linceae),* Almond *(Rosacea),* Caper *(Capparidaceae)*, Quackgrass *(Poaceae)*, Cinnamon *(Lauracea)* Asparagus *(Asparagaceae)*, Psyllium *(Plantaginaceae)*, Chamomile *(Asteraceae)*, Fenugreek, Alfalfa *(Fabaceae)*.

Note that great interest is placed in mucilage, as present, in large quantities, in the *Malvaceae* family.

Concerning the ethno-botanical study, some plants are used in traditional Moroccan pharmacopoeia according to the ancient theory of signature. For example, stinking wood *(Anagyris foetida)* whose kidney-shaped seeds are prescribed for kidney diseases and *Medicago sativa* seeds (Alfalfa), used against kidney inflammation.

Below, I present the results of the comparison of the recipes collected by the ethno-botanical study with those of traditional Arab medicine; for methodological reasons, I separated diuretic plants from plants used against kidney pathologies. The table 2 concerns diuretics.

We noted that 80% of diuretics used in traditional medicine are cited by ancient authors (especially from Maghreb and Andalusia). The remaining 20% are, in general, endemic or introduced plants.

Most plants considered as diuretics in traditional Moroccan medicine are cited by ancient authors, from Maghreb and Andalusia. Only some of these are also mentioned by oriental authors (Celery, parsley, cumin, anise).

Some recipes with a high cultural significance are worth noting: the young leaves of Borago officinalis (Borage) are specially used to prepare Khli'a Couscous broth (dried and salted meat). Given the large amounts of brine it contains, this dish is likely to cause water retention. This is why borage, whose diuretic properties are known, is added to the broth. In other Couscous recipes, borage is not usually used.[8] *Leptadenia pyrotechnica* (a Saharan plant not cited by ancient authors), is used by nomads; when they walk barefoot in the sun and the burning sensation in their feet extends to the navel to the point where they can no longer urinate, they drink a decoction made from this (tab. 3).

It is noted that, unlike diuretics, anti-lithiasis and anti-inflammatory plants are cited for the same effects, by both oriental authors and western authors (Maghreb and Andalusia). It is plausible that this indicates that, for severe pathologies, they rely on medical history, while for diuretics, it is rather local experience that is decisive.

Note that some plants used against kidney disease are not mentioned in historical books: *Herniaria hirsuta*, Chestnut, Eucalyptus, Corn (styles), Prickly pear (flowers), *Juncus maritimus*. The introduction of these plants into the pharmacopoeia has given rise to new recipes where old plants and new plants are mixed. This, in our view, represents a form of renovation in traditional treatments.

As an example, we present an anti-inflammatory mixture against kidney diseases in the Moroccan pharmacopeia, which contains: Chestnut, Eucalyptus leaves, Corn styles, Prickly pear flowers, Pennyroyal *(Mentha pulegium)*, Lavender, Indian nard, Rye seeds, Chamomile, Quackgrass and Juncus.

Table 2. Comparison between recipes collected by the ethno-botanical study and those of traditional Arab medicine (diuretics).

Diuretic plants in Moroccan pharmacopeia	Historical use (cited as diuretic by)	Diuretic plants in Moroccan pharmacopeia	Historical use (cited as diuretic by)
Celery	All authors	Lentisk	All Maghreban and Andalusian authors
Absinthe	All authors	Purple viper's-bugloss	Only by Ibn Al-Baytar
Parsley	All Maghreban and Andalusian authors and Avicenna	Field eryngo and Holly-leaved eryngo	All Maghreban and Andalusian authors
Red Bryony	Ibn Al-Jazzar as anti-inflammatory	Squill	All authors
Mediterranean Heath	Ibn Al-baytar and Al-*Ichbili*	Globe artichoke	All Maghreban and Andalusian authors
Caraway	All authors only as carminative	Borage	All Maghreban and Andalusian authors
Sarghina	All Maghreban and Andalusian authors, not by oriental authors	Statice	Not cited
Alfalfa dodder	All Maghreban and Andalusian authors	Silvery paronychia	Not cited
Anise	All Maghreban and Andalusian authors, Avicenna and RAZES	Broom Brush	Not cited
Black pepper	All Maghreban and Andalusian authors	Bouhmama's cauliflower	Not cited
Camel grass	All Maghreban and Andalusian authors	Hibiscus sabdariffa	Not cited

Table 3. Comparison between recipes collected by the ethno-botanical study and those of scientific Arab medicine (kidney diseases).

Medicinal plant	Therapeutic use	Historical use (cited by)
Celery	Anti-inflammatory	Panacea for all authors (in the occident and orient)
Mediterranean Heath	Urinary antiseptic	IBN Al-Baytar and AL-Ichbili
hairy rupture-wort	Kidney stones	Not cited
Onion	Dropsy, water retention; urination disorders, bladder diseases, with seeds of Radish, carrot and parsley	All Maghreban and Andalusian authors
Jujube	Urinary antiseptic, cystitis	All Maghreban and Andalusian authors
Lesser galangal	In decoction, against renal inflammations	All Maghreban and Andalusian authors except Ibn Hamadouch
Marshmallow	Decoction of roots to calm painful urination	Panacea usually used in kidney diseases
Khella	Decoction against kidney and bladder pain, antispasmodic	Used by Razes, Madjusi and Ibn AL-Habal
Asparagus	Unblocks all obstructions and facilitates secretions, used against syphilis and gonorrhoea	All authors
English lavender	Urinary antiseptic	Used by ancient physicians as anti-inflammatory
Psyllium	Inflammation of the kidneys, bladder and urinary tract	All Maghreban, Andalusian authors and Razes
Olibanum	Kidney stones, cystitis and oliguria	Maghreban and Andalusian authors
Roman nettle	Kidney stones, cystitis and oliguria	Maghreban and Andalusian authors
Opium poppy	Cystitis	Maghreban and Andalusian authors
Harmel	With Nigella, cumin, garlic, rance butter and honey (Kidney stones)	Avicenna and Ibn AL-Habal (Kidney stones)
Carrot (seeds)	Renal colic, oliguria	Panacea against kidney stones
Savory	Painful urination	Ibn Al-Baytar and Ibn Hamadouch
Bermuda grass and couch grass	Rhizome against kidney stones and urinary disorders	Maghreban and Andalusian authors
Sea urchin spurge and Resin Spurge	Cooling and affections of a kidney	Ibn Al-Baytar and Ibn Hamadouch
Barley	Against vesico-urinary irritations and against gonorrhoea	All authors
White henbane and black henbane	Low dose, sedative and antispasmodic in bladder pain	All authors as narcotic
Fringed lavender	Kidney stones	Only Tuhfat Al-Ahbab
Tailed pepper	Antiseptic in the treatment of urinary and bladder diseases	Maghreban and Andalusian authors
Capper	At Tissint, the dried root, reduced to powder is mixed with honey, is used against gonorrhoea, as diuretic	IBN al-Jazzar, Razes

3.1. Transmission of knowledge

3.1.1. The potential scientific base of traditional medical practice in Morocco. The remoteness of rural areas from official health centres helps traditional medicine in retaining a certain following, always represented locally by a practitioner, even if he sometimes earns his living in another occupation. The sedentary and urban-centred nature of modern medicine is thus a factor that militates in favour of traditional practitioners.

Care is very often given in patients' homes. The best-known example is that of traditional birth attendants who look after mothers in their own homes, but there are also many *fuqaha* who are willing to visit their patients on their sickbeds, wherever they may be.

Moreover, traditional therapy remains overall a "soft" type of medicine, using treatments that are mainly oral or topical and very rarely drawing blood. The medicinal herbs are used in decoctions, oleates, sugary pastes etc. in which the active principle is greatly diluted so that its effects are spread out over time, thus avoiding therapeutic shock. Progressive dosage is always the rule, which makes for easier surveillance of treatment. Moroccan pharmacopoeia only contains few dangerous products, and all of them are familiar to people in rural areas.

The materials for traditional medications were local plants, as well as exotic plants supplied by herbalists during the weekly rural souks.

The Faqihs, in mosques, having Arabic medicine books, contribute to perpetuating medical knowledge and to relieving the pains of people in the village.

How has this ancestral scientific knowledge reached remote areas in the mountains; how did this bookish knowledge come to them?

Al-Qaraouyine University in Fez –and the Fez schools that were annexes of the University– was, since the 13th century, a scientific centre attracting scholars –from all fields– who came from all over Morocco and from outside the country to complete their academic studies. On returning to their villages, they carried with them knowledge, which they passed on to others interested in science, but they also carried books with them. These books became private property or were placed in libraries, especially in the zaouïas, which provided religious, social and educational functions. Over time, this bookish medical knowledge has been transformed into popular knowledge, distorted certainly in its purely academic aspects, but keeping the essence of the recipes in their natural form.

Pilgrimages also contribute to the spread of medical knowledge, The Senegalese of the Tijania brotherhood, who come to the pilgrimage to Fez, often bring back to Morocco dried calices of *Hibiscus sabdariffa*, with a diuretic and urinary antiseptic effect, to offer to their guests.[8]

4. CONCLUSIONS

Without natural medicines, these mountain people would be in a dismal situation. However, economic aspects alone do not justify the use of medicinal plants. Indeed, ancient remedies help fight the ills of people in remote areas, who also benefit from science-proven remedies. The country people, especially in remote areas, benefit older scientists more than contemporary scholars.

Modern phytotherapy has drawn a lot and still draws from ancestral therapeutic heritage. This therapeutic continuity deserves to be studied and medicine from nature deserves to be re-examined. Traditional medicine is still popular in Morocco since it is an important form of healthcare for many. Its positive aspects could be encouraged if it were officially recognised and given a place in the health system. In Morocco today a new attitude is developing with regard to traditional medicine, and this can be seen particularly in *the emphasis now being placed on research into the history of Arab medicine and the pharmaco-chemistry of the medicinal plants commonly used by the people.* This new attitude has led to a more objective approach to traditional medicine in Morocco so that it is now possible to contemplate involving all facets of the country's potential –human, intellectual and material, modern and traditional– in developing a public health policy founded on improved management and optimum utilisation of the country's resources and efforts. This means recognition of the past and present accomplishments of the people in caring for the sick and in controlling disease.[7]

If we examine modern herbal medicine in its most credible sources, we find that several plants used in Arab and Greco-Latin medicine are successfully used in contemporary natural medicine:

Erica and Calluna, containing Arbutin, are very efficient urinary antiseptics; Quack-grass root, containing Agropyrene, potassium, silice, malic acid, Inositol, has a high antibiotic effect. *Plantago psyllium*, rich in mucilage, has an anti-inflammatory effect; marshmallow, rich in mucilage has anti-inflammatory and emollient effects; Borage, containing mucilage and potassium, is highly diuretic; corn style and Hibiscus are highly diuretic while Pumpkin seed oil is used against prostate hypertrophy. This encourages us to reframe traditional medicine and integrate it further into the public health system.

Public health officials must not lose sight of the vital importance of using the material and human resources available in the country, be they traditional or modern, to achieve optimum management of their own potential and thus improve the provision of public health.

Indeed, there is no foreseeable hope of extending health coverage in many countries today unless we adopt unorthodox measures such as the involvement of traditional practitioners and the use of medicines based on local plants, especially in rural and remote areas.

However, all this should not discourage attempts to involve traditional medicine in basic health care coverage in the framework of a pragmatic health policy. It will require a careful and critical analysis of the situation prevailing in the sector so that unverified assumptions can be discarded, but, at the same time, *any prejudice against traditional medicine must also be set aside. Only then will it be possible to attain the impartiality that is necessary to achieve the best in public health and to draw on all the resources of the nation, human and material, traditional and modern, for the greater benefit of underserved populations.*

Finally, the idea of considering the opposition between "scientific medicine" based on causality and laws and "traditional medicine" based on direct and limited experience deserves to be re-questioned.

ΠΕΡΙΛΗΨΗ

Η θεραπεία των νοσημάτων του ουροποιητικού στην παραδοσιακή φαρμακοποιία του Μαρόκου: Στοιχεία εθνολογίας και ιστορικής επιστημολογίας

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Το έργο αυτό, που βασίζεται κυρίως στην εθνοβοτανική, συμβάλλει στη γνώση της φαρμακοποιίας του Μαρόκου σχετικά με τη θεραπεία των ασθενειών του ουροποιητικού συστήματος. Η προσέγγισή μας, τόσο συγχρονική όσο και διαχρονική, επιδιώκει να τονίσει την ιστορική αγκύρωση των σημερινών παραδοσιακών ιατρικών πρακτικών μέσω μιας συγκριτικής μελέτης των συνταγών της μαροκινής παραδοσιακής φαρμακοποιίας για τις ουρολογικές ασθένειες και τα κείμενα ιατρικής αναφοράς της Αραβικής. Προσπαθώ να δείξω τη διαχρονικότητα της ιστορικής ιατρικής γνώσης στις παραδοσιακές ιατρικές πρακτικές, θέτοντας, υπό αυτή την έννοια, το θεμελιώδες ζήτημα της εγκυρότητας του υποτιθέμενου επιστημολογικού διαχωρισμού μεταξύ της παραδοσιακής ιατρικής γνώσης και του επιστημονικού λόγου.

Λέξεις ευρετηρίου: Αραβικές ιστορικές ιατρικές γνώσεις, Ασθένειες των ουροφόρων οδών του Μαρόκου, Εθνοβοτανική, Φαρμακοποιία του Μαρόκου

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Appendix 1. Scientific names of the plants mentioned.

Absinthe: *Artemisia absinthium*
Alfalfa: Medicago sativa
Alfalfa dodder: Cuscuta epithymum
Anise: Pimpinella anisum
Asparagus: Asparagus officinalis
Barley: Hordeum vulgare
Bermuda grass: Cynodon dactylon
Black henbane: Hyoscyamus niger
Black pepper: Piper nigrum
Borage: Borago officinalis
Bouhmama's cauliflower: Fredolia aretioides
Broom Brush: Leptadenia pyrotechnica
Camel grass: Cymbopogon schoenanthus
Caper: Capparis spinosa
Caraway: Carum carvi
Carrot: Daucus carota
Celery: Apium graveolens
Chamomile: Matricaria camomilla
Chaste tree: Vitex agnus-Castus
Cinnamon: Cinnamomum zeylanicum
Common rue: Ruta graveolens
Cucumber: Cucumis sativus
Cumin: Cyminum Cuminum
Dill: Anethum graveolens
English lavender: Lavandula vera
Fennel: Foeniculum vulgare
Fenugreek: Trigonella foenum-graecum
Field eryngo: Eryngium campestre
Flax-seed: Linum usitatissimum
Fringed lavender: Lavandula dentata
Globe artichoke: Cynara scolymus
Hairy rupturewort: Herniaria hirsuta
Harmel: Peganum harmala
Heartsease: Viola tricolor
Henna: Lasonia inermis
Holly-leaved eryngo: Eryngium ilicifolium
Jujube: Ziziphus lotus
Jujube: Ziziphus vulgaris
Khella: Ammi visnaga
Lentisk: Pistacia lentiscus
Lesser galangal: Alpinia officinarum
Liquorice: Chicorium intybus
Mahleb: Prunus mahaleb
Marrube: Marrubium vulgare
Marshmallow: Althea officinalis
Mauve: Malva sylvestris
Mediterranean Heath: Erica multiflora
Melon: Cucumis melo
Myrtle: Myrtus communis
Nettle: Urtica dioïca
Nigella: Nigella sativa
Olibanum: Boswellia carterii
Onion: *Allium cepa*
Opium poppy: Papaver somniferum
Parsley: Petroselinum sativum
Pennyroyal: Mentha pulegium
Psyllium: Plantago psyllium
Pumpkin: Cucurbita pepo
Purple viper's-bugloss: Echium plantagineum
Pyrethrum: Anacyclus pyrethrum
Quackgrass: Agrophyrum rupens
Red Bryony: Bryonia dioïca
Resin Spurge: Euphorbia resinifera
Roman nettle: Urtica pilulifera
Rose: Rosa damascena
Roselle: Hibiscus sabdariffa
Saffron: Crocus sativus
Sarghina: Corrigiola telephiifolia
Savory: Satureja calamintha
Sea urchin spurge: Euphorbia echinus
Sesame: Sesamum indicum
Silvery paronychia: Paronychia argentea
Southern maidenhair fern: Adianthum Capillus-veneris
Squill: Drimia maritima
Statice: Limonium bonduelli
Tailed pepper: Piper cubeba
Tamarind:Tamarindus indica
White henbane: *Hyoscyamus albus*

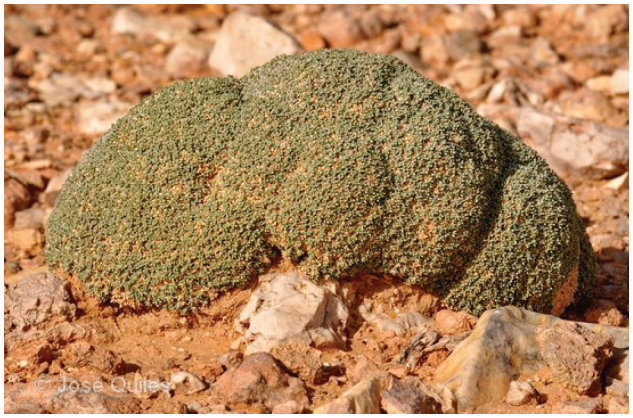
Appendix 2. Photos.

Old man harvesting a medicinal plant for self-medication in the Talouat region (Western High Atlas).

Talouat village, one among the study areas (Western High Atlas).

The author during the ethno-botanical investigation in the Laâyoune region (Atlantic Sahara).

Leptadenia pyrotechnica (not cited by ancient authors).



Fredolia aretoïdes (not cited by ancient authors).

Euphorbia echinus in Tata region (endemic plant of south Morocco).

Paronychia argentea (not cited by ancient authors).

Capparis spinosa in Tissint oasis (South Morocco).

Medicago sativa seeds and Anagyris foetida seeds (kidney-shaped).

Limonium bonduelli (not cited by ancient authors).