



# An ethnobotanical survey of galactogenic plants of the Berhoum District (M'sila, Algeria)

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## ABSTRACT

**Background/Aim:** This work aimed an ethnobotanical study on the galactogenic plants used in the Berhoum region (East of M'sila, Algeria) as a part of different studies on the medicinal plants related to M'sila region.

**Methods:** The fieldwork was undertaken as an ethnobotanical survey involving 76 informants (mean age: 50; 64% women, 36% men). Used the medicinal plants were identified, and the results were analyzed according to literature investigation dealing with ethnobotany. Use value (UV), fidelity level, and informant consensus factor (ICF) were used to analyze the obtained data. **Results:** A total of 29 plant species belonging to 29 genera and 12 families (mainly, *Apiaceae* and *Fabaceae*) have been registered. Fruits and seeds were the most commonly used plant parts (80%). The used plants are mainly prepared as an infusion and decoction (69%). *Trigonella foenum-graecum* L. (UV = 0.58) were the species most commonly used by local healers. The FIC factors ranging from 0.45 to 0.89 for the six uses categories retained for this study. The ICF (0.65) was registered for the use galactogenic category with 29 species. **Conclusion:** This work showed that the population of the Berhoum District uses various medicinal plants for galactogenic purposes. Furthermore, ethnobotanical analysis will provide data on sustainable use and valorization of this plant heritage for ethnopharmacological and phytochemical studies.

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## INTRODUCTION

Milk is an important natural food for newborns. The importance of milk is due to the different nutrients which contain "high biological value proteins, essential amino acids, significant quantities of inorganic salts which are essential for the building up the skeleton, immunoglobulins and growth factors [1]." Breast milk is the best source of nutrition for newborns. Breastfeeding has well-established short-term benefits, particularly the reduction of morbidity and mortality due to infectious diseases in the first 2 years of life. The following long-

term outcomes were reviewed: Blood pressure, Type 2 diabetes, serum cholesterol, obesity, and intellectual performance [2]. Breastfeeding is a great choice that provides many benefits to the baby and the mother by way of improved health, development, and most importantly, a strong bond.

Many herbs are used to stimulate milk production; most of them have long histories of traditional use, mainly in stimulating milk production in animals. Reports on the traditional use of herbal products as galactagogue in Algeria are rare. The objective of this study is to collect data on the traditional uses of spontaneous

and marketed medicinal plants used with to galactogenic effect by the population of the Berhoum District, which constantly turns toward the traditional pharmacopoeia and to preserve their use by the following generations. In addition, this document provides baseline data for future pharmacological and phytochemical studies. The socioeconomic and cultural contexts strongly influence the people's choice in fighting several pathologies through the use of medicinal plants as does the high cost of modern medicine [3].

## MATERIALS AND METHODS

### Presentation of the Study Area

The Berhoum District is in a privileged position by being in the northeastern part of Algeria [Figure 1]. Berhoum is part of the M'sila province, which has about 23,620 inhabitants [4] and covers an area of 249.34 km<sup>2</sup>. This region is at an altitude of 596 m, is located between 35°39'18" N and 5°2'4"E. The climate is characterized by a dry and cold semi-arid climate, with irregular and low amounts of rainfall [5]. The vegetation is sparse classified as a steppe and thorny brush.

### Sampling and Interviews

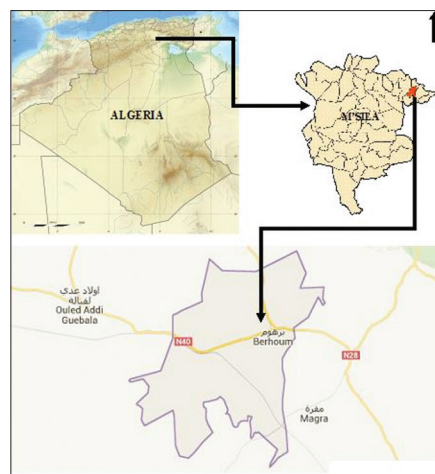
The field work and interview were conducted from February to April 2015. A questionnaire was given to the herbalists or sellers of plants in the district [Figure 2], through face-to-face interviews [6]. The information is divided into two parts; the first concerns the informant as the sole owner of the information, while the second gathers information concerning the medicinal plants such as local names, plant parts used, medicinal use, preparation, and price. In the process, plant specimens involved were collected, and subsequently preserved and stored in the herbarium of the Department of Nature and Life Sciences, Faculty of Sciences, University of M'sila. The identity of each plant species mentioned by the herbalists was verified and confirmed by botanists of the Department and by a bibliography [7,8]. A medicinal use was accepted as valid only if it was mentioned by at least three independent interviewees [9].

### Quantitative Analysis

For data analysis, informant consensus factor (ICF) was employed to indicate how far the information is homogeneous. All citations were placed into ailment categories for which the plant was claimed to be used. ICF values will be low (near 0) if plants are chosen randomly, or if informants do not exchange information about their use. Values will be high (near 1) if there is a well-defined selection criterion in the community and/or if information is exchanged between informants [10]. The ICF [11] is calculated as in the following formula:

$$ICF = \frac{Nur - Nt}{Nur - 1}$$

Where Nur is the number of use citations in each category and Nt is the number of species used.



**Figure 1:** Location of the study area (Berhoum District: M'sila, Algeria)

The use value of species (UV) [10], a quantitative method that demonstrates the relative importance of species known locally, was also calculated according to the following formula:

$$UV = U/N$$

Where U is the number of citations per species and N the number of informants.

$$FL (\%) = (Np/N) \times 100$$

Where Np = Number of informants that claim a use of a plant species to treat a particular disease; N = Number of informants that use the plants as a medicine to treat any given disease [12].

Data of UV, ICF, and FL are shown in Tables 1-3, respectively.

## RESULTS

### Ethnobotany Analysis

In our study, 76 sellers were interviewed in total [Figure 3], comprising 49 women (64%) and 27 men (36%). The age group of 40-60 is the most important among sellers in the district followed by the age group 20-40 and the group over 60 years (54, 28, and 18%, respectively). 61% of the herbalists have a primary-medium-secondary level, while 25% are illiterate and 14% have a university level.

Different parts of galactogenic plants are used differently by the population in the study area. The distribution of organ use revealed that the seeds are most commonly used (50%) followed by fruits (17%), aerial parts (13%), leaves (10%), and 10% for the remaining parts.

In general, remedies are administered orally. Infusion is the most frequent mode of preparation (45%). This method consists of pouring a boiling liquid on the used part of medicinal plant. The decoction is used with a percentage of 24. Powder is the least common form of preparation (10%).

QUESTIONNAIRE CARD N°.....

**SECTION A**

Date	Area	Sexe		Age	Educational level					Informants			
		M	W		Illiterate	Primary	Intermediary	Secondary	Academic	Herbalist	Healer	Villager	
...	...	...	...	.....	...	...	...	...	...	...	...	...	...

**SECTION B**

	Botanical name	Scientific name	Names : Arab / Amazigh / Targui or other
Utilization (Type of disease) NB : No recipes	.....	.....	.....

Mode of use	Infusion	Decoction	Fumigation	Maceration	Powder	Cream	Bath	Plaster	Other
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Part (s) used (es)	Root	Leaf	Fruit	Flower	Seed	Flowering tops	Aerial parts.	Plant whole	Other
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

**SECTION C**

	Botanical name	Common name	Names : Arab / Amazigh / Targui or other
Plants associated	.....	.....	.....

Utilization (Type of disease ) NB : Recipes (mode, period, amount, nature...)	Botanical name	Common name	Names : Arab / Amazigh / Targui or other
.....	.....	.....	.....

Figure 2: Questionnaire card of surveys (Sari et al., 2012)

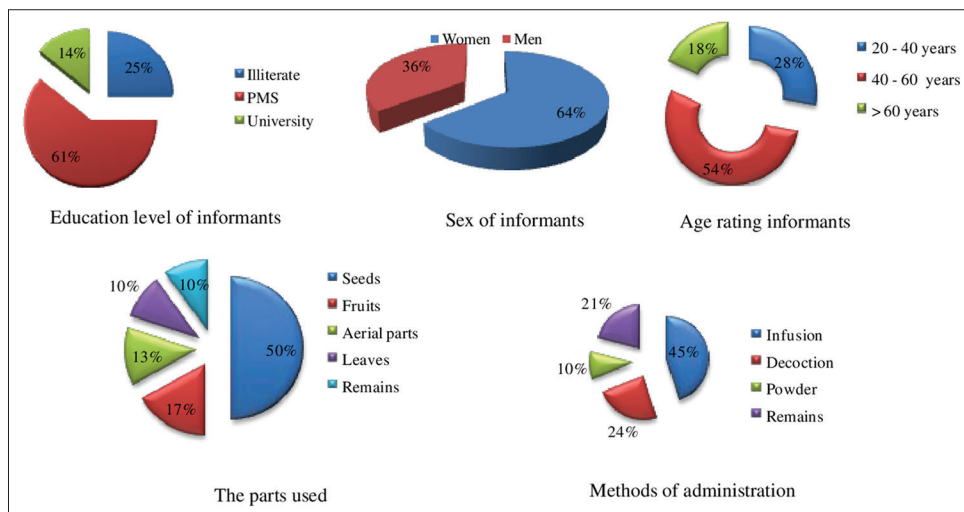


Figure 3: Distribution of the traditional use of galactogenic plants in the Berhoum District according to different parameters

The plants are dried and ground to obtain a powder to swallow with a glass of water. In general, these are the modes most used in traditional medicine [13]. The respondent also mentioned other methods of administration with a percentage of 10.

**Floristic Analysis**

In this study, 29 plant species under 12 families in the Berhoum District were reported as plants with galactogenic effect with a dominance of *Apiaceae* and *Fabaceae* (28% and 24%, respectively). Among the recorded taxa, herbs are represented by 26 species followed by shrubs tow and one tree. For each species botanical name, family, vernacular name, mode of administration, and part(s) used were recorded [Table 1].

The ICF values obtained for the categorized uses are presented in Table 2. Six categories were reported, namely, rheumatism, flu, asthma, galactogenic, gastric disorders, and blood sugar. ICF values obtained for the reported categories indicate the degree of shared knowledge for the uses of medicinal herbs. The ICF's factors ranging from 0.45 to 0.89 per uses categories [Table 2]. The ICF (0.65) was registered for the use galactogenic category with 29 species, which may indicate a high incidence of this type in this region.

**DISCUSSION**

Herbal medicine is used frequently by the population of the region of Berhoum, among other medicinal plants has galactogenic effect and in the least it makes use of modern medicine.

**Table 1: List of medicinal galactogenic plants in the Berhoum district (M'sila, Algeria)**

Family/Botanical name	Vernacular name	Part used	Preparation method	UV
<i>Apiaceae</i>	Chibitt, Chanar	Seeds	Dried and ground seeds used as herbal tea	0.01
<i>Anethum graveolens</i> L.				
<i>Apium graveolens</i> L.	Krafess	Leaves	Application of a decoction of fresh leaves	0.01
<i>Carum carvi</i> L.	Kerouiya, Qardamana	Seeds	Infusion of dried and crushed seeds	0.01
<i>Coriandrum sativum</i> L.	Kesbour, Debcha	Seeds	Multiple uses of fresh or dried seeds in infusion and decoction	0.01
<i>Cuminum cyminum</i> L.	Kemmoun	Seeds	Infusion of dried and crushed seeds	0.01
<i>Foeniculum vulgare</i> (Miller) Gaertner	Besbaça, Chebets	Seeds	Multiple uses in the form of salad and infusion of dried and crushed seeds	0.14
<i>Petroselinum crispum</i> (Mill.) Nym.	Mâadnous, Maqdounis	Leaves	Infusion of a fresh handles of leaves	0.01
<i>Pimpinella anisum</i> L.	Habet h'lawa	Seeds	Infusion of some seeds	0.01
<i>Areaceae</i>	Nekla	Fruits	Use of molasses with beverages instead of sugar	0.01
<i>Phoenix dactylifera</i> L.				
<i>Brassicaceae</i>	Habb errachad, Rechad	Seeds	Use of seeds either as an infusion or as a decoction	0.01
<i>Lepidium sativum</i> L.				
<i>Raphanus sativus</i> L.	Fdjel	Roots	Multiple uses of roots in the form of juice or as a soup mixed with cucumber seeds and apple seeds	0.01
<i>Cactaceae</i>	L'Hendi	Fruits	Fruit consumption in the form of juice	0.01
<i>Opuntia ficus-indica</i> (L.) Miller				
<i>Cyperaceae</i>	Hab el Haziz, Habb ez zelim	Seeds	Maceration (overnight) of a handful of seeds	0.01
<i>Cyperus esculentus</i> L.				
<i>Fabaceae</i>	Areq Souss	Sticks	Infusion of some sticks	0.01
<i>Glycyrrhiza foetida</i> Desf				
<i>Glycine max</i> (L.) Merr.	Soya	Seeds	Consumption in the form of salad	0.01
<i>Lens culinaris</i> Medik.	Adès, Bersim	Lentils	Consumption in the form of soup with vegetables	0.01
<i>Medicago sativa</i> L.	Safsfa, Nefel, Sefsa	Aerial parts	Infusion of the dried aerial parts	0.01
<i>Pisum sativum</i> L.	Djelbana	Seeds	Consumption of crushed seeds in the form of soup with vegetables	0.01
<i>Trigonella foenum-graecum</i> L.	Helba	Seeds	Decoction and maceration of the seeds (the most recommended)	0.58
<i>Trifolium pratense</i> L.	Nefel, Fesa	Aerial parts	The aerial parts used in infusion	0.01
<i>Lamiaceae</i>	H'baq	Leaves/ flowers	Infusion of half a handful of leaves and dried flowers	0.01
<i>Ocimum basilicum</i> L.				
<i>Origanum majorana</i> L.	Merdgouch	Aerial parts	Herb tea of the aerial parts	0.01
<i>Teucrium polium</i> L.	Djaad, Goutiba, Timzourin	Flowers	Infusion or decoction of a handful of flower heads	0.01
<i>Moraceae</i>	Kerma, Taguerourt	Fruits	The consumption of raw fruit after meals and dry mixed with olive oil before sleeping	0.01
<i>Ficus carica</i> L.				
<i>Poaceae</i>	Chair	Seeds	Consumption in the form of a soup called "Tchicha" (cooking and molding of the seeds)	0.01
<i>Hordeum vulgare</i> L.				
<i>Zea mays</i> L.	Doura, Zabloud	Fruits	Fruit consumption ripens in boiling water or burnt out by fire	0.01
<i>Ranunculaceae</i>	Sanoudj	Seeds	Multiple uses either the seeds crushed in infusion or in the form of powder mixed with olive oil	0.01
<i>Nigella arvensis</i> L.				
<i>Urticaceae</i>	Harraïq, Hariq, Bout en nar	Leaves	Infusion of two handfuls of fresh leaves	0.01
<i>Urtica dioica</i> L.				
<i>Zygophyllaceae</i>	Harmel	Seeds	Milled seeds mixed with honey and olive oil (in large quantities risk of toxicity)	0.01
<i>Peganum harmala</i> L.				

UV: Use value

In this study, we report the use of 29 medicinal species belonging to 12 families. Our results showed that the most predominant families were the *Apiaceae* family represented with 8 species, 28% followed by the *Fabaceae* family with 7 species, or 24%. In addition, the predominance of *Apiaceae* and *Fabaceae* is second only to the *Lamiaceae* family and the *Astearceae* family according to most ethnobotanical studies conducted in Algeria [14,15]. Plant parts used, methods of preparation, and pharmaceutical form plant organs most commonly used for remedy preparation are aerial parts, fruits, and seeds (80%). In general, these are the plant parts that allow an easier identification to informants, so that they feel more confident to start with preparation.

According to our results, the most common methods of preparation in the Berhoum region are decoction and infusion with a percentage of 69. Decoction and infusion are highly

valued and often preferred by local healers in Africa [16].

In our study, the informant consensus of medicinal plant use in the Berhoum District resulted in ICF factors ranging from 0.45 to 0.89 per uses categories [Table 2]. The consensus analysis revealed that ICF for our interviewees of the six categories selected found, shows that with three rheumatic species the ICF is 0.89%; for the ICF of flu is equal to 0.71% (13 species), concerning the IFC of the categories of use of asthma (10 species), lactation (29 species), gastric disorder are 0.69, 0.65, and 0.56%, respectively, and the blood sugar have intermediate ICF (0.45), indicating greater homogeneity among informants. The ICF values found are above average values (ICF > 0.5). These results reflect a wealth of traditional use of the populations of the Berhoum region strongly dominated by a number of twenty-nine listed species with galactogenic plants

**Table 2: ICF values of uses categories**

Uses categories	Number of taxa (Nt)	% All species	Number of use report (Nur)	% All use citations	ICF
Rheumatism	3	5.56	19	15.45	0.89
Flu	13	24.07	42	34.15	0.71
Asthma	10	18.52	30	24.39	0.69
Galactogenic	29	53.70	82	66.67	0.65
Gastric disorder	21	38.39	46	37.40	0.56
Blood sugar	7	12.96	12	9.76	0.45

ICF: Informant consensus factor

**Table 3: Most frequently used plants for different uses categories based on highest FL (%) in each uses category (total informants=76)**

Botanical name	Uses categories	Citation for particular disease (use-report)	FL (%)
<i>Trigonella foenum-graecum</i>	Galactogenic	44	53.63
<i>Trigonella foenum-graecum</i>	Flu	17	40.48
<i>Peganum harmala</i>	Respiratory disorders	15	50.00
<i>Foeniculum vulgare</i>	Gastric disorder	11	14.47
<i>Carum carvi</i>	Blood sugar	4	33.33

FL: Fidelity level

followed by twenty-one species listed for the use intended for gastric disorders.

Fidelity level (FL) quantifies the importance of a species for a given purpose. The FL of a plant species for the six categories selected in the study area varied between 14.47% and 53.63% [Table 3]. The maximum FL of 53.63% expressed by *Trigonella foenum-graecum* for the galactogenic category. On the other hand, the FL < 50% indicated less preferred species by the informants for galactogenic category.

Our quantitative analysis showed that *T. foenum-graecum* was the most commonly used species with 58% UV, followed by *Foeniculum vulgare* with 14% UV and the rest of the species used in the galactogenic category exhibited UV [Table 1]. In total, a percentage tends toward 1. This shows that *T. foenum-graecum* is the species most commonly used by breeding mothers and counselors in the Berhoum District.

## CONCLUSION

Herbal medicine is used frequently by the population of the region of Berhoum among other medicinal plants has galactogenic effect and in the least it makes use of modern medicine. In total, 29 medicinal plant species belonging to 12 families were reported to be used by the population of the study area. Furthermore, local traditional informants from the Berhoum District demonstrated high consensus regarding galactogenic category, with FL (53%), and UV (58%) expressed by *T. foenum-graecum*. It is important that traditional herbal medicine contributes to develop the Algerian pharmacopoeia

by the realization of appropriate *in situ* conservation and management program.

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