Procurement of traditional remedies and transmission of medicinal knowledge among Sahrawi people
displaced in south-western Algeria refugee camps

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1. Introduction

Traditional medicinal systems worldwide are based on natural resources from the surrounding environment and on the ethnobiological knowledge needed to exploit those resources. If culture is the filter between man and the surrounding environment, then when the latter changes, traditional knowledge and practices come under pressure to re-organise the original link. When displacements occur because of war or other calamities, refugees strive to keep the connection between cultural identity, traditional resources and their homeland (Brainard and Zaharlick, 1989; Pieroni et al., 2005). Resistance against cultural erosion may be stronger when refugees are in a new context without host culture, and the loosing of ties with the place of origin would bring to the lost of their collective cultural identity without it being replaced by a process of integration or acculturation (cf. Kim, 2001).

In these contexts, the main forces that drive changes in the cultural domain of traditional medicinal knowledge are: (1) the adaptation of the original knowledge to the new environment, and (2) the development of strategies to obtain the original remedies. Examples of the first process are the substitution of traditional remedies with local available ones (traditional and/or modern) and the inclusion of remedies from the new culture into refugees’ own pharmacopoeia (with the same use(s) or new ones elaborated according to own belief systems) (Pieroni et al., 2005). Examples of the second process are the strategies for the procurement of traditional remedies such as their cultivation, gathering (in the new environment or through trips back when they are possible), marketing, and the development of social networks that link migrants and refugees to relatives and friends in the place of origin.

About 165,000 (UNHCR, 2005 figures) Sahrawi people have been living in four refugee camps located on an isolated desert plateau in southwestern Algeria since 1975 (Figure 1), when Morocco occupied the former Spanish colony of Western Sahara and they were forced to flee. In a context in which refugees find themselves in a long-lasting and intractable state of limbo, with a high level of dependency from donors, a peace process that seems to have irredeemably stagnated, and lives that are progressively wasted (Seddon, 2000; Cozza, 2003; Shelley, 2004), Sahrawis have been fighting against identity loss both militarily and through social and cultural resistance. In the realm of traditional medicine, refugees established practices to obtain their medicinal remedies through social networks within and outside the camps. These strategies permitted the continuation of traditional folk medicinal practices when otherwise this would not have been possible due to the lack of botanical resources in camps’ area. Moreover, they represent a link between displaced people and their homeland, and ultimately constitute a form of cultural resistance in the wastelands of the refugee camps.
This paper examines the process of adaptation of Sahrawi traditional medicine with displacement, particularly focusing on the origin of remedies used in the camps and on the strategies developed by refugees to obtain them, as well as on the changes that occurred to traditional medicine in relation with knowledge transmission and cultural identity.

2. Methodologies

2.1. Sahrawi history and life in the refugee camps

Sahrawis, literally ‘people from the desert’, is the name given to the tribes of nomadic and pastoral people who traditionally inhabit a coastal area of north-western Africa called Western Sahara. The origin of the Sahrawis traces back to the fusion between the Bani Hasan Arabic groups, that migrated from Yemen from XI to XIII century BC, and the Sahjaha nomadic Berber group that was living in Western Sahara. A slow process of integration of Arabic migrants with the autochthonous Berbers took place until the XVI century, from which arose a nomadic population of Sunnite Islamic religion, the Sahrawis. Sahrawi people were essentially nomadic, pasturing camels, goats, and sheep in the sandy low-lying plains of Western Sahara and relying for food on camel milk and meat, dates, sugar, and small amounts of cereals and legumes (OXFAM, 1995; Cozza, 2003). They moved in accordance with the seasons, their routes dictated by wells, watering holes, and rains. As an informant stated, they were ‘people moving towards every line of rain’.

During the 1960s, under Spanish colonization, the Sahrawis became increasingly sedentary. In 1975, following the occupation of Western Sahara by Mauritanian and Moroccan forces (Mauritanian pulled out from Western Sahara in 1979), about 70,000 Sahrawis became refugees after fleeing Moroccan army (Loewenberg, 2005; Spiegel and Qassim, 2003). As most of the men immediately joined the army, it was the women, children and old people who fled to the camps (Lippert, 1992). Nowadays, Sahrawi people live in the refugee camps of south-western Algeria (about 165,000), in the part of Western Sahara under dispute (about 65,000), and minorities are present in south Morocco, Mauritania, the Canary Islands, and Algeria.

Camps are located in a desert plateau called Hamada near the Algerian town of Tindouf. The Sahrawi Arab Democratic Republic (RASD)/Frente Polisario - the political and military organisation that represents the refugees - was granted administrative and governing autonomy over this area by the Algerian government. In the camps, refugees live in canvas tents and mud brick huts, with severe problems of water and food supply, and car batteries as main source of electricity. The European Union, some bilateral development co-operations, UN agencies, and several solidarity groups existing all around Europe make food, shelter, and other basic commodities available (Loewenberg, 2005). Indeed, the general food ration covers only 68% of the estimated energy requirement of the population and anaemia caused by malnutrition is a common health problem among the general Sahrawi population, especially children and women (Branca, 1997; UNHCR, 2002). In spite of the efforts of the RASD and donors to build an efficient health system in the camps, the average age at death is around fifty, with extremely high child mortality rates mainly due to diarrhoea and acute respiratory infections (Branca, 1997; Mezzetti, 1994). In an attempt of coping with the situation and looking for an improvement of life quality in the camps, throughout the years refugees developed an informal economy with the marketing of many products (from clothing to personal hygiene products and food items to supplement the base diet provided by humanitarian assistance) from within and outside the camps (Bhatia, 2001). The development and expansion of trading routes through the camps, from Senegal, Mali, Mauritania, Algeria and Spain, brought to the emergence of small neighbourhood shops and of distinct commercial areas within the camps.

Besides the camps, RASD has also political control over the eastern part of the Western Sahara which has been taken off from Moroccan control through a war of guerrilla that lasted until the peace agreement of 1991 (Bhatia, 2001). Consequently, Western Sahara territory is geographical and politically divided in two parts separated by 2,200 kilometres of earthen wall, constructed by Morocco in the late 1980s, and protected by 150,000 soldiers and about one million landmines (Loewenberg, 2005; San Martin, 2004). The wall crosses into northwest Mauritania physically separating the eastern portions of the territory.
under Polisario control. These portions are the so-called ‘liberated territories’ (20% of the Western Sahara approximately), while the remaining ‘occupied territories’ are under the administering authority of the Moroccan government.

2.2. Field study
The investigation of Sahrawi traditional medicine and veterinary in the Sahrawi refugee camps has been undertaken within a cooperation project funded by the Europian Union (‘Salud animal en la tendopoli Sahrawi – Algeria’, nr. ONG-PVD/2002/020-151) and carried out by two Italian NGOs (Africa 70 and IVetro Veterinari Senza Frontiere Italy). Fieldwork in this research was conducted over a period of 14 weeks in October 2003, November-December 2004, and January-February 2006. Investigation methods for ethnobotanical and cognitive-anthropological analysis applied over the periods were structured interviews with a random-selected sample of households, semi-structured interviews with traditional healers and informants regarded as knowledgeable by local people, consensus analysis using free listings, ‘walk in the woods’ approach with knowledgeable informants, and voucher specimens collection of the remedies cited (cf. Berlin, 1992; D’Andrade, 1995; Martin, 1995; Alexiades and Sheldon, 1996; Cotton, 1996; Weller, 1998; Cunningham, 2001; Puri and Vogl, 2004).

In the 2004 period, structured interviews were conducted with thirty-seven households (people living together in the same tent and mud brick huts) in the refugee camps of Awserd and Smara to investigate Sahrawi popular medicine. In each household, members were asked to identify the person in the household responsible for keeping and administering traditional remedies, with whom the interview was conducted. Respondents had a mean age of 56 (ranging from 26 to 84), thirty-three of them being women and four men. Household members were almost five on average, ranging from two to ten. Informants were inquired about the frequency of use of traditional remedies in the household, the remedies had at the moment, their use, origin and way of procuring, difficulties in remedies’ procuring, and the origin and transmission of their knowledge about traditional medicine. Interviews were conducted in Hassanya, the Arabic dialect with Berber substrate spoken by Sahrawis (cf. Cohen, 1963; Quitout, 1999; Ould Mohamed Baba, 2004), and back-translated into Spanish by local research assistants.

In every case, prior informed consent was obtained verbally before carrying out the interview and before using a camera or audio-recorder. Participants were given an explanation of the methodology, aims and possible outcomes of the study. Throughout the field study, the ethical guidelines adopted by the AAA/American Anthropological Association (1998) were observed, and methodological and ethical advices by Jacobsen and Landau (2003) were taken in consideration. During the interviews, pharmacognostic (dried) specimens, and in few cases fresh specimens, were collected and inventoried. Voucher specimens of the plants cited coming from the Hamada and the part of Western Sahara under Polisario control were collected in the field with knowledgeable informants. Plant identification followed the Sahara and Western Sahara botanical standard treatises (Ozenda, 1991; Lebrun, 1998). Botanical names are written complete with author(s) and family only the first time they appear in text or tables. Voucher specimens, digital-recorded interviews, and digital pictures of plants and remedies are available at the first author’s address.

3. Sahrawi traditional medicine
Sahrawi traditional medicine finds its origin centuries ago, in the Arabic and Islamic medicine and in the pharmacopoeia of Berber populations based on local resources from Western Sahara, but also Senegal, Mali and Mauritania, where nomads were moving looking for pastures and water for their herds. At the same time, they were exchanging products with traders from Mauritania and Mali from the south and from Morocco and Algeria from the north, thus obtaining medicinal remedies not available in their nomadic areas (Caro Baroja, 1955; Guinea, 1949; Monteil and Sauvage, 1949, 1953). In addition, remedies from the coast were marketed eastward and viceversa. With the partial sedentarization of the 1960s, marketing of medicinal remedies in the main cities of Western Sahara like Laayoune and Smara became another important source for obtaining these products.
Two types of medicinal knowledge were distinguishable: a specialistic knowledge practised by experts, and a popular medicine practised by women within families. In relation to the former type, during war expeditions there always was a male expert carrying the knowledge needed to heal wounds, to adjust broken bones and even to carry out surgical operations (Mezzetti, 1994; Caro Baroja, 1955). At the same time, female experts were responsible for childbirth, fertility and ophtalmological problems, often through complex medicinal recipies. While woman specialistic knowledge (based on medicinal plants and other remedies) has been preserved in the camps, man specialistic knowledge is quickly disappearing. In fact, related practices have been used soon after the displacement to treat the effects of Moroccan bombings (Mezzetti, 1994), but they are at present contested by donors, development agencies, NGO’s, and the same Polisario government, that have been trying to develop a modern medical system in the camps.

Popular medicinal knowledge is practiced and transmitted within families, and mainly deals with common ailments like digestive disorders, broncho-pulmonary afflictions, and eghindi, a folk term that includes allergies and intoxications. This article will present and discuss data only about this second type of medicinal knowledge and related traditional remedies.

Informants reported 287 citations of remedies used, with a mean of almost eight remedies each, the number of remedies cited per household ranging from zero to 19. Of these remedies, 240 (84%) are of vegetal origin, 26 (9%) of mineral origin and 21 (7%) of animal origin. Vegetal remedies correspond to 68 products belonging to 57 species and 32 botanical families, Fabaceae and Lamiaceae (five species each) being the most cited.

In spite of the forced settlement of most of the population, of the almost complete absence of vegetal life around the camps, and that refugees have been living in the wasteland of the Hamada for thirty years, traditional medicine has been maintained within households. About 78% of the households reported to have used traditional remedies in the last week before the interview, and this figure rises to 95% when the time frame considered are the six months prior to interviews. The person that prepares and administers the remedies, and that holds the related knowledge, is the oldest woman of the household in 89% of the cases, and the oldest man in the other 11%. Traditional remedies are kept dried and often triturated enveloped in cloth pieces or in plastic bags, and form part of the few items present in the spoiled tents of the camps. This habit of conservation of remedies is characteristic of Saharan nomadic populations, which need to store the remedies as they come over them in specific phytogeographic regions and in limited periods of the year (i.e. during the reproductive cycle of plants after the few and irregular rains), and not when the same remedies are needed.

In Table I, the medicinal plants that informants had in the household at the time of the interview are reported in alphabetical order of scientific name, along with botanical families, voucher specimens when available, vernacular names as collected in the refugee camps, place(s) of procurement of the remedies (in order of relative importance within each specific product’s row), and percentage of quotation. Most reported species are Acacia tortilis and Ammodaucus leucotrichus; the resin and the dried leaves of the first species are reported by 75% and 38% of the informants respectively, while the dried fruits of the latter are reported by 54% of the informants, the species being described by Sahrawi as their ‘traditional antibiotic’. Other most reported species are characteristic of the flora of Western Sahara and include Cleome amblyocarpa and Maerua crassifolia, of southern Sahara-Sahelian areas like Adansonia digitata, or are important Arabic remedies such as the seeds of Trigonella foenum-graecum.

In Table II, other biological remedies are presented, along with a description of the remedy, vernacular names, places of procurement and frequency of quotation. Red hematite, used as antiseptic and cicatriser, is reported by 35% of the informants, while almost 20% of them cited honey as a medicinal remedy.

4. Origin of the remedies used and procurement strategies
In Table III, we present the places of provenience of the remedies used in the camps along with their percentages and frequencies of quotation. In discussing the table, the order followed will start from the camps to include progressively all the places in relation to their distance from refugees.

Table III

Origin of traditional remedies used in Sahrawi refugee camps

<table>
<thead>
<tr>
<th>Places of provenience</th>
<th>%</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Sahara under Polisario control</td>
<td>58.5%</td>
<td>168</td>
</tr>
<tr>
<td>Tindouf market</td>
<td>20.1%</td>
<td>58</td>
</tr>
<tr>
<td>Western Sahara under Moroccan occupation</td>
<td>6.7%</td>
<td>20</td>
</tr>
<tr>
<td>Mauritania</td>
<td>5.6%</td>
<td>16</td>
</tr>
<tr>
<td>Refugee camps' markets and shops</td>
<td>2.8%</td>
<td>8</td>
</tr>
<tr>
<td>Algerian markets but Tindouf</td>
<td>1.8%</td>
<td>5</td>
</tr>
<tr>
<td>Spain</td>
<td>1.8%</td>
<td>5</td>
</tr>
<tr>
<td>Own production in the camps</td>
<td>1.4%</td>
<td>4</td>
</tr>
<tr>
<td>Hamada (surrounding of the camps)</td>
<td>1.4%</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>100%</td>
<td>287</td>
</tr>
</tbody>
</table>

The area where the refugee camps are situated is a rocky plateau about 500 meters above sea level, the Hamada, characterized by rocks eroded by the sun, the wind, and the flow of the few rain, and almost completely without vegetal life. With less than 50 mm of rain per year, the Hamada is classified as an absolute desert of Libyan or continental type (Ozenda, 1991), not fitted for human life. Less then 1.5% of the remedies used are gathered in the surrounding of the refugee camps; among them, the leaves of *Acacia tortilis* (cited by one informant who gathered them from one of the very few and spoiled individuals present in the camps), the leaves of *Cleome amblyocarpa* (two informants, some kilometres north from the camps), and the aerial parts of *Hammada scoparia* (one informant). Plants readily available are usually not stored in tents and collected when needed. This is the case with the few medicinal plants growing around the camps, like *Pergularia tomentosa* L. (Asclepiadaceae), *Zygophyllum gaetulum* Emberger et Maire subsp. *gaetulum* (Zygophyllaceae), and *Hammada scoparia*. Their local availability is probably the reason for their absence or low scores in survey results. In addition, informants collected the aerial parts of *H. scoparia* around the camps only in one case out of four, plant individuals growing in the Western Sahara being regarded as ‘more powerful’.

Almost 3% of the remedies cited have been bought in the camps. They are sold in food items’ shops and come mainly from Western Sahara or Mauritania (e.g. resin and dried leaves of *A. tortilis*), and from Algeria (e.g. leaves of *Tetraclinis articulata* and chameleon skin, a highly regarded but difficult-to-procure remedy). Common food items used as remedies like garlic and onion are also found in these shops. The selling of these products are usually personal initiatives of local traders, which buy well-known remedies from other traders or from herders or other people coming back from trips outside the camps. Given the efforts made by refugees to procure traditional therapeutics for home consumption, more medicinal products could be expected to be sold in camps’ markets and shops. Nevertheless, trading in medicinal remedies within the camps has not developed: refugees prefer to obtain Western Saharan remedies mainly through familiar and other non-commercial social networks, or to buy remedies at Tindouf market or directly from ‘travelling’ traders. Reasons for this include the perception that remedies sold in the camps are of low medicinal quality, the high prices of remedies in camps’ markets and shops, and the irregularity in the supplying of these remedies, which makes other networks more reliable for procurement.
Given the climatic situation of the Hamada, no medicinal plants are cultivated in the camps, and the 1,4% of remedies from own production is of animal origin. Remedies obtained from wild and grown animals are traditionally relevant in Sahrawi medicine. Camels and goats are diffusely grown around the camps in spite of the extreme difficulties people have to feed them: it is estimated that families in the camps own approximately 45,000 between sheep and goats, and 500 camels (DNV-RASD, 2005). Remedies from these animals are the only ones that refugees can produce by themselves in the camps, and are usually given free to friends and relatives when needed.

About forty kilometres from the refugee camps there is the Algerian town of Tindouf. This city of about 50,000 inhabitants serves as the southern headquarters for the Algerian Armed Forces and is important in trading routes across Sahara desert. Tindouf is the pole of refugees’ commercial networks, and informants buy about 20% of the remedies in markets and shops, and from traders in the city streets. Typically, these remedies are plants cultivated in northern parts of Algeria or imported from other countries and characteristical of Arabic and Islamic medicine. Examples include the highly regarded seeds of Trigonella foenum-graecum, Peganum harmala and Nigella sativa, the latter being cited in the Koran as a panacea (Siouti, 1994), and worldwide known remedies like Myristica fragrans, Cinnamomum zeylanicum, and Eugenia caryophyllata. Among the non-vegetal therapeuticals bought in Tindouf, four informants mentioned pieces of salt blocks from local salt deposits (see McDougall, 1990). Apparently, medicinal remedies’ market of Tindouf has been developing with the refugee camps, and traditional Sahrawi remedies coming from the part of Western Sahara under Polisario control or from Mauritania can increasingly be found on sale in the city. Nevertheless, refugees buy these kinds of remedies in Tindouf only if they have no other possibilities of obtaining them directly. As an example, out of twenty-eight informants reporting to possess el-alk (the resin of A. tortilis) in their tents, only one bought it in Tindouf, while twenty-three informants obtained it from the ‘liberated territories’ (three more bought it in camps’ markets and shops and one from Mauritanian traders). Similarly, only one informant out of four bought the leaves of Rhus oxycantha in Tindouf, while the others obtained them from the liberated territories. Reasons for this preference again lie in the cultural tie of Sahrawis with their homeland and the perception that remedies coming without intermediation from Western Sahara or Mauritania are of better quality and more powerful. The resin of Commiphora africana, for example, is preferentially bought to Mauritanian traders, informants stating that the resin sold in Tindouf is not good as remedy. Another reason for this preference is the high prices of remedies in Tindouf; as it happens with remedies on sale in the camps, prices increase with increasing intermediation of different traders, and with increasing of the distance from their geographical area of production or gathering. Refugees have no source of income, and the work in the military or political administration is typically unpaid; as a result, on the one hand they seek to diversify family income, with members separately engaged in commerce, military service, and education abroad, and on the other hand they try to establish non-commercial networks for obtaining items for living, including traditional remedies. Commercial networks are growing in the camps, and the source of the starting capital for these networks include pensions for former Spanish civil servants, and remittances from Sahrawis working abroad (mainly in Algeria, Mauritania, the Canary Islands, Spain) (Bhatia, 2001). This process expanded also the private ownership of cars and trucks, typically imported from Spain or Mauritania. This consequently facilitated the movement of the refugees among camps and between the camps and Tindouf, increasing also the marketing in medicinal remedies and the supplying of these remedies in Tindouf.

Informants bought almost 2% of the remedies cited in other Algerian markets but Tindouf, mainly in Alger and Beshar. Refugees obtain there otherwise difficult-to-find remedies, like Artemisia herba-alba or crashed sea urchins. Those refugees that have the legal and economic possibility of travelling across Algeria or to/from Europe, for example, buy remedies with which they come over to bring back to the camps.

Sahrawis, in spite of the forced sedentarization, reflect their nomadic culture in depending in almost 60% of the reports on the products and on the species gathered from the wild in Western Sahara. Medicinal species are mostly gathered in the eastern
stripe of Western Sahara under Polisario control. This area is characterised by a sub-oceanic desert climate where the lack of rains is partly replaced by a high hygrometric degree of the atmosphere that allows a more plant species to grow, and by permanent diffused vegetation, at least in the southern part (Guinea, 1949; Ozenda, 1991). About 65% of the single remedies cited (counting the number of remedies and not the number of citations) comes completely or in part from these territories. The control of this stripe of Western Sahara is crucial for the conservation of Sahrawi traditional medicine in the refugee camps, and refugees’ families have established social networks to obtain remedies traditionally gathered in the area. Out of 37 households interviewed, 32 (about 86%) have some established network to obtain remedies from the ‘liberated territories’; in Figure 2, the networks through which these resources are gathered and brought to the camps and respective percentage are presented.

There is a large variety and amount of remedies to be distributed to other families members that asked for them. More than half of the family members who are in charge of bringing the remedies to the camps are militaries of the Polisario (40% of the total), a figure that raises to 52% of the total networks if we include also the militaries not belonging to the family. In fact, Sahrawi population in this area are mainly combatants cantoned with their units in order to control the territory and pasture the about 27,000 camels of the Polisario (DNV-RASD, 2005). Soldiers are estimated to be between three and six thousands; at any given time, one third of them are on permission, which allows them to leave their posts at the front in order to return to their families in the camps (Bhatia, 2001). These soldiers gather the plants and other remedies during favourable seasons, and store them until they go back to the camps on permission. Beyond the militaries, in the territories live some Sahrawi nomads who use the area as grazing land for camels and goats. A large majority of them is people and families from the camps that during the cold season (from September-October to February-March) travel with their herds to the territories and live according to traditional lifestyle. During favourable cold seasons, plants grow and are gathered to be used in loco and to be brought back to the camps for own consumption or for relatives and friends.

In some cases, these non-commercial and intra-familiar networks for procuring traditional remedies are embedded into non-familiar commercial activities like the production and marketing of coal from the liberated territories to the camps, or, during favourable years, the gathering and marketing in Tindouf of the desert truffle (*Terfezia ovalispora*).
About 7% of the remedies coming from the liberated territories are obtained through commercial relations with traders that come from Mauritania and sell to families and combatants some specific products that are then brought to the camps. In table III, we can see that more than 5% of the remedies reported in the camps have been bought to traders from Mauritania or in markets in the same country (e.g. in Zouerat), which are an important source of specific products which are difficult to obtain otherwise. These products are mainly those characteristic of Sahelian areas, like the dried fruit pulp and the dried and powdered leaves of *Adansonia digitata* and the resin of *Commiphora africana*. In some occasions, traders coming from Mauritania arrive until the camps to sell remedies and other stuffs (clothes, personal products, handicraft, etc.).

As reported in table III, almost 7% of the remedies cited come from the territories of the Western Sahara under Moroccan occupation, on the other side of the berm – the Moroccan defensive wall. The western portion of the territory has a population of 200,000 Moroccan soldiers, approximately 200,000 Moroccan settlers from the post-1975 period, and above 65,000 indigenous Sahrawi (1997 figures) (Bhatia, 2001). Most of these Sahrawis have been separated from their families for three decades, but have kept familiar ties in spite of the physical separation. Products are sent to the camps from relatives or are brought by those refugees that recently had the permission to travel back to Western Sahara for visiting the family. Nevertheless, procurement of traditional remedies in the ‘occupied territories’ is still difficult for most of the refugees, and usually is carried on only for specific products that can not be procured in other ways. These products are usually bought at the markets of Laayoune or Smara cities, and include plants characteristic of the oceanic climate of Morocco and Western Sahara and endemic species like *Argania spinosa* and *Corrigiola telephiifolia*, and products of oceanic origin like crashed sea urchin. Sweet remedies are highly regarded in Sahrawi culture, especially in the treatment of *eghindil*. Not-refined sugar arrives to the camps from the occupied Western Sahara, probably coming from the Canary Islands. The habit of using this sugar remounts to the commercial relations that Sahrawi people living in the coast traditionally had with people of these islands (see Caro Baroja, 1955).

Beyond *el-alq* (acacia resin) and not-refined sugar, the other most regarded sweet remedy is honey, which can sometimes be found on sale in Tindouf. Indeed, the main place of origin of the honey consumed in the camps (in six out of seven citations) is Spain, and honey is completely responsible for the almost 2% of remedies of Spanish provenience in Table III. The way honey arrives to the camps is mainly through Sahrawi children that during summer holidays go to Spain through NGOs and solidarity groups; these children in some cases bring back to the camps pots of honey.

### 5. Difficulties in the procurement of remedies

We have shown up to now that traditional Sahrawi medicine is still diffusely practised by refugees after thirty years of living displaced in the desert, we identified the remedies used, and investigated the variety of solutions that refugees established to procure the remedies they depends upon. The following research questions that consequently arise are: are there traditional remedies that are difficult to procure? If so, which are these remedies? We investigated these issues through free-listing (‘please tell me which are the remedies that you would like to have but that you could not procure’), and results are reported in Table IV for remedies of vegetal origin, and in Table V for other biological remedies of animal or mineral origin cited by at least two informants. On average, each informant reported about three products, ranging from zero to eight. We found no relation between the number of remedies had in the household and the number of remedies reported as difficult to procure by each informant.

Table IV
<table>
<thead>
<tr>
<th>Botanical taxon and family</th>
<th>Folk name(s) recorded in the camps</th>
<th>Specific products/Plant part(s)</th>
<th>% of quotation (n=37)</th>
</tr>
</thead>
</table>

8
Table V
Other biological remedies reported as difficult to procure in Sahrawi refugee camps

<table>
<thead>
<tr>
<th>Remedy</th>
<th>Folk name recorded in the camps</th>
<th>% of quotation (n=37)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambra grisea, whale's fat</td>
<td>Enebra</td>
<td>45.9</td>
</tr>
<tr>
<td>Honey</td>
<td>Lasal</td>
<td>21.6</td>
</tr>
<tr>
<td>Chameleon egg</td>
<td>Buya</td>
<td>16.2</td>
</tr>
<tr>
<td>Ostrich (Struthio camelus L.) fat</td>
<td>Naama</td>
<td>10.8</td>
</tr>
<tr>
<td>Yellow and hard clay</td>
<td>Unkel</td>
<td>10.8</td>
</tr>
<tr>
<td>Gazelle (Gazella spp.) meat</td>
<td>Dama</td>
<td>5.4</td>
</tr>
<tr>
<td>Not-refined sugar</td>
<td>Azucar el-har</td>
<td>5.4</td>
</tr>
</tbody>
</table>

As far as it concerns vegetal remedies, we find in the list all the products most used by Sahrawis as reported in Table I, i.e. the leaves and resin of A. tortilis, the fruits of A. leucotruchus, and the leaves of Maerua crassifolia, usually gathered in the liberated territories, as well as the dried fruit pulp of A. digitata and the resin of C. africana, usually bought to traders and in Mauritanian markets. These data indicate that strategies for remedies procurement, even for more common remedies, do not cover all the households and/or all the year/s, and that when a household runs out of remedies it can be difficult to replace them in the short time. These difficulties increase with specific products like the seeds of Salvia aegyptiaca, the fruits of Balanites aegyptiaca, and the fruits and leaves of Lycium intricatum, usually collected in the liberated territories. In fact, fruits and seeds are available for gathering only in rainy years, where a sequence of years completely without rain is common. The cold season between 2004 and 2005 has been characterized by an almost complete absence of rain and has not been favourable for plant growing and gathering; hence, some families run out with the stock of specific remedies without being able to replace them. Informants reported some characteristic remedies of the part of Western Sahara under Moroccan control: Euphorbia officinarum (daghmus) is a common species in the oceanic regions of Western Sahara, while its presence becomes scattered moving east towards the Polisario-controlled area. Daghmus honey, an estimated product by Sahrawis, is produced and sold in...
the occupied territories, but only in few cases it finds the way to arrive to the camps. Similarly, *enebra* is a product of oceanic origin described by informants as whale’s fat, whale’s lees, or part of the whale’s intestine and probably corresponding to the homeopathic remedy *Ambra grisea*. Sahrawis consider *enebra* a panacea, and half of the informants reported it as very difficult to procure, while no informants had it in the household during the survey. It can be found sometimes on sale in Tindouf, but at very high prices, whereas in the occupied territories is reported as easier to procure.

Ostrich fat and gazelle meat are difficult to obtain due to the progressive disappearing of these animals from Western Sahara following the killing by Spanish colons and the war (cf. Valverde, 1957; Cuzin, 1996). Among all the animal fats used by Sahrawi, ostrich fat is the most appreciated, especially for broncho-pulmonary affections (Caro Baroja, 1955), though fats that are more available, i.e. from goats and camels, have progressively substituted it. A common characteristic of non-vegetal products most cited in Table V is their very irregular supplying for sale in Tindouf streets and from Mauritanian traders. The high demand in comparison with the availability raises their prices often at non-affordable levels for Sahrawi refugees, and makes these remedies subjected to faking by individual traders, a fact that refugees are aware.

**6. Knowledge transmission and cultural identity with displacement**

Sahrawis identify themselves as nomadic people, traditionally depending on their camel herds and on Western Sahara territory and its resources to meet their needs for food, shelter, fuel, medicine, and other necessities of life. With sedentarization and displacement to refugee camps, Sahrawis found themselves in a context where traditional lifestyle could not be continued and most of their knowledge could not be applied or transmitted. In the camps, the conservation of traditional medicine and of ties with Western Sahara - along with other practices like breeding of camels, sheep, and goats and the tea ceremony – nevertheless contributed to maintain traditional Sahrawi perceptions of who they are, in other words a collective cultural identity based on shared knowledge and practices, and rooted in their traditional lifestyle and nomadic areas. This link contributes to national identity and to the legitimating of refugees’ political referent - the Polisario. As Chamberlain (2005) notes, the struggle for national liberation is tied to Sahrawi cultural life in a number of ways, and the cultural practices of the Sahrawi are implicitly and explicitly contrasted with those of the Moroccans. As a result, many aspects of everyday Sahrawi existence (including traditional medicine) become cultural markers that distinguish the Sahrawi from other cultures, and this legitimizes the Polisario’s role as a defender of Sahrawi culture. In this context, traditional medicine helps to maintain Sahrawi cultural identity by reminding refugees that they are different in the way they categorize and perceive illness and in the remedies used, where these remedies are often resources of the Western Sahara, their 'stolen homeland'. The importance of the 'liberated territories', obtained through a guerrilla war, of Polisario combatants in the procurement of the remedies, as well as the 'campaigns' organized by Polisario for gathering traditional remedies in the 'liberated territories' to be subsequently distributed in the camps (Mezzetti, 1994), strengthen the connection between cultural and national identity.

Nevertheless, in spite of the strategies elaborated to obtain the remedies and their cultural significance, socio-cultural and productive processes that occurred with displacement have affected refugees’ traditional medicine. These processes undermined Sahrawi shared knowledge and cultural practices, especially in younger people. Half of the population - everyone under the age of 30 years - was born in the camps, and many have studied or are studying abroad, mainly in Cuba (only primary schools are present in the camps), returning to the camps after the completion of their studies. They are acculturated into Western medicinal culture, adopt Western practices, and often have only a 'narrative' knowledge of Western Sahara. Once they return to the camps they often do not participate in the transmission of traditional knowledge and thus rupture the generational legacy within Sahrawi culture. Consequently, Sahrawi medicinal knowledge transmission has weakened. Upon asking informants whether they transmitted their knowledge about traditional medicine and, if so, to whom, 22% said they did not transmit it to anyone. Given this trend, however, medicinal knowledge transmission has not weakened as much as might be
supposed: 57% reported that they transmitted it all or in part to daughters, usually the youngest daughter, followed by younger sisters (12%) and then by friends or other people who asked for it (9%). Daughters are far more likely to receive traditional medicinal knowledge from former generations because the transmission of this knowledge among Sahrawi is gendered; in fact, 89% of the informants, or ‘family experts’, were women, and 83% of them learned their knowledge from their mothers or grandmothers. In addition, out of four male informants, three did not transmit their knowledge to anybody, indicating that loss of gender status of popular medicinal knowledge may be related to erosion in knowledge transmission.

To test the hypothesis that the degree of conservation of traditional medicine is related to variations within refugees' generations, we cross-tabulated the age of the informants with the number of different remedies cited by each informant, and present the results in Figure 2. Older informants, as expected, cited more remedies. As Zent (2001) argues, traditional ethnobotanical knowledge, under the pressure of external cultures and new living patterns, decreases with decreasing age of the informants. Generally, younger informants store in their tents only a part of the variety of remedies stored by older informants, mainly those remedies that were most cited (Table 1). Sahrawis mainly obtain these products from their cultural keystone species, i.e. species that are culturally salient and strongly shape people’s cultural identity, following the definition by Garibaldi and Turner (2004). For example, Sahrawis use A. raddiana in multiple ways, its parts are taxonomically differentiated with specific labels, and it plays a role in Sahrawi traditional narratives, songs, and symbolism. Sahrawi families maintained their use of A. raddiana and its products in the camps, where the relation between these remedies and cultural identity is mediated by the possibility to procure them in the Western Sahara. The households that are not integrated into effective procurement networks with the 'liberated territories' usually buy culturally important remedies in markets and from traders or obtain them and the related knowledge for free from other tents in the camps. Exchanges of remedies eventually fortify cultural links among refugees, between refugees and the 'liberated territories', and between refugees and the Sahrawis living in the 'occupied territories'.

Figure 2. Cross-tabulation bar chart between informants' age and number of remedies cited (Pearson Chi-Square=0.008)

![Figure 2: Cross-tabulation bar chart between informants' age and number of remedies cited (Pearson Chi-Square=0.008)](chart.png)
7. Conclusions
The data presented show that Sahrawi refugees preserved the use and knowledge of traditional medicinal remedies in the camps, and that they established a variety of networks in order to obtain these remedies. Most are wild plants gathered in the part of Western Sahara that the Polisario controls, and soldiers stationed there play an important role in the procurement of these remedies for refugees’ families. The conservation of traditional medicine in this context represents a means to maintain cultural identity, and the procurement of remedies from the 'liberated territories' in Western Sahara is a means for refugees to maintain ties with their place of origin. The conservation of traditional knowledge and practices also represents resistance against acculturation and despair. Many refugees report feeling that their lives have been wasted, and emigrate and have abandoned hope of ever returning to Western Sahara. This, and the influence of different host cultures for the Sahrawi who have studied abroad, lead slowly to the loss of traditional knowledge and to the ties with Western Sahara for the younger generations, who often know and use only culturally relevant remedies.

References


Fig. 1. Location of the study area and geographical locations reported in the text