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Review Article

SOME HERBAL DRUGS USED FOR TREATMENT OF DIABETES

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ABSTRACT

Diabetes mellitus is a dreadful disease found in all parts of the world and is becoming a serious threat to mankind health. Diabetes mellitus is a group of metabolic diseases characterized by high blood sugar (glucose) levels that result from defects in insulin secretion, or action, or both. The World Health Organization (WHO) has listed 21,000 plants, which are used for medicinal purposes around the world. Herbal medicines have been highly esteemed source of medicine throughout the human history. Alternative to synthetic agents, plants provide a potential source of hypoglycemic drugs and are widely used to prevent diabetes. In the present review, an attempt has been made to summarize some of the herbal plants having anti-diabetic activity which are beneficial for the mankind.

Keywords: Diabetesmellitus, Herbal drugs, hypoglycemic drugs, plants.

INTRODUCTION

The plants provided food, clothing, shelter and medicine. Much of the medicinal use of plants seems to have been developed through observations of wild animals and by trial and error. As time went on, each tribe added the medicinal power of herbs in their area to its knowledge base. Herbal medicinal products are defined as any medicinal product, exclusively containing one or more active substances. Herbs had been used by all cultures throughout history. It was an integral part of the development of modern civilization. Herbal market are globally increase due to safe drug delivery with fewer side effect compared to synthetic drugs.

HERBAL DRUGS-

"Herbal formulation mean a dosage form consisting of one or more herbs or processed herb(s) in specified quantities to provide specific nutritional, cosmetic benefits, and/or other benefits meant for use to diagnose treat, mitigate diseases of human beings or animals and/or to alter the structure or physiology of human beings or animals". Herbal preparations are obtained by subjecting whole plant, fragmented or cut plants, plants parts to treatments such as extraction, distillation, expression, fractionation, purification, concentration or fermentation. These include comminuted or powdered herbal substances, tinctures, extracts, essential oils, expressed juices and processed exudates[1].

Advantages[2]

1. Mostly herbal drugs are well tolerated by the patient, having fewer unintended consequences and fewer side effects than traditional medicine, and may be safer to use.
2. Herbal drugs are more effective for long-standing health complaints that don't respond well to traditional medicine.

3. Cost of herbal drugs is much less than prescription medications. Research, testing, and marketing add considerably to the cost of prescription medicines. Herbs tend to be inexpensive compared to drugs.

4. Herbs are available without a prescription. Simple herbs, such as peppermint and chamomile, can be cultivated at home.

Limitations[2]

1. An herbalist would not be able to treat serious trauma, such as a broken leg, nor would he be able to heal appendicitis or a heart attack as effectively as a conventional doctor using modern diagnostic tests, surgery, and drugs.

2. Self treatment with herbal drugs may consist of many risk factors. Moreover with no proper direction of doses may lead to overdose.

3. Consumption of herbal drugs without correct identification of plant i.e. use of wrong part of plant may lead to poisoning.

4. All herbal drugs are not safe; some may be poisonous or may cause allergenic reactions.

5. Curing period is usually longer in comparison to conventional medication. Immense patience while undergoing herbal treatment is needed.

Glucose is necessary for health because it's an important source of energy for the cells that make muscles and tissues. It's also brain's main source of fuel. Insulin is a hormone produced in the pancreas which enables body cells to absorb glucose, to turn into energy. When the blood glucose increases for example, after eating food material, insulin is released from the pancreas to normalize the glucose level[3].

Diabetes mellitus is a condition in which a person has a high blood sugar level, either because the body doesn't produce enough insulin, or because body cells don't properly respond to the insulin that is produced. If the body cells do not absorb the glucose, the glucose accumulates in the blood, leading to vascular, nerve, and other complications[4].

Diabetes mellitus, commonly referred to as diabetes was first identified as a disease associated with "sweet urine," and excessive muscle loss in the ancient world. Elevated levels of blood glucose (hyperglycemia) lead to spillage of glucose into the urine, hence the term sweet urine. Insulin lowers the blood glucose level. When the blood glucose elevates (for example, after eating food), insulin is released from the pancreas to normalize the glucose level. In patients with diabetes, the absence or insufficient production of insulin causes hyperglycemia.

There are three main types of diabetes mellitus [5]. Type I diabetes mellitus results from the body's failure to produce insulin. This group is called as insulin dependent diabetes mellitus or "juvenile diabetes Type I Diabetes. It is an autoimmune disorder caused by lymphocytic infiltration and β-cells destruction within the pancreatic islets of Langerhans. In the juvenile diabetes; the disease is more severe with more sudden onset below the age of thirty with symptoms of polyuria, polydipsia, wasting and weakness. They respond well to insulin and are more likely to develop hypoglycemia by insulin over dosage while upon inadequate administration they show ketosis. Type II diabetes mellitus results from insulin resistance, a condition in which cells fail to use insulin properly, sometimes also with an absolute insulin deficiency. This form was also known as non insulin-dependent diabetes mellitus or "adult-onset diabetes". The onset is insidious mostly after 40 years of age and symptoms are relatively mild. In this group there is only functional deficiency of insulin. Gestational diabetes is the third main form, is a type of diabetes that some women get during pregnancy and characterized by high blood sugar levels.

If treatment means to cure the disease, there is no drug which can cure diabetes completely. The primary target for diabetic patient is to bring blood glucose levels close to normal value. Diabetes treatment depends on the type and severity of the diabetes. Type I diabetes is treatedwith insulin, exercise, and a diabetic diet. Type II diabetes is first treated with weight reduction, a diabetic diet, and exercise. When these measures fail to control the elevated blood sugars, oral medications are used. If oral medications are still insufficient, insulin medications are considered[6].

Symptoms

1. Elevated blood sugar levels, and loss of glucose in the urine. High amounts of glucose in the urine can cause increased urine output and lead to dehydration. Dehydration causes increased thirst and water consumption.

2. Insulin deficiency eventually leads to weight loss despite an increase in appetite.

3. Fatigue, nausea and vomiting.

4. More chances of developing infections of the bladder, skin, and vaginal areas.

5. Blurred vision. Extremely elevated glucose levels can lead to lethargy and coma.

Herbal Treatment of Diabetes Mellitus-Natural products have received considerable attention for the management of diabetes and its complications which have reached epidemic levels worldwide[7]. For most herbs, the specific ingredient that causes a therapeutic effect is not known. Whole herbs contain many ingredients, and it is likely that they work together to produce the desired medicinal effect. The type of environment in which a plant grew will affect its components, as will how and when it was harvested and processed[8].

Mechanism of Action of Herbal Anti-diabetics[9,10,11]

The antidiabetic activity of herbs depends upon variety of mechanisms. The mechanism of action of herbal anti-diabetic may be-

a. α –amylase inhibition.

b. Inhibition in renal glucose reabsorption.

c. Stimulation of insulin secretion from beta cells of islets or/and inhibition of insulin degradative processes.

d. Cortisol lowering activities.

e. Insulin resistance reduction.

f. Providing certain necessary elements like calcium, zinc, magnesium, manganese and copper for the β -cells.

g. Regenerating and/or repairing pancreatic β cells.

h. Increasing the size and number of cells in the islets of Langerhans.

i. Stimulation of insulin secretion.

j. Stimulation of glycogenesis and hepatic glycolysis.

k. Inhibition of β -galactocidase and α–glucocidase.

l. Protective effect on the destruction of the β cells.

m. Improvement in digestion along with reduction in blood sugar and urea.

n. Prevention of pathological conversion of starch to glucose.

Life style for patient[12]

Some of the home and herbal remedies prescribedby Ayurveda are described below.

1. Include turmeric and cinnamon diets.

2. Avoid oily, fried and starchy foodstuffs.

3. Avoid coffee, sugar, refined flour andalcohol.

4. Eat smaller meals (low fat diet) five to six times a day instead of having three large meals.

5. Increase intake of vegetables like spinach, cucumber, tomatoes, onion, sprouts, beans, garlic etc.

6. Refrain from taking stress.

7. Regular exercise. Walk for at least 40 minutes a day.

8. Avoid red meat and excessive salt in you rmeals. Fish and soy can be taken due to their good protein value.

9. Avoid white bread, rice, potatoes, sweet and sugary foods.

DISCUSSION-

Diabetes mellitus is the most common endocrine disorder, affecting more than 300 million people worldwide. For this, therapies developed along the principles of western medicine (allopathic) are often limited in efficacy, carry the risk of adverse effects and are often too costly, especially for the developing world. All the herbal drugs discussed in the review exhibit significant clinical and pharmacological activity. The potency of herbal drugs is significant and they have negligible side effects than the synthetic antidiabetic drugs. In this review article an attempt has been made to focus on hypoglycemic plants and may be useful to the health professionals, scientists and scholars working in the field of pharmacology and therapeutics to develop evidence based alternative medicine to cure different kinds of diabetes. In fact diabetes now a day is a global problem because every year a considerable amount of foreign exchange is involved in the import of the drugs of foreign origin. 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 carryout clinical research work of the indigenous plants to prove their efficiency. The clinically active plants should be studied along with active compounds which are responsible for the hypoglycemic activities.

Herbal drugs used for the treatment of diabetes

S.N.	Botanical name	English name	Local name	Family
1.	*Acacia Concina* DC	Shikakai	Khangthur	Mimosaceae
2.	*Aloe vera* Mill.	Aloe	Kunwarghandel	Liliaceae
3.	*Allium cepa* L.	Onion	Piaz	Liliaceae
4.	*Allium sativum* L.	Garlic	Thoom	Liliaceae
5.	*Adhatoda vasica* Nees	Vasaka	Bekkar	Acanthaceae
6.	*Alocacia indica* schott	Giant Taro	Mankachu	Araceae
7.	*Aloevera tournex*.Linn	Barbados Aloe	Ghrita kumari	Liliaceae
8.	*Anana scomosus (L)* merr	Pineapple	Matikathal	Bromeliaceae
9.	*Andrographis paniculata* Nees	Green chirayta	Kalmegh	Acanthaceae
10.	*Annonareticulata* Linn	Custard apple	Aatlas	Annonaceae
11.	*Annona reticulata* L.	Bullock's heart	Atlas	Annonaceae
12.	*Antidesmaacidum* Retz	Devil's tree	Nikhutenga	Euphorbiaceae
13.	*Areca catecheu Linn*	Betel palm	Tamul	Arecaceae
14.	*Argyreia speciosa* Linn. F.	Elephant creepe	Takoria alu	Convulaceae
15.	*Boenninghausenia albiflora*	Tooth-ache plant	Yomri, Nukmam	Rutaceae
16.	*Bombox malabaricum DC*	Red cotton tree	Simolu	Bombacaceae
17.	*Brassica juncea*(L)Czern.	Mustard greens	Sorioh	Brassicaceae
18.	*Caesalpinia crista* Linn.	Fever nut	Lataguti	Caesalpiniaceae
19.	*Caesalpinia pulcharrima*	Pride of Barbados	Guletura	Caesalpiniaceae
20.	*Cajanus cajan* Mill	Pigeon pea	Rahar	Papilionaceae
21.	*Cassia fistula* L.	Golden shower cassia	Sunaru	Caesalpinaceae
22.	*Cassia occidentalis Linn.*	Coffee-senna	Bonoriadadol	Caesalpinaceae
23.	*Cassia sophera Linn*	Senna sophera	Bonmadelua	Caesalpinaceae
24.	*Catharanthus roseus* L.	Periwinkle	Sada bahar	Apocynaceae
25.	*Cajanus cajan* (L.)	Millsp. Pigeon pea	Arar ke dal	Papilionaceae
26.	*Cicer arietinum* L.	Gram	Chinnay	Papilionaceae
27.	*Cichorium intybus* L.	Chicory	Kasni	Asteraceae
28.	*Cyperus rotundus* L.	Nutgrass	Deela	Cyperaceae
29.	*Daucus carrota* L.	Carrot	Gager	Apiaceae
30.	*Dodonaea viscosa* (L) Jacq.	Switch sorrel	Sanatha	Sapindaceae
31.	*Elettaria cardamomum* Maton	Cardamon	Chotilachi	Zingiberaceae
32.	*Equisetum debile Roxb.*	Horse Tail	Lai-utang	Equisteraceae
33.	*Fagonia indica* L.	Fagonia	Dhamana	Euphorbiaceae
34.	*Ficus bengalensis* L.	Banyan	Bohr	Moraceae
35.	*Glycine max* Merr	Glycine	Soyabeen	Papilionaceae
36.	*Gmelinaarborea* Roxb	Beechwood	Gomari	Verbenaceae
37.	*Grewia abutelifolia* Juss	Phalsa berries.	Petuk	Tiliaceae
38.	*Ichnocarpus frutescent* R. Bn.	Ichnocarpus frutescence	Syamalota	Apocyanaceae
39.	*Imperata cylindrical* Beauv	Kunai grass	Ulukher	Poaceae
40.	*Ipomoea aquatica* Forssk.	Water spinach	Kalmou	Convulaceae
41.	*Ipomoea batata* (L) Lam.	Sweet Potato	Mitha alu	Convulaceae
42.	*Jatropha curcus* Linn.	Physic nut	Bongaliara	Euphorbiaceae
43.	*Hordeum vulgare L.*	Barley	Jo	Poaceae
44.	*Kickxia ramosissima (Wall.)*	Janchen Kichxia	Khunger booti	Scrophulariaceae
45.	*Melia azedarach L.*	Barbados lilac	Herak	Meliaceae
46.	*Momardica charantia L.*	Bitter gourd	Karella	Cucurbitaceae
47.	*Ocimum album L.*	White basil	Chitti Tulsi	Lamiaceae

Contd.

48.	*Ocimum sanctum L.*	Holy basil	Tulsi	Lamiaceae
49.	*Olea ferruginea Royle*	Indian olive	Kao	Oleaceae
50.	*Plumeria acuminata*	Cacaloxochitl	Sun-champa	Apocyanaceae
51.	*Portulaca oleraceae*	Purslane	Kulfa	Portulaceae
52.	*Pouzolzia zeylanica (L) Benn*	Pouzolzbush	Borali bakua	Urticaceae
53.	*PremnalatifoliaRoxb*	Dusky Fire Brand	Agnimantha	Verbenaceae
54.	*Psidium guyava Linn*	Guava	Madhuri	Myrtaceae
55.	*Oryza sativa L.*	Rice	Chawal	Poaceae
56.	*Rosa alba L.*	White rose	Chitta gulab	Rosaceae
57.	*Solanum nigrum L.*	Black nightshade	Kachmach	Solanaceae
58.	*Syzygium cuminii Skeels*	Black plum	Jamoo	Myrtaceae
59.	*Taraxacum officinale Weber.*	Dandelion	Doddak	Asteraceae
60.	*Tylophora hirsuta L.*	Tylophora	Glow	Asclepiadaceae
61.	*Triticum aestivum L.*	Wheat	Karunk	Poaceae
62.	*Trigonella foenum-graecum L.*	Fennugreek	Methri	Fabaceae
63.	*Vigna mungo (Burm. f.) Walp.*	Green gram	Mung	Fabaceae
64.	*Vigna sinensis (Burm. f.) Walp.*	Cow bean	Lobia	Fabaceae
65.	*Withania coagulens (L.) Dunal.*	Wintercherry Chitta	verino	Solanaceae
66.	*Zea mays L.*	Corn/maize	Makai	Poaceae
67.	*Zizyphus jujuba Mill.*	Chinee tree	Beri	Rhamnaceae

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REFERENCES

1. Waxler-Morrison NE. Plural medicine in Sri Lanka: Do Ayurvedic and Western medical practice differ, Soc Sci Med 1988; 27: 531-44.
2. Dahanukar SA, Kulkarni RA, Rege NN. Pharmacology of Medicinal Plants and Natural Products (1994–98), Indian J Pharmacol. 2000;32:S81–S118.
3. Edwin Jarald, Siddaheswar Balakrishnan Joshi and Dharam Chandra Jain. Diabetes and Herbal Medicines. Iranian Journal of Pharmacology and Therapeutics, 2008; 7: 97-106.
4. Ranjan C, Ramanujam R. Diabetes and insulin resistance associated disorders: Disease and the therapy. Curr Sci. 2002; (83):1533-38.
5. Rother KI. "Diabetes treatment – bridging the divide". The New England Journal of Medicine 2007; (356) 15:1499-501.
6. Anbu N, Musthafa MD and Velpandian V,Anti diabetic activity of polyherbal Aavaraiyathi churna in alloxan induced diabetic rats. International Journal of Toxicology and Pharmacology Research 2012; 4(4):77-80.
7. C. J. Nolan, P. Damm, and M. Prentki, "Type 2 diabetes across generations: from pathophysiology to prevention and management," The Lancet 2011; (378) 9786, 169-181.
8. Pritesh Patel, Pinal Harde, Jagath Pillai, Nilesh Darji And Bhagirath Patel Sat Kaival Pharmacophore 2012; 3: 18-29.
9. Pulok KM, Kuntal M, Kakali M, Peter JH. Leads from Indian medicinal plants with hypoglycemic potentials. J Ethnopharmacol 2006;106:1–28.
10. Mohamed B, Abderrahim Z, Hassane M, Abdelhafid T, Abdelkhaleq L. Medicinal plants with potential antidiabetic activity-A review of ten years of herbal medicine research (1990-2000). Int J Diabetes Metabol 2006;14:1-25.
11. Manisha Modak, Priyanjali Dixit, Jayant Londhe, Saroj Ghaskadbi, and Thomas Paul A. Indian Herbs and Herbal Drugs Used for the Treatment of Diabetes., J. Clin. Biochem. Nutr.2007; 40: 163–173.
12. Eddouks M, Maghrani M. Phlorizin-like effect of Fraxinus excelsior in normal and diabetic rats. J Ethnopharmacol 2004; 9:149-54.

