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Medicinal plants used for the medicalization and the cosmetics of the hair in a human population of the plain of the gharb (Morocco)

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ABSTRACT

In many countries of the world, the use of the plants for medical or cosmetic by local human population is important. However, due to the increase of the frequency of use of modern medicines by the population, knowledge about the traditional use of plants may be lost.

Of the present work, we contribute to the conservation of this heritage by studying the use of medicinal plants in medicalization or cosmetics by the indigenous human population of a large plain of Morocco, plain of the Gharb. 71 species arranged in 68 genera and 43 botanical families are used for cosmetic hair. 19 species are endemic spontaneous one, 43 plants are grown, others are imported. The Lamiaceae, Poaceae, Rosaceae, Fabaceae, Solanaceae and Myrtaceae families are represented in botanical species and genera.

The results showed that for the activation of hair growth the main used species are *Allium sativum, Lawsonia intermis*. Softening hair *Opuntia ficus indica, Musa coccinea, Lawsonia intermis*; to make hair shiny the main used species are *Musa coccinea, Rosmarinus officinalis, Allium sativum, Myrtus communis, Punica granatum, Lawsonia intermis, Citrus limonum* ; to color the hair only one species is widely used, *Lawsonia intermis*.

For the relative frequencies of use of different plant parts uilisées we have noted: leaf (45%), seed (21.12%), fruit (18%), the underground part (16.9%), flower (8.45%), oil (7%) and the latex is not used.

INTRODUCTION

Morocco has a rich vascular flora with a high proportion of endemic species[1-3]. The use of these plants for medical or cosmetic by the local population is far from negligible[4]. Indeed, 20% of the population lives, at least in part, on forest products and over 500 medicinal plants are economically important[5]. However, due to the increase of the frequency of use of modern medicines by the population, knowledge about traditional plant use are lost from one generation to another[5,6].

Thus, for ethnobotanical studies many authors have contributed to the preservation of these types of knowledge that are of great value to humanity. We include those of Benkhnigue et *al*. (2010)[7] et Salhi et collaborators (2011)[8].

In this work, we studied the medicinal plants used to medicalize or for aesthetical purpose of hair by the population of a large plain of Morocco: the plain of Gharb. It is a contribution that aims to inventory medical or cosmetic plants while showing the main recipes of the use of these plants.

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MATERIALS AND METHODS

Study site

The Gharb plain, figure 1, is presented as an immense alluvial which has geological superficial deposits of the Quaternary age[9]. The attitude is low; it covers the provinces of Kenitra and the Sidi Kacem cities and its area is about 4200 km^2. The climate is Mediterranean tempered by oceanic influences. The population is young and constitutes 6,2% Of the Moroccan population; nearly 40% of the population is under 15 years and nearly 54 % are of working age[10].

Figure 1 : Plain of Gharb (Morroco)

Method of data collection

Qualitative research on medicinal plants used in the plain for purpose of the cosmetic is made using 500 question cards (see Annex 1) of ethnobotanical surveys. The field campaign was conducted during the year 2012. The systematic identification of some samples collected in the field was carried out in the laboratory of Biodiversity and Natural Resources of the Faculty of Sciences of Kenitra city using the available herbarium and a number of books. Thus, we obtained a scientific understanding of the medicinal and cosmetics flora used by the local population of the study area.

RESULTS AND DISCUSSION

Species used, their systematic classification, their used parts, and the purpose of use and the use frequency are noted in TABLE 1:

As shown in TABLE 1, 71 species are used in hair cosmetic. These species arranged in 68 genera and 43 botanical families, are used in four categories of use: activate hair growth, promote their softening, their coloring and to increase their brilliance. Depending on the species, the same plant may be used for a single category, two categories, three or four categories. *Solanum melongena*, *Hibiscus sabdariffa* and *Malva sylvestris* have been used in recipes for hair coloring. *Oryza sativa*, *Jasminum nudiflorum*, *Raphnus sativus*,

TABLE 1 : Botanical families, species, parts of plant and purpose of use of medicinal plants in the studied area.

BOTANICAL FAMILIES	SPECIES	PARTS OF PLANT USED	PURPOSE OF USE				TOTAL
			Hair growth	Softening hair	Hair coloring	Brightness of hair	
Paoceae	*Saccharum officinarum* L.	Rhizome	3	1			4
	Zoysia matrella L.	Rhizome- Leaf	4	1			5
	Zea mais L.	Seed	1	1		1	3
	Oryza sativa L.	Seed	1				1
	Triticum turgidum L.	Seed	1	2		1	4
Rosaceae	*Cydonia oblonga* Miller	Fruit	1	2		1	4
	Amygdalus communis L.	Seed- Leaf	1	2	1		4
	Fragaria anassa L.	Leaf- Root			2		2
	Pyrus malus L.	Fruit- Aerial part	1	2		2	5
	Rosa damascena Mill.	Flower		3			3
Fabaceae	*Trigonella foenum graecum* L.	Seed- Aerial part	5	1	1	1	8
	Glycyrrhiza glabra L.	Root	1				1
	Glycine max L.	Seed	1	1			2
	Cicer arietinum L.	Seed	1	1			2

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BOTANICAL FAMILIES	SPECIES	PARTS OF PLANT USED	PURPOSE OF USE				TOTAL
			Hair growth	Softening hair	Hair coloring	Brightness of hair	
Asteraceae	*Artemisia absinthium* L.	Leaf	1	2	2	1	6
	Matricaria recutita L.	Flower	1	2	5	2	10
Solanaceae	*Nicotiana tabacum* L.	Leaf- Aerial part	2	1		1	4
	Capisicum annum L.	Seed- Fruit	3	3			3
	Solanum melongena L	Fruit			1		1
Alliaceae	*Allium sativum* L.	Bulb	14	6	2	5	28
	Allium cepa L.	Bulb	4	1	1	1	7
Lamiaceae	*Rosmarinus officinalis* L.	Leaf	5	6		6	17
	Thymus pallidus Batt. & *T. broussonetii* Boiss.	Flower- Leaf	7	3	2	2	14
	Mentha pulegium L.	Leaf		1	1	1	3
	Oscimum basilicum L.	Leaf	1				1
	Lavandula stoechas L.	Leaf- Flower	3	7		2	12
Pinaceae	*Cedrus atlantica* Manetti	Leaf	2				2
	Pinus halepensis (Miller)	Seed- Leaf		1		1	2
Malvaceae	*Hibiscus sabdariffa* L.	Leaf			1		1
	Malva sylvestris L.	Leaf			1		1
Myrtaceae	*Myrtus communis* L.	Leaf	5	4		5	14
	Syzygium aromaticum L.	Flower	1	6	1	1	9
	Eucalyptus sp	Leaf- Oil	2	1			3
Lythraceae	*Punica granatum* L.	Fruit- Leaf	3	2		5	12
	Lawsonia intermis L.	Leaf	12	13	26	5	56
Zingeberaceae	*Curcuma longa* L.	Rhizome		1			1
	Zingiber officinale Rosc.	Rhizome		1		1	2
Loraceae	*Persea gratissima* Gaertn	Fruit	3	7	1	2	13
	Cinnamomum verum L.	Leaf- Aerial part	2				2
Urticaceae	*Urtica dioica* L.	Stem- Leaf	2	1			3
Coffeaceae	*Coffea arabica* L. & *C. canephora* L.	Seed	4	1			5
Iridaceae	*Crocus sativa* L.	Flower	2	2	1		7
Oleaceae	*Jasminum nudiflorum* Lindl.	Leaf	3				3
Brassicaceae	*Raphnus sativus* L.	Root- Leaf- Fruit	1				1
Apiaceae	*Daucus carota* L.	Root		1	1	2	4
Musaceae	*Musa coccinea Andews*	Fruit- Leaf	3	13	1	6	23
Pedaliaceae	*Sesamum indicum* L.	Seed	1	3			4
Cupressaceae	*Tetraclinis articulata* L.	Root- Leaf	2				2
Fagaceae	*Quercus suber* L.	Root	1				1
Theaceae	*Camellia sinensis* (Linnaeux) O. Kuntze	Leaf	1	1	3		5
Ranunculaceae	*Nigella damascene* L.	Seed	4	3	2	2	11
Thymelaeaceae	*Daphne gnidium* L.	Leaf- Aerial part	3	5	2		10
Tamaricaceae	*Tamarix gallica* L.	Leaf	2	3			5
Arecaceae	*Phoenix dactylifera* L.	Fruit	1			3	5
Cannabinaceae	*Cannabis sativa* L.	Seed	1	1		1	3
Plantaginaceae	*Plantago psyllium* L.	Leaf		1			1
Moraceae	*Ficus carica* L.	Leaf- Fruit		1	1		2
Actinidiaceae	*Actinidia Chinensis* Planch	Fruit		1			1
Tiliaceae	*Tilia platyphyllos* Scop.	Leaf	1	1			2
Sapotaceae	*Argania spinosa* L.	Seed- Oil	1	2			3

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BOTANICAL FAMILIES	SPECIES	PARTS OF PLANT USED	PURPOSE OF USE				TOTAL
			Hair growth	Softening hair	Hair coloring	Brightness of hair	
Juglandaceae	*Juglans regia* L.	Bark		2			2
Simmondsiaceae	*Simmondsia chinensis* Link	Oil	1	5	3		9
Cactaceae	*Opuntia ficus indica* (L.) Mill.	Stem- Fruit	5	16		4	25
Zygophyllaceae	*Peganum harmala* L	Seed- Aerial part	6	2		1	9
Euphorbiaceae	*Ricinus communis* L.	Leaf- Oil	3	6	1	3	13
Rutaceae	*Citrus limonum* Risso	Fruit		8	1	5	14
Arecaceae	Cocos nucifera L.	Fruit		2		1	3
Linaceae	*Linum usitatissimum* L.	Seed	5	4			9
OLeaceae	*Olea europea* L.	Fruit- Oil	6	7	2	2	17
TOTAL :	43 Families ; 68 Genera ; 71 Species	-	151	178	66	77	472

Tetraclinis articulata and *Quercus suber* were used to activate hair growth. In contrast, *Trigonella foenum graecum, Artemisia absinthium, Matricaria recutita, Allium sativum, Allium cepa, Thymus pallidus, Thymus broussonetii, Syzygium aromaticum, Persea gratissima, Musa coccinea, Nigella* damascene, *Ricinus communis* and *Olea europea* are included in only one of the four categories. Other species have been used in at least two of the four categories of use.

Systematic point of view the most represented families are the Lamiaceae (6 species), Poaceae (5 species), Rosaceae (5espèces), Fabaceae (4 species), Solanaceae (3 species) and Myrtaceae (3 species). The other families were represented by only one species each, and form the majority (67.44 %) of the total plants listed.

On the wealth in genera of the botanical families those were richest in species are also the richest in genera namely Lamiaceae (5 types), Poaceae (5 types), Rosaceae (5 genera), Fabaceae (4 genera), Solanaceae (3 genera) and Myrtaceae (3 genera). We deduce and flora recorded this a poor diversity in genera and species. Thus, identified flora was systematically diverse. Indeed, compratively to other works, El-Hilaly et *al.* (2003)[2] in the region of the city of Taounate have inventoried 102 medicinal or cosmetic species belonging to 48 families, in the region of the town of Taza Khabbachi and colleagues (2012)[11], 73 species belonging to 39 families, and in the region of Rabat Hseini and colleagues (2007)[12] 280 species belonging 77 families.

On the frequency of use of species, all esthetic types confused, the most commonly species used are: *Opuntia ficus indica* 5.27% 4.85% *Musa coccinea, Olea europea* 3.58% 2.75% *Citrus limonum*: *Daphne gnidium* 2.75% *Nigella damascene* 2.75% 2.12% *Matricaria recutita*. To activate hair growth: *Allium sativum* 9.27% 7.94% *Lawsonia intermis*. For the softening of the hair *Opuntia ficus indica* 8.98% 7.30% *Musa coccinea*; *Lawsonia intermis* 7.30%. To make hair softer *Musa coccinea* 7.79%, *Rosmarinus officinalis* 7.79%, *Allium sativum* 6.49%, *Myrtus communis* 6.49%, *Punica granatum* 6.49% *Lawsonia* intermis 6.49%; Citrus *limonum* 6.49%. To color the hair only one species is widely used (39.39%), *Lawsonia intermis*.

In addition, only19 species are spontaneous 9 of them are locally spontaneous and 10 have regional origin and one is endemic. In contrast, 43 plants are grown, 9 plants are imported.

On the use of different parts of plants identified the relative frequencies differ: leaf (45%), seed (21.12%), fruit (18%), the underground part (16.9%), the flower (8.45%), oil (7%) and the latex is not used.

Also, a large number of species or families of botanical species are known for their use in the cosmetic industry. We include some features of the most used species. Pharmacological studies have shown that preparations of fruits of *Solanum melongena* are rich in antioxidants due to the high content of flavonoids[13]. The flowers of *Hibiscus sabdariffa* contain *polysaccharides* that promote a strong induction of proliferation of human keratinocytes (HaCaT)[14]. A Plant Complex was prepared using a group of plants including

Glycine soja Siebold and *Zucc*, and *Raphanus sativus* was standardized to provide active against loss of skin elasticity (Benaiges et *al*., 1998). The seeds of *Trigonella foenum-graecum* contains antioxidants and substances used for medicinal purposes in many traditional systems such as antibacterial, stimulating gastric against anorexia and diabetes[15]. The oils of *Artemisia absinthium* and *Artemisia vulgaris* have a broad spectrum of antimicrobial activity[16]. Fluid extracts and dry of *Matricaria recutita*, *Rhamnus purshiana* and *Cinnamomum zeylanicum* can contribute émolliante and moisturizer that can protect the skin against the sun-vis[17]. In the *Thymus*, many phameucetical works have identified about 200 different compounds, mainly terpenes, have been identified[18]. The essential oil of *Syzygium aromaticum* is used in flavor and fragrance industries[19]. Oil of *Persea aka Gratissima* is incorporated into cosmetic formulations[20]. *Lawsonia inermis* is known worldwide as a cosmetic anti-carcinogenic, anti-inflammatory, analgesic and antipyretic[12]. All *Punica granatum* components have a wide range of clinical applications for the treatment and prevention of cancer and other diseases where chronic inflammation. Its juice and its zest, for examples, possess potent antioxidant properties[21]. The presence of many bioactive compounds in the essential oils of *Nigella sativa* (p-cymene, limonene, α-pinene, linalool and thymol), allows these oils to have a potent antimicrobial function[22]. In the essential oil of *Myrtus communis* twenty-four components, approximately 79.10% of the oil, were identified, some have pharmaceutical interest[23].

Note well that the Alpha-hydroxy acids contained in the fruit of several species are one of the aesthetic component of certain products that are used to restore damaged skin and improve its texture[24].

CONCLUSION

71 species arranged in 68 genera and 43 botanical families are used in hair cosmetic. These plants are used for different purposes: activate hair growth, promote their softening, allow their coloration and/ or increase their brilliance. The Lamiaceae, Poaceae, Rosaceae, Fabaceae, Solanaceae and Myrtaceae are the families witch was richer in species and in botanical genera. The Identified flora is rich in species such as in other regions of Morocco. However, 67.44% of the surveyed families have only one species each. Similarly, a significant number of species or families of botanical species identified are known for their use in the cosmetic industry.

Furthermore, such as in other regions of Morocco, the identified flora is systematically rich and contains 19 spontaneous species, one species is endemic, 43 species are grown, and 8 are imported.

The species are used in the activation of the growth of hair, softening them, their brightness or their coloring. The relative frequencies of the use of the different parts of the plants are such as: the leaf (45%), seed (21.12%), fruit (18%), the underground part (16.9%), flowers (8.45%), oil (7%) and the latex is not used.

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