

# Herbal Medicines in the Treatment of Diabetes Mellitus

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**ABSTRACT:** *Diabetes mellitus has become a widespread metabolic disease in the world that is seriously endangering public health. There are chemicals and biochemical agents that aid in diabetes management, but there is no permanent cure available that helps to fully recover from this condition. The blood sugar levels of glucose are regulated by insulin, a hormone produced from the pancreas. Many conventional drugs for diabetes have been discovered after doing a significant number of studies analysis. Type 2 diabetes mellitus therapy seeks to decrease insulin resistance and improve the insulin secretion. Substances and extracts extracted from various environmental assets, in particular plants, have always been an abundant supply for the management and treatment of the issue of diabetes and its complications. This analysis allows the reader to consider the significance of different forms of conventional herbal and polyherbal medications that could be utilized to treat diabetes mellitus.*

**Keywords:** *Antidiabetic drugs, Diabetes Mellitus, Herbal Medicines, Herbal Remedy, Hormone problem.*

## INTRODUCTION

Diabetes mellitus is a non-infectious endocrine condition characterized by carbohydrate metabolism disruption and hypoglycemic association. It is associated with the development of many serious illnesses, such as micro vascular disorders (nephropathy, retinopathy, nephropathy) and macro vascular illnesses (peripheral vascular disease and coronary heart diseases). Diabetes mellitus is sometimes referred to as diabetes, and has been described as "sweet urine" and muscle weakness associated diseases. The blood sugar levels of glucose are regulated by insulin, a hormone generated from the pancreas. As this level rises, insulin from the pancreas is released and the glucose level is preserved. Insulin secretion is missing or reduced in diabetic patients, that triggers hyperglycemia. Type 1, type 2 and gestational diabetes mellitus are three types of diabetes mellitus.

Type 1 Diabetes mellitus is referred to as insulin-dependent diabetes mellitus given the complete failure of  $\beta$ -cell activity of the Langerhans islets found in the pancreas. Type 2 Diabetes mellitus, that is a transient depletion of  $\beta$ -cell mass caused by genetic predisposition, is recognized as insulin non-dependent diabetes mellitus and occurs mainly in obese individuals and is correlated with blood pressure and blood cholesterol levels. Type 2 diabetes mellitus therapy seeks to reduce insulin resistance and improve the insulin secretion. Gestational diabetes is a form of diabetes that is present in pregnant women with hyperglycemia. It typically occurs in 2-4% of 2nd or 3rd trimester pregnancies. Complications of diabetes mellitus include polydipsia, polyuria, polyphagia, tiredness, vomiting, diarrhea, male impotence, slow wound healing, and loss of vision [1].

### *Diagnosis of diabetes mellitus*

By analyzing blood sugar levels, diabetes could be assessed. In healthy individuals, the blood glucose levels during fast is 80 mg/dl and up to 160 mg/dl in the postprandial state. Finger twitch blood glucose check, fasting blood sugar, diagnostic glucose tolerance test, glycohemoglobin, are various measures for diagnosing diabetes throughout the lab [2].

### *Pathophysiology of diabetes mellitus*

Oxidative stress plays an essential role in the pathogenesis of diabetes. The discrepancy among reactive oxygen species (ROS) generation and enzymatic or non-enzymatic antioxidant potential is referred to as oxidative stress. Free radicals like super oxide, hydroxyl, peroxy, hydroperoxyl and non-radical species such as hydrogen peroxide are found in the reactive oxygen species. Super oxide dismutase, glutathione reductase, vitamins A, C and E, carotenoids, glutathione, and trace minerals include antioxidants. In the existence of reactive oxygen species previously occupied by the hunter receptor in scavenger cell and causing the development of foam cells and arterial sclerosis plaques, low - density lipoproteins cholesterol is oxidised. Such ROS could trigger different harmful pathways that play a significant role in diabetes disease development. The glucosamine pathway, sorbitol aldose reductase pathway, electron transport chain, protein kinase C stimulation are a few important pathways. Stimulus of these mechanisms and mechanism of action may contribute to atherosclerosis, programmed death of cells, lipid per oxidation and formation of advanced glycation end product (Ages), amylin, as well as pancreatic  $\beta$  cell function malfunction. Specific genomic DNA binding factor and its negative regulator (kelch such as protein 1 correlated to ECH) have been shown to have substantial cell defence mechanism of action towards oxidative stress [3].

### *Antidiabetic drugs*

Diabetes mellitus disorder may be avoided by controlling the amount of blood sugar with different forms of medications, acquiring various activity or yoga treatments or dietary advice. Insulin medication for type 1 diabetes mellitus and other oral hypoglycemic medications like sulphonylureas, thiazolidinediones and peptide analogues for the management of diabetic mellitus are available commercially for diabetes mellitus therapy [4].

### *Herbal Remedy*

The main issue for health personnel remains the management of diabetes mellitus with no negative impacts. 800 herbal medicines are used for the treatment of diabetes mellitus, as per the world ethano-botanical scheme. Just 450 medicinal herbs provide scientifically confirmed anti-diabetic abilities, from which 109 medicinal herbs have a total mechanism of action. In prehistoric times, traditional medicinal herbs were used by physicians and lay people with their bioactive compounds and property for the management of serious conditions such as cardiovascular disease, diabetes and cancer. In India and China, there is a long history of common plants used for diabetes management. Non-prescription herbal medications are readily accessible. These herbal medicines are used for diseases that are life threatening. These medications are also used to treat illnesses when chemical drugs are unsuccessful. There are medicines that are normal and healthy, so there are no toxic effects. Herbal medicines completely restore the individual or treat the symptoms,

although the disorders are not permanently healed by synthetic drugs. Herbal formulations include natural herbs and extracts of fruits and vegetables that are effective without negative impacts in the treatment of various ailments. In the other hand, chemical medicines are synthetically developed and also have adverse effects as well. As opposed to other opathic drugs, natural medicines are inexpensive. No negative impacts are triggered on the environment by herbal products. Herbal formulas are made from natural products, while all ophthalmic drugs are produced from natural products that are chemically and chemically adjusted. Without a prescription, herbal medications are accessible, though all opathic medications are accessible with a medication [5].

#### *Traditional herbal Anti diabetic drugs*

The herbal medicines and plants are presently used for the anti diabetic action in extracted types. Different clinical studies have demonstrated that extract from medicinal herbs display anti-diabetic activity and restore the action of pancreatic  $\beta$ -cells [6][7].

##### *Allium sativum*

It is traditionally named as garlic, belongs to the *Allium sativum* family of Liliaceae. Ethanolic garlic extract (10 ml/kg/day) demonstrates hypoglycemic activity regularly. The garlic extract was more effective than the anti-diabetic drug glibenclamide. Anti-diabetic response was recorded in STZ-induced rats with ethyl acetate, ethanol, and petroleum ether extract. Garlic has different medicinal properties such as anti-platelet, antibacterial, reducing blood pressure and lower the number of cholesterol in the blood [8].

##### *Aloe borbadensis*

It is identified as Ghikanvar that refers to Liliaceae family. It appears like some kind of cactus plant with leaf in the form of a green blades which are heavily narrow, hairy and packed with clear viscid gel. Oral dosing of 150 mg/kg of body weight of an aqueous extract of aloe vera greatly decreases the amount of blood glucose. Aloe vera gel consists of various therapeutic properties, such as anti-diabetic, antioxidant, reduction of glutathione levels in diabetic rats by 4 times.

##### *Azadirachta indica*

It is commonly named as Neem that belong to the Meliaceae family. In India and Burma, it is open. Ethanolic and aqueous *Azadirachta indica* extracts demonstrates a decrease in elevated blood glucose levels. In type 2 diabetic patients whom diabetes isn't really controlled exclusively by allopathic drugs, it may be supplemented with allopathic drugs. Organic neem pills are treated by significant amount of patients globally. The extract increases blood supply by expanding the blood vessels and helps to lower the amount of blood glucose in the body.

##### *Brassica juncea*

It is referred to as Rai that refers to the cruciferae family. In different food products, it is commonly used as a seasoning. Aqueous seed extract has a blood glucose reduction function that has been reported in diabetic rats triggered by alloxan. 250, 350, 450 mg/kg extract doses indicate hypoglycemic behaviour.

### Carica papaya

It is referred to as Rai that refers to the cruciferae family. In different food products, it is commonly used as a seasoning. Aqueous seed extract has a blood glucose reduction function that has been reported in diabetic rats triggered by alloxan. 250, 350, 450 mg/kg extract doses indicate hypoglycemic behavior.

### Catharanthus roseus

It is called Vinca roseus that refers to the Apocynaceae family. Methanolic leaf and twig extract indicates a drop in the amount of blood sugar in diabetic rats caused by alloxan. Oral dosing of a dose of 500 mg/kg of extracts of twigs and leaves was effective for reducing blood sugar levels in animals. The mode of action of Catharanthus roseus improves insulin production from  $\beta$ -Langerhans cells.

### Coriandrum sativum

It is mainly recognised as cilantro that refers to the Apiaceae family. In different food products, it is commonly used as a seasoning. 200 mg/kg of seed extract often improves the activity of Langerhans  $\beta$  cells and reduces serum sugar in diabetic rats triggered by alloxan and insulin synthesis from  $\beta$  pancreatic cells. Coriandrum sativum extract indicates a decline in blood sugar properties and an insulin synthesiser

### Eugenia jambolana

Jamun is considered to belong to the family Myretaceae. It includes dried Eugenia jambolana seeds and mature fruits. The main components are malvidin 3-laminaribiosidea and ferulic acid. Dried seed extract (200 mg/kg) for use in the care of diabetic patients.

### Gymnemasylvestre

It is generally referred to as Gudmar that indicates "destruction of sugar" and consists of the family Asclepidaceae. Extract of the leaf from G. Sylvestre (3.4/13.4 mg/kg) demonstrated substantial reductions in blood sugar levels in rats caused by streptozotocin. For the management of diabetes, it is mainly used in Indian ayurvedic medicines. In G, the participating constituents. Alkaloids, flavonoids, saponins and carbohydrates are known as sylvesters. It is often used to treat cancer, to treat inflammation, and to cure different microbial diseases.

### Mangifera indica

It is commonly described as mango and comprises of the Anacardiaceae family. Leaf extract (250 mg/kg) showed anti-diabetic activity, but orally administration of aqueous extracts did not improve the amount of blood glucose in alloxan-induced diabetic rats [9].

### *Obstacles of Herbal Medicinal Products in India*

Since the medicinal importance of herbs is somewhat leveled against it, specific amounts of medicinal products are not administered to patients, specific amounts of medicinal products are not administered strictly on time, as the production method is not standardized, varying amounts



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