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Research Article

Ethnopharmacological survey of medicinal plants from Eastern Algeria: Traditional treatment of type II diabetes

Louiza Mansar-Ben Hamza*¹, Zouhir Djerrou^{2,3}

¹Institut des Sciences Vétérinaires d'El Khroub, Laboratoire de Gestion de la Santé et des Productions Animales (GSP), Université Constantine 1, Algeria

²Département des Sciences de la Nature et de la Vie, Faculté des Sciences, Université 20 Août 1955 Skikda, Algeria

³Laboratoire de Pharmacologie et Toxicologie, Institut des Sciences Vétérinaires, Université Constantine, Algeria

ABSTRACT

An ethno botanical survey was conducted to investigate the medicinal plants used in East Algerian folk medicine to remedy the different pathologies and type II diabetes particularly. The results of this study have revealed 39 plant species belonging to 24 families used largely by the local population of these regions. Some of these plants were used to alleviate non-insulin-dependent diabetes. 6 plants were used alone and 21 plants were used in the preparation of some teas containing 2 or several plants. The anti diabetic activity of the majority of these plants was confirmed by several scientific reports. However, other studies are required to look for possible adverse effects consecutively to this traditional plant's use.

Keywords: Ethno botanical survey; Phytotherapy; Type II diabetes; East Algeria

INTRODUCTION

Type II diabetes is a quickly growing global metabolic disease characterized by impaired insulin secretion from pancreatic β cells and insulin resistance in liver, muscle and adipose tissue (Ashcroft and Rorsman, 2012; cited by Tamer Ahmed Ismail et al., 2013). Several chemical drugs are available to treat this disease but a lot of adverse effects were reported as well. Herbal remedy is one of the oldest methods of treatment. It is reported that approximately 1200 species of plants with hypoglycemic medicinal properties were selected from plants of folk medicine (Mossa, 1986; Saxena et al, 2004). Among these plants, some are used in the treatment of diabetes (Ali et al., 2007) and other plants with anti diabetic activity have been reported (Napralert, 1998-2000). In China, natural medicine in the traditional medical system for therapy of diabetes used 82 plants (Li et al., 2004) and among anti diabetic herbal drugs officially approved in this country, there are 200 species of plants with hypoglycemic properties (Jia et al., 2003). In India, 30 hypoglycemic medicinal plants were selected from plants of folk medicine (Ayurvedic) (Mossa, 1986; Saxena et al, 2004).

In the Middle East, 20 plants are used for the treatment of diabetes (and other diseases). Most of these

plants (leaves, flowers or fruit ...) are prepared as decoction (Azaizeh et al., 2006). In Quebec, indigenous peoples, Cries, use plants with anti diabetic potential. 8 of them have been tested *in vitro* and showed their anti diabetic activity (Spoor et al., 2006). Other countries use plants for diabetes: Mali (Coulibaly et al, 1989), Togo (Adjanohoun et al, 1986 ; cited by kwashie Eklu et al., 1997-1998), Nigeria (Gbolade, 2007), Morocco (where the most commonly used herbs for diabetes are white horehound, sagebrush, olive and *Zygodium*) (Mossa et al 1986; Hmamouchi et al, 1995; Jaouhari et al, 1999; Skim et al, 1999). A preparation of traditional Moroccan pharmacopoeia consists of 3 related plants *Ammivis naga*, *Erythraea centaureum* and *Thymus ciliatus* and is also used in the treatment of type II diabetes (Alaoui et al, 1995). In a study on the use in Morocco and Canada of anti diabetic plants (Haddad et al, 2001), it appears that two plants are widely used in these two countries: *Trigonella foenumgraecum* with some hypoglycemic and hypolipidemic components were confirmed by clinical trials. This plant occupies the first position in Morocco and the second position in Canada while *Vaccinium spp* (blueberry) occupies the first position in Canada. In conclusion, the ethno pharmacological expertise showed some anti diabetic plants candidates, particularly the Canadian blueberry and other plants of Mediterranean origin used in Morocco as globular and *Nigella* (Skim et al, 1999; Spoor et al, 2006).

There are other anti diabetic plants as *Anacardium occidentale* L. (Sokeng et al., 2001), *Tinospora cordifolia* (Prince et al., 2004), *Pterocarpus marsupium* (Dhanabal et al., 2006). The present study aimed to investigate the medicinal plants used in East Algerian

* Corresponding Author

Email: l_benhamza@yahoo.fr

Contact: +313791781246

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Table 1: Plants used in East Algeria folk medicine

N°	Families	Species (scientific and local names)	The used parts	Plants used to treat type II diabetes
1	Liliaceae	(<i>Allium sativum L.</i>) toum	Bulb	Yes
		(<i>Aloe socotrine</i>) marsaber	Juice, leaves	No
2	Poaceae	(<i>Hordeum vulgare L.</i>) chiir	Seeds	Yes
3	Apocyanaceae	(<i>Nerium oleander</i>) defla	Leaves	No
4	Composed family	(<i>Artemesia absinthum L.</i>) chajart meriem	Leaves and flowers	No
		(<i>Artemesia herba alba</i>) chih	Aerial parts	Yes
		(<i>Cynara scolymus L.</i>) kherchaf	Capitule/stem/leaves	Yes
		(<i>Anthemis nobilis L.</i>) babounaj	Capitules	No
5	Cesalpiniaceae	(<i>Cassia senna L.</i>) sana elmaki	Leavesd /gousses	No
6	Crucifers	(<i>Lepidum sativum L.</i>) hab erchad	Leaves and seeds	Yes
7	Cucurbitaceae	(<i>Cucumis sativus major</i>) feguous hmiri	Fruit	No
8	Fumariaceae	(<i>Fumaria officinalis L.</i>) hachichat esbiyane	Whole plant except bark	Yes
9	Gentianaceae	(<i>Erythrae centaurium Rafn L.</i>) mararet el hanach	Leaves /flowers	Yes
		(<i>Gentiana lutee L.</i>) gentyane esafra	Bark	No
10	Globulariaceae	(<i>Globularia atypum L.</i>)	Leaves	No
11	Juglandaceae	(<i>Juglans regia L.</i>) joza	Leaves	Yes
12	Labiaceae	(<i>Ajuga iva L.</i>) changoura	Whole plant except bark	Yes
		(<i>Origanum majorana L.</i>) marnougouche	Flowers	Yes
		(<i>Mentha viridis L.</i>) naanaa	Leaves	No
		(<i>Mentha pulegium L.</i>) fliyou	Leaves	No
		(<i>Marrubium vulgare L.</i>) marriouet	Leaves and flowers	No
		(<i>Rosmarinus officinalis L.</i>)	Leaves and flowers	No
		(<i>Salvia officinalis L.</i>) siwak ennabi	Leaves and flowers	Yes
13	Lauraceae	(<i>Laurus nobilis</i>) rand	Leaves	No
14	Moraceae	(<i>Morus nigra L</i>) toute asouid	Leaves	Yes
15	Myrtaceae	(<i>Eucalyptus globullus Labill.</i>) calytus	Leaves	No
		(<i>Myrtus communis L.</i>) rihane	Leaves and baies	Yes
16	Oleaceae	(<i>Olea europa L.</i>) zitoune	Leaves	Yes
		(<i>Fraximus angustifolia Vahl.</i>) dar---dar	Leaves and fruits	No
17	Ombellifers	(<i>Foeniculum duice Mill.</i>) besbes	Leaves and roots	No
		(<i>Foeniculum vulgare (Mill.) Gaertn</i>) sanout	Seeds	No
18	Papillonaceae	(<i>Trigonella foenum-graecum L.</i>) halba	Seeds	Yes
		(<i>Phaseolus vulgaris L.</i>) loubia	Cosses	Yes
19	Renonculaceae	(<i>Nigella sativa L.</i>) senouge	Seeds	No
20	Rhamnaceae	(<i>Rhamnus alaternus L.</i>) meliacen	Leaves	No
21	Rosaceae	(<i>Aigremny eupatoria L.</i>) terfafe	Leaves and flowers	No
22	Theaceae	(<i>Thea sinensis</i>) chay	Leaves	No
23	Zingiphylaceae	(<i>Zinziber officinale Rosc.</i>) zanjabil	Rhizome	No
24	Zygophylaceae	(<i>Zygophyllum gaetulum Coss.</i>) bougueriba	Whole plant	Yes

folk medicine, particularly the treatment of type II diabetes.

METHODOLOGY

Several surveys have been conducted with herbalists, pharmacists, traditional healers and breeders of livestock using medicinal plants. The survey focused these natural agents used as a treatment of type 2 diabetes during the five years from 2002 to 2006.

Several regions of Algeria were concerned by this investigation: Constantine, Mila, Jijel, Setif, Oum-Bouaghi, Skikda, Algiers and Hassi El Oued-Messaoud. For ethnobotanical data, a questionnaire was developed to facilitate the investigation of the study area, the name of the plants (vernacular, scientific), harvest conditions and preparations, used parts (aerial, flowers, leaves, stems, rhizomes, fruits, seeds), indications (disease / internal or external use), form of utilizations (infusion, decoction, maceration, powder, other) and amounts applied.

RESULTS AND DISCUSSION

The results mentioned in table 1 have shown 24 plant families used in folk medicine in the regions of our study. These plants are collected, dried and stocked in paper bags until use. Generally the average duration of conservation is between 2 to 3 years and can be extended to 5 years.

The collection of plants is mainly in flowering step, at the beginning or at the end of spring, some collections are made in summer, winter or fall.

According to the present survey, these plants are mainly used for man and very rarely for animals. We mention here the use of the fruits of *Ecballium elaterium* Rich (Cucurbitaceae family) in the management of jaundice due to piroplasmiasis in cattle. This plant reservoir is used all the year when the diseases appeared. Some of these medicines are of daily use as verbena and mint. The majority of plants are used as teas, infusions, decoction, maceration and power when the oral route is the only recommended. The parts used are the leaves, stems, flowers, fruits and roots.

According to our survey 16 plant species were used by local population to treat type II diabetes. Some of these plants were reported as hypoglycemic agents (garlic, bean pods, olive leaf, bilberry leaf (*Vaccinium myrtillus*), fenugreek, prickly pear (*Opuntia ficus indica* L.), artichokes, cress agrimony, small centaury, *Ajuga iva* L., black mulberry, myrtle, walnut, barley, sage and *Zygophyllum horned* (Baba Aissa 2000). Some of these plants were reported to be toxic when used at high doses of in case of prolonged treatment as sagebrush, aloe, fenugreek, rosemary, sage, etc (Baba Aissa, 2000).

We mention also that some plants used in other countries in the treatment of type II diabetes are not used in the Eastern Algeria folk medicine as cinnamon (*Cin-*

namomum verum), leaves of bilberry (*Vaccinium myrtillus*), leaves of alfa (*Stipatena cissima* L.) leaves *Anthemus arvensis* L. (chamomile of fields), stem of prickly pear (*Opuntia ficus indica* L.), stems of *Citrillus colocynthisvulgaris* (L) Sch (Cheriti et al., 1995; Ould El Hadj, 2003), *Chamomile recutita* (family Asteraceae) (Hassan Al-Musa and Fahaid AL-Hashem., 2014), *Ocimum basilicum* L. (Zeggwagh, N., A. Sulpice and T.M. Eddouks, 2007).

The hypoglycemic or anti diabetic properties of the majority of these used plants as antidiabetic agents were confirmed scientifically in several studies: *Allium sativum* L (Eidi et al., 2005), *Artemesia herba alba* (Khazraji et al., 1993), *Lepidum sativum* L (Eddouks & Maghrani, 2008), *Ajuga iva* L. (El Hilali & Lyoussi, 2002), *Olea europa* L. (Chauhan et al., 2010), *Zygophyllum gaetulum* Coss. (Skim et al., 1999), *Trigonella foenum-graecum* L. (Khosla et al., 1995).

CONCLUSION

The present ethno botanical survey allowed us to inventory several medicinal plants used in Eastern Algeria traditional medicine. A total of 39 plant species classified under 24 families were given with their scientific and vernacular names. Some of these plants were used in the traditional treatment of non-insulin-dependent diabetes; 6 plants were used alone and 21 plants were used to formulate some teas containing 2 or several plants. Other scientific studies are required to determine the chemical composition of these plants, to evaluate the efficacy of these natural remedies and to investigate the possible adverse effects following this traditional use.

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