

# ETHNOPHYTOTHERAPICAL APPROACHES FOR THE TREATMENT OF DIABETES BY THE LOCAL INHABITANTS OF DISTRICT ATTOCK (PAKISTAN)

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## ABSTRACT

Results of the present investigation are based on 37 indigenous plant species belonging to 23 Angiospermic families. These indigenous plants were used as traditional phytotherapies for the control and treatment of diabetes mellitus. The rural inhabitants of the area classified these traditional phytotherapies on the basis of uses of various parts of plants and method of their uses. About 29 traditional phytotherapies were investigated from the rural inhabitants of the area. These traditional phytotherapies were classified as antidiabetic extracts, leaves, powders, flour, seeds, vegetables, fruits and herbal mixtures.

**Key Words:** Ethnophytotherapy, diabetes, District Attock (Pakistan).

## INTRODUCTION

Plant based drugs have been in use against various diseases since time immemorial. The primitive man used herbs as therapeutic agents and medicament, which they were able to procure easily. The nature has provided abundant plant wealth for all living creatures, which possess medicinal virtues. The essential values of some plants have long been published but a large number of them remain unexplored as yet. So there is a necessity to explore their uses and to conduct pharmacognostic and pharmacological studies to ascertain their therapeutic properties (Baquar, 1989). Despite considerable progress in the management of diabetes mellitus by conventional synthetic drugs, the search for natural anti-diabetic plant products for controlling diabetes is going on. There are many hypoglycemic plants known through the folklore but their introduction into the modern

therapy awaits the discovery of animal test system that closely parallel to the pathological course of diabetes in human. Hypoglycemic activity has been reported in many plants during the last twenty years (Anonymous, 1992). Such potential oral hypoglycemic agents as the cyclopropanoid amino acids and hypoglycins A and B, derived from the unripe fruit of the West Indian tree *Blighia sapida*, are too toxic for use as insuline substitutes. Moreover, their action differs from that of insuline in that they appear to act as antimetabolites, capable of blocking the pathway of oxidation of fatty acids. This depletion of liver glycogen subsequently induces hypoglycemia (Yusuf *et al.*, 1994).

Approximately 343 plants of the world have been tested for the blood glucose lowering effect in the laboratory experiments. Of these plants 158 are claimed to be used in the ayurved (Rahman and Zaman, 1989).

In fact diabetes now a days is a global problem. So to the present study aims to open new avenues for the improvement of medicinal uses of indigenous plants of the selected area for diabetes. And also to know the traditional phytotherapy which provide the base for clinical research to studied the active compounds of such antidiabetic plants which are responsible for the hypoglycemic activities. Another important objective of such study is to bring the antidiabetic medicinal plants sector on a firm scientific footing, raise awareness, add value to the resource and contribute to the socio-economic well being of the country particularly and through out the world generally.

### **Geo-climate of the Area**

Attock district lies between 37° 7' and 34 ° North latitude, 71 ° 45' and 73 ° East longitude. It is bounded on the North and West by the river Indus. In the east lies district Haripur of NWFP and Rawalpindi district of Punjab. The southern side is occupied by District Chakwal of the Punjab. The average annual rainfall is 783 mm. The mean maximum temperature in January is 17.92 ° C and mean minimum January temperature is 5.24 ° C. The mean maximum temperature in July is 36.4 ° C and mean minimum is 26.45 ° C. The total area of the district is 6856.703 Sq Km (2647.395 Sq miles) (Anonymous, 1998).

### **METHODOLOGY**

Pakistan being rich in indigenous herbal resources, offer a great scope for ethnobotanical and ethnopharmacological studies. The present enumeration is based on 37 indigenous plant species used as

traditional phytotherapy for the control and treatment of diabetes by rural inhabitants of District Attock. Frequent field trips were conducted during 2003 in order to get information, various interviews were conducted with elderly persons, local hakims (Herbal doctors) and household ladies in different villages of the area individually. Indigenous plants were collected, identified according to flora of Pakistan (Stewart, 1972). Confirmation of plants were done in the Herbarium of Quaid-i-Azam University, Islamabad and voucher specimens were deposited in herbarium for future references.

## RESULTS

Results of this investigation were based on 37 medicinal plant species belonging to 23 angiospermic families. Among them monocots represented by 3-families and dicots by 20 families. In table 1, indigenous plants used for diabetes mellitus by rural inhabitants of the area are arranged alphabetically followed by their English name, local name and family name.

### Traditional Phytotherapies

#### 1. Antidiabetic Extracts

##### *Adhatoda vasica* Nees

**Method of use:** Extract obtained from the fresh leaves of plant mixed with water. About 10 ml of extract is use triplicate per day. It will shows symptomatic hypoglycemic action to lower blood glucose level of diabetics.

##### *Aloe vera* Nill, *Fagonia cretica* L. and *Tylophora hersuta* L.

**Method of use:** Equal quantity of extract obtained from the fresh aerial parts of *Fagonia critica*, fresh leaves and stem of *Aloe vera* and fresh branches of *Tylophora hersuta* L. Then these three extracts are mixed and use small teaspoon thrice a day. According to the rural inhabitants of the area this formula is very old and 100% effective to lower the blood glucose level of diabetics.

##### *Ficus benghalensis* L

**Method of use:** The latex obtained from the aerial parts of the plant (leaves and young branches) and mixed with honey and use orally to control high blood blood glucose level.

##### *Psidium guajava* L.

**Method of use:** Hot water extract made from the dried leaves of plant is use to reduced blood glucose level of diabetics. This hot tea was very common among the local people of the area.

***Momardica charantia* L.**

**Method of use:** The juice obtained from the fresh fruits of plant and use one small cup daily. This juice also exhibit anti-diabetic properties.

***Allium cepa* L.**

**Method of use:** The juice obtained from the underground corm and use one tea spoon thrice a day. This is very effective treatment for the control of blood sugar and high blood pressure amongst the diabetics.

***Catharanthus roseus* (L.) G. Don.**

**Method of use:** Extract obtained from fresh leaves and use small tea spoon following morning. This extract has also hypoglycemic action.

## **2. Antidiabetic leaves**

***Zizyphus jujuba* Mill.**

**Method of use:** 4-5 fresh leaves are plucked washed with clean water and chewed daily by diabetics to lower blood glucose level.

***Dodonaea viscosa* (L.) Jacq.**

**Method of use:** 2-3 Fresh leaves of the plant are plucked and chewed twice a day with glass of water.

## **3. Antidiabetic powder (safoof)**

***Ocimum sanctum* L. and *Ocimum album* L.**

**Method of use:** Leaves of these plants species are dried under shade, then ground to made powder (Safoof) and use 21 gm twice a day. According to rural inhabitants, this powder is diety therapy and drug treatment for diabetics.

***Momardica charantia* L.**

**Method of use:** The fruits of the plant are dried under shade, then ground to obtained powder. This powder shows significant effect to lower blood glucose level of diabetics.

***Syzygium cuminii* Skeels**

**Method of use:** Seeds of the plant are dried under shade, then ground to made powder About 25 gm

powder is used thrice a day with water. This decrease blood glucose level very significantly.

***Kickxia ramosissima* (Wall) Janchen**

**Method of use:** The whole plant is dried under shade and is ground to made powder. This powder is prescribed for treatment of diabetes by rural inhabitants of the area.

***Cichorium intybus* L.**

**Method of use:** The roots are dried under shade and then ground to obtained powder. About 15 gm of this powder is taken with glass of water twice a day before meal to lower blood glucose level amongst diabetics.

***Melia azedarach* L.**

**Method of use:** The dried fruits of the plant is obtained, when leaves falls seasonally. The pericarp of fruit is obtained and dried for 4-5 days. Then this pericarp is ground to made safoof. About half small teaspoon is used with glass of water in the following morning daily for 1 month. This is a very effective phytotherapy for the treatment of diabetes amongst the rural inhabitants of the area.

***Hordeum vulgare* L., *Cicer arietinum* L., and *Elettaria cardamomum* Maton**

**Method of use:** 125 gram seeds of *Hordeum vulgare* and roasted seeds of *Cicer arietinum* are ground and mix with 50 gm powder fruits of *Elettaria cardamomum*. Then these are mixed and use half teaspoon with water thrice a day to control blood glucose level.

#### **4. Antidiabetic flour**

**Method of use:** The flour obtained from the plants with equal quantity of 2 Kg from each plant.

- i. *Cicer arietinum* L.                      Seeds
- ii. *Daucus carrota* L.                      Underground part (Dried form)
- iii. *Hordeum vulgare* L.                      Seeds.
- iv. *Oryza sativa* L.                              Seeds
- v. *Triticum aestivum* L.                      Seeds
- vi. *Zea mays* L. (yellow variety)      Seeds

The flour obtained from all above 6-plants are mixed up. In the every morning eat small bread of this flour with fresh butter of cow for 2-month. This flour is used as dietary and substitute for the control of diabetes.

#### **5. Antidiabetic seeds**

***Trigonella foenium graecum L.***

**Method of use:** 25 gm seeds of plant constitute a single dose and this dose is used daily for 21-days with water. It is one of efficient treatment to reduced blood glucose level amongst diabetics.

***Withania coagulens (L.) Dunal.***

**Method of use:** 15 gm seeds of the plant are soaked in water for whole night. In the morning before breakfast use these seeds with water.

**6. Antidiabetic Pot Herbs/Vegetables**

***Solanum nigrum L.***

**Method of use:** Fresh aerial parts of the plant are cooked as vegetable in houses and is recommended to diabetics.

***Taraxacum officinale Weber***

**Method of use:** Fresh leaves are cooked as vegetable (locally-called Saag). And this is used by diabetics to reduced blood glucose level.

***Cajanus cajan & Vigna mungo (Burm. F.) Walp.***

**Method of use:** The pulse obtained from the seeds of these plant is cooked and is recommended to diabetics.

***Allium sativum L.***

**Method of use:** The under ground bulb is cooked or uncooked is used for diabetes and hypertension amongst diabetics.

***Caralluma edulis (Bther. Hb.)***

**Method of use:** The aerial parts are cooked as vegetables and used by rural inhabitants of the area for diabetes mellitus.

**7. Antidiabetic fruits**

***Vigna sinensis (Burm, F.) Walp.***

**Method of use:** The immature pods of the plant are used for reducing blood glucose level.

***Syzygium cuminii Skeels.***

The fresh fruits are used for diabetes.

***Olea ferruginea* Royle.**

**Method of use:** Fruit fresh in summer season are collected, dried and recommended to diabetics in winter season for reducing blood glucose level.

**8. Antidiabetic Herbal Mixture**

**Methods of use:** 25 gm seeds of each, that is *Syzygium cuminii*, *Momardica charantia* and 12 gm each of *Cyperus rotundus* and *Rosa alba* are used successfully for lowering blood glucose level by inhabitants of the area.

***Trigonella foenum-graecum* L.**

**Method of use:** A herbal mixture comprising 50 gm each of *Tylophlra hirsuta* leaves *Trigonella foenum-graecum* seeds and aerial parts of *Fumaria indica*. This mixture is significantly reduced blood glucose level of diabetics.

**DISCUSSION**

Local peoples of the area especially old man and ladies-termed as specialists treat the diabetes by using indigenous medicinal plants. And they think (belief) that traditional medicines are better, permanent cure of their diseases. So the indigenous knowledge, accordingly, continuous to provide the building blocks for the development in rural communities (Rahman and Zaman, 1989). During the study, it was found that the traditional phytotherapies were more adaptable and acceptable from old time to present. Because of widespread use of folk herbal remedies appears to be not only a case of preference but also of a situation without alternative choices . Such a system of medical treatment on which the majority of the population has been relying upon for generations with considerable success, should not be overlooked for further medical investigation, specially on those plants which have not been looked at for medical research, although the same have been in use by local inhabitants over hundred of years.

**CONCLUSION**

In fact diabetes now a days is a global problem because every year a considerable amount of foreign exchange is involved in the import of the drugs of foreign origin. The utilization of indigenous drug resources

with importance of the local industry on the one hand and will minimize the expenditure incurred on the purchase of foreign drugs on the other. In view of the economic importance of medicinal indigenous plants, research and development efforts should be focused on these plants. So it is strongly recommended to carry out phytochemical and clinical research work of the indigenous plants to prove and substantiate the traditional phytotherapies of the rural people. The clinically active plants should be studied along with active compounds which are responsible for the hypoglycemic activities. Compounds from these plants with proven results may then be synthesized in large amount commercially for wider circulation throughout the world for global marketing.

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**TABLE: INDIGENOUS MEDICINAL PLANT SPECIES USED FOR TREATMENT OF DIABETES**

| <b>S. #</b> | <b>Botanical name</b>                         | <b>English name</b> | <b>Local name</b> | <b>Family</b>    | <b>Voucher No.</b> |
|-------------|---|---------------------|-------------------|------------------|--------------------|
| 1           | <i>Aloe vera</i> Mill                         | Aloe                | Kunwarghandel     | Liliaceae        | 14                 |
| 2           | <i>Allium cepa</i> L.                         | Onion               | Piaz              | Liliaceae        | 81                 |
| 3           | <i>Allium sativum</i> L.                      | Garlic              | Thoom             | Liliaceae        | 75                 |
| 4           | <i>Adhatoda vasica</i> Nees                   | Vasaka              | Bekkar            | Acanthaceae      | 72                 |
| 5           | <i>Cataranthus roseus</i> L.                  | Periwinkle          | Sada bahar        | Apocynaceae      | 59                 |
| 6           | <i>Cajanus cajan</i>                          | Pigeon pea          | Arar ke dal       | Papilionaceae    | 61                 |
| 7           | <i>Caraluma edulis</i> (Edgew.)<br>Bther Hk   | Carallume           | Choung            | Asclepiadaceae   | 26                 |
| 8           | <i>Cicer arietinum</i> L.                     | Gram                | Chinnay           | Papilionaceae    | 42                 |
| 9           | <i>Cichorium intybus</i> L.                   | Chicory             | Kasni             | Asteraceae       | 66                 |
| 10          | <i>Cyperus rotundus</i> L.                    | Nutgrass            | Deela             | Cyperaceae       | 69                 |
| 11          | <i>Daucus carota</i>                          | Carrot              | Gager             | Apiaceae         | 62                 |
| 12          | <i>Dodonaea viscosa</i> (L) Jang              | Switch sorrel       | Sanatha           | Sapindaceae      | 06                 |
| 13          | <i>Elettaria cardamomum</i><br>Maton          | Cardamon            | Chotilachi        | Zingiberaceae    | 23                 |
| 14          | <i>Fagonia cretical</i> L.                    | Fagonia             | Dhamana           | Euphorbiaceae    | 24                 |
| 15          | <i>Ficus bengalensis</i> L.                   | Banyan              | Bohr              | Moraceae         | 08                 |
| 16          | <i>Fumaria officina</i> (hausk.)<br>Pugsbyi   | Fumitory            | Papra             | Fumariaceae      | 09                 |
| 17          | <i>Hordeum vulgare</i> L.                     | Barley              | Jo                | Poaceae          | 03                 |
| 18          | <i>Kickxia ramosissima</i><br>(Wall.) Janchen | Kichxia             | Khunger booti     | Scrophulariaceae | 18                 |
| 19          | <i>Melia azedarach</i> L.                     | Barbados lilac      | Herak             | Meliaceae        | 13                 |
| 20          | <i>Momardica charantia</i> L.                 | Bitter gourd        | Karella           | Cucurbitaceae    | 22                 |
| 21          | <i>Ocimum album</i> L.                        | White basil         | Chitti tulsi      | Lamiaceae        | 56                 |
| 22          | <i>Ocimum sanctum</i> L.                      | Holy basil          | Tulsi             | Lamiaceae        | 05                 |
| 23          | <i>Olea ferruginea</i> Royle                  | Indian olive        | Kao               | Oleaceae         | 37                 |
| 24          | <i>Oryza sativa</i> L.                        | Rice                | Chawal            | Poaceae          | 39                 |
| 25          | <i>Psidium guajava</i> L.                     | Guava               | Amrood            | Myrtaceae        | 10                 |
| 26          | <i>Rosa alba</i> L.                           | White rose          | Chitta gulab      | Rosaceae         | 11                 |
| 27          | <i>Solanum nigrum</i> L.                      | Black nightshade    | Kachmach          | Solanaceae       | 15                 |
| 28          | <i>Syzygium cuminii</i> Skeels                | Black plum          | Jamnoo            | Myrtaceae        | 16                 |
| 29          | <i>Taraxacum officinale</i><br>Weber.         | Dandelion           | Doddak            | Asteraceae       | 17                 |
| 30          | <i>Tyophora hersuts</i> L.                    | Tylophora           | Glow              | Asclepiadaceae   | 20                 |
| 31          | <i>Triticum aestivum</i> L.                   | Wheat               | Karunk            | Poaceae          | 29                 |
| 32          | <i>Trigonella foenum</i><br>Graecum L.        | Fennugreek          | Methri            | Papilionaceae    | 21                 |
| 33          | <i>Vigna mungo</i> (Burm, f.)<br>Walp.        | Green gram          | Mong              | Papilionaceae    | 33                 |
| 34          | <i>Vigna sinensis</i> (Burm, F.)<br>Walp.     | Cow bean            | Lobia             | Papilionaceae    | 34                 |

|    |  |              |               |            |    |
|----|--|--------------|---------------|------------|----|
| 35 | <i>Withania coagulens</i> (L.)<br>Dunal. | Wintercherry | Chitta verino | Solanaceae | 12 |
| 36 | <i>Zea mays</i> L.                       | Corn/maize   | Makki         | Poaceae    | 25 |
| 37 | <i>Zizyphus jujuba</i> Mill.             | Chinee tree  | Berri         | rhamnaceae | 44 |