

Anti-diabetic activity of some medicinal plants

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Abstract

Diabetes mellitus is generally present chronic disease and a necessary reason for death in many countries. Even with progress in the medical management of the syndrome, it is not easy to control the delayed complication of diabetes. The disease is spreading day by day. The main trait element of diabetes is hyperglycemia, which reflects the drop in the use of glucose due to a poor reaction to insulin discharge. Many plants are used to cure diabetes because of the antidiabetic action. Hypoglycemic and anti hyperglycemic actions have been saved with abundant plants, a lot of which is worn as an established herbal treatment of diabetes. A huge number of substances obtained from plants that suggest antidiabetic potential, while others may affect in hypoglycemia as a bad result due to their toxicity, mainly their hepatotoxicity. This review shows the importance of plants and the action of some plants to act against diabetes that is used as natural medicine for this disease.

Keywords: Diabetes mellitus; Medicinal plants; Hypoglycemic; Antioxidant

Introduction

From the creation of humans, it is greatly probable that they affected with diseases and with the passage of time started to use a variety of ingredients together with flora, animals, insects or natural resources to cure different diseases. It was expected that the population was aware of the importance of plants as medicine from thousands of years ago. Plants are used for improving health in a natural way. Plants are not only used for the treatment of diseases but also improving life in different ways as improving income and making an enjoyable lifestyle. Today diseases are spreading. Diabetes is commonly present syndrome which is rising at a frightening speed and has become one of the world's most severe public health troubles.¹ It is a disease of endocrine structure that is carbohydrate metabolism disease due to a whole or relative insufficiency of insulin discharge, achievement, or together. Diabetes mellitus is affecting millions of people all over the world and the number of people affecting by it is increasing day by day. It has become a challenge to control this increasing number. It has become more problematic for health and even it because of the death of millions of people in developed countries and is a threat in many rising and recently industrialized countries. In different countries its ratio of causing death is different. Diabetes will be the seventh top source of death in 2030, according to the World Health Organization (WHO).

Literature Review

Diabetes mellitus is divided into three main categories: Type 1 that depends on insulin, type 2 that does not depend on insulin or is insulin free and the third and last one kind is gestational diabetes. Type 1 diabetes is a syndrome that causes the damage of pancreatic β -cells which responding opposition to endogenous antigen. It is present about 5%-10% of patients of diabetes and mostly seen in people above the age of 20 years. Second type 2 diabetes.² From all three types, type 2 diabetes is the most common and highly affecting type. Almost 90%-95% of people are suffering from this type of diabetes. Different studies show the well-built hereditary foundation for the progress of 2nd type diabetes. The occurrence is because of disorder in insulin work in addition to discharge. The most common type equally in the worldwide and Indian state is the kind 2 or else insulin-independent diabetes mellitus which is linked with important postprandial hyperglycemia.

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Review Article

The principal to the increase of type 2 diabetes has not been completely confirmed, but it is identified that there are hazard causes for raising the disease such the same as fatness, later age, an inactive way of life and reduced intake behavior.³ Both types of disease show different characters and cause different complications. There are different factors which are the source of diabetes some are ecological factors; fatness, as well as later age, are some of them. Sometimes due to less action of insulin on the different target tissue, there is an insufficiency or extra concentration of proteins, carbohydrates and lipids and at more time hyperglycemia cause the loss of vision and nephropathy which are main symptoms of diabetes.⁴ It also causes heart disease. A cardiovascular syndrome. Even by means of the more advanced improvements in the medical field, the plants are still used as medicine to cure different disorders. To cure diabetes, a huge quantity of plants is used as medicine due to their antidiabetic activity.

Natural antioxidants perform the role to combat against oxidative stress and prevent many diseases including diabetes. Vegetables along with the various plants' extracts are trying to use for the treatment of diabetes.⁵ The poor countries could not afford medical care and drugs that are more expensive, there the drugs obtained from plants is used for treatment that is cheaper medicine. Despite the synthesis of drugs with insulin for controlling diabetes, it is significant to use plants as medicines.⁶ Plants show antidiabetic activity and cure the diabetes disease in a natural way with a small cost. Plants show hypoglycemic function. In this review, some plants are collected from different articles that are used as medicines due to their antidiabetic activity.⁷ The study shows the helpfulness of the plants in the management of diabetes mellitus. Different plants used as antidiabetic early times and nowadays and their activity as medicinal plants to cure diabetes is discussed (Table 1).

Table 1: Mode of action of different plants

Botanical name	Plant part used	Extract used	Mode of action
<i>Lactuca sativa</i>			Inhibit enzymes α -glycosidase and α -amylase
			Antidiabetic by obtaining insulin or decreasing concentration of diabetes causing enzyme
			Enhancement of pancreatic tissues
<i>Portulaca oleracea</i>	Seed outer portion leaves	Powder from seed	Powder increase glycogen level in type 2 diabetes patient
			More insulin fight, liver role, less lipoprotein quantity cholesterol, total cholesterol level change, etc
			Hyperglycemic action
			As anti-diabetic by increasing antioxidant and lipid
<i>Azadirachta indica</i>	Each part of the plant	Leaf extract ethanol	Antimicrobe
			Anti stirring
			Pharmacological
			Antidiabetic
			Less glucose in blood and enzyme that act as antioxidant
<i>Ficus hispida</i>	Fruit bark		Lesson and improve injured area of the liver in diabetic rats
			Antidiabetic activity
<i>Sonchus oleraceus</i>	Whole plant	Chemical obtained secondary e.g. metabolites, polyphenol content	Hyperglycemic activity in normal and diabetic rats
			Antioxidant
<i>Vitis vinifera</i>	Unripened fruit	Seed extract phenol extract of fruits	Antidiabetic
			For different many diseases including diabetes
<i>Boswellia carterii</i>	Different parts	Oleo-gum-resin	A defensive effect from guts filament beside diabetic marginal neuropathy in insulin-independent mice
			Confirmed more insulin accepting the key, low glucose mixture speed resulting in less insulin acceptance, inhibition of diabetic oxidative pressure
			Gastrointestinal problems
<i>Moringa</i>		Different materials	Inflammation treatment
			Diabetes treatment (more insulin level, glycogen in the liver and also suppresses different changes in β cells in the pancreas)
			Use 21 days suppress diabetes

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<i>oleifera</i>		MOMtE	Cure diabetes
<i>Coriandrum sativum</i>	Different parts or whole as different diseases treatment	Dried outer portion newly originated parts and fragrant fruits	Cooking, indications for beneficial purposes
			Antidiabetic

Discussion

Lactuca sativa: As Persian medicine to cure diabetes the kernel has been using that is called "Khas" from recent times. It contains the action to inhibit enzymes α -glycosidase and α -amylase.⁸ Grains in a polyherbal method verified anti-diabetic achievement from first to endobtaining insulin by decreasing the concentration of enzymes that are the main basis of diabetes and also enhancement of pancreatic tissue.⁹

Portulaca oleracea: This is a seed that acts as an antidiabetic agent. The powder obtained from the seed increase the glucagon level in type 2 diabetes similar to the intensity of peptide-1. If these seeds are used in insulin-dependent diabetes patient it resulting enhancement of insulin fight and liver role, enhance or decrease the concentration of lipoprotein cholesterol, changing total cholesterol level, lessening of fast etc.¹⁰ The outer portion of plants shows hypoglycemic activity as progressing the secretion of insulin and renewal of diabetic endothelial improper function through by making different changes. The leaves exhibited anti-diabetic role by the establishment of antioxidant enzyme and by controlling the intensity of lipid for rust in the liver and kidney of the diabetic natural world.¹¹

Azadirachta indica: It is prominent in India and its nearby countries commonly used health plant due to its broad range of natural action. Each part of this plant acts as medicine and is also used for economic purposes. *Azadirachta indica* is also famous due to its important properties such as an anti-microbe, anti stirring, different pharmacological and antidiabetic. This plant reduces the intensity of glucose in blood and reduces the absorption of an enzyme that acts as an antioxidant.¹²

Last researches showed that use of this plant in rat considerably improved the actions of antioxidants in hepatic structures signifying that leaf extract this plant has both antioxidant and antidiabetic capacity.¹³ It showed the declining level of hepatic glucagon in the rats that are fed with a rich amount of fat. Constant dealing with ethanol take out of *A. indica* has been revealed to lessen and to improve the injured area of the liver in streptozotocin-induced rats having diabetes.¹⁴

Ficus hispida: Fruits of these plants were used to cure the diabetes disease. Bark cut out of this plant has been exposed to show hypoglycemic action in diabetic and normal rats that have not diabetes.

Sonchus oleraceus: Antioxidant action of this plant was examined by the use of the whole plant of *S.oleraceus*. The Antidiabetic activity was shown by this plant extract. The measurement of different factors such as stress markers in different parts of bodies, examination shows a high level of antioxidant.¹⁵ Different effect such as hypoglycemic action,

in diabetic rats the capacity to avoid oxidative stress etc. Chemical compounds present show that the compound obtained from the plant has a high intensity of the compounds that have an anti-diabetic capacity such as secondary metabolites and polyphenol content.¹⁶

Vitis vinifera: Huge sections of this plant have been used to cure the different disease of the beginning. The fruits of these plants that have not ripened were used as medicine in different places.¹⁷ These unripe fruits also have the anti-diabetic activity for which these are used by diabetic patients. It is on the basis of conventional Persian meditation writing.¹⁸

The extract from seeds has defensive action from guts filament beside diabetic marginal neuropathy in insulin-independent mice. In other organisms containing another type of diabetes, it plays an important role in improving different functions for acting against diabetes. A medical test on insulin independent patient shows that polyphenol take out of fruits confirmed the increase of insulin understanding key and decline of glucose mixture speed, which show withdrawing the cellular insulin acceptance and also inhibition of diabetic oxidative pressure. It was seen that the placebo group has more good effects on diabetic patients as compared to the serum or antioxidants obtained from seeds.¹⁹

Boswellia carterii: The species of *Boswellia* has a dehydrated and warm character and known as kandor. It is used to cure gastrointestinal troubles and other than for the inflammation treatment in medicinal books in Persia. An oleo-gum-resin of this plant has been used to cure diabetes. As it enhances the insulin level, glycogen in the liver and also suppresses different changes in β cells in the pancreas. It controls diabetes by reducing the apoptosis of peri-insular cells.²⁰

Moringa oleifera: The material obtained from this plant when used for 21 days reduces the increase of diabetes disease. Reduction in glucose and nitric oxide concentration were examined when both doses of MOMtE were applied to rats. Use of MOMtE to cure diabetes was to overturn structural injury in islet cells.

Coriandrum sativum: This herb belongs to such plants which are important due to its use as eatables and to cure diseases. The dried outer portion newly originated parts, and fragrant fruits have been used in cooking and also for as indications for beneficial purposes. It has icy and dehydrated properties and has been used to cure diverse quantity of disease. To cure diabetes this plant has hyperglycemic action by increasing the glucose release. In some organism having diabetes, this plant shows different changes that make able the organism to suppress diabetes.²¹

Conclusion

Plants have been used to cure a huge number of diseases due to low cost and easy to use. People make much use of the plants because they are easily available and cure disease in a natural way. Diabetes is the mainly present syndrome that has become the more challenging disease and the spreading rate is increasing day by day. *Lactuca sativa*, *Portulacaoleracea*, *Azadirachta indica*, *Ficus hispida*, *Sonchus oleraceus*, *Vitis vinifera*, *Boswellia carterii*, *Moringa oleifera*, and *Coriandrum sativum* are some of the plants that are used to cure diabetes that is caused due to a high altitude of glucose. Plants show hyperglycemic and antioxidant activity due to which suppress the high intensity of glucose and cause the suppression of disease.

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