

## Diabetes Mellitus, Obesity and Phytotherapy

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### ABSTRACT

*Diabetes Mellitus and Obesity are increasingly diagnosed diseases nowadays. Although insulin analogues and oral antidiabetics cause an important pathway in the regulation of blood sugar in patients with diabetes, the desired point in the treatment of diabetes and its complications has not yet been achieved. At this stage there has been increased interest in plant-based therapies, which are the basis of traditional traditional medical treatment, and many studies have been conducted around the world. In this article, we aimed to present increasing numbers of plant-based molecular studies and phytotherapy to your attention.*

**Keywords:** Diabetes mellitus, phytotherapy

### INTRODUCTION

Over the past 20 years, the incidence of obesity and diabetes mellitus has been increasing steadily. There are interactions with these diseases for many reasons such as genetics, environmental, lifestyle, socio-cultural environment and medicines that have been used in recent years for the treatment of other diseases and the like. Interestingly, the incidence of Type 2 Diabetes mellitus in adolescent obesity-related young adults is considerable and remarkably high. Diabetes mellitus treatment management led to the turning point in the treatment of diabetes by the discovery and treatment of insulin analogues and oral antidiabetics by scientists. Although these new and contemporary diabetic treatments have significantly reduced the rate of life-threatening complications associated with diabetes, unfortunately, chronic complications such as Dialysis, Heart Failure, Polyneuropathy, Cataract, and the like, which limit human life, which nowadays still occur independently of the type of diabetes mellitus the increase in the frequency continues.

The fact that these complications related to Diabetes Mellitus and Obesity are still going on has put scientists in search of new class drugs in the treatment of diabetes and obesity. This point has been the subject of further research by drawing more attention to studies of whether herbal medicines, which form the basis of

traditional medical treatments, can be researched and treated as an alternative treatment. For many years, experiments on animals have been carried out on plant-derived drugs and data are collected.

It has been shown that more than 1000 plants have beneficial effects in the treatment of diabetes mellitus in scientific studies (1). Understanding of the mechanisms of action, pathophysiology and structures of these plants, and their understanding of the activity relationships of these plants and their interaction with other molecules in the human body is crucial to the development of new drugs in the treatment of diabetes mellitus.

The main phytochemical groups with blood sugar effects in the treatment of diabetes are polyphenols, terpenoids and steroids. Many of the antioxidant polyphenols (flavonoids, anthocyanins, xanthones, stilbenes, quinines, tannins, etc.) are useful in patients with diabetes and these polyphenols act by reducing lipid peroxidation, glycosylation of proteins and oxidative stress, which does not mean that all polyphenols are beneficial, because some are prooxidant and toxic (2). Triterpenes are commonly found in plants all over the world, and most of the pentacyclic triterpenes exhibit various biological properties including anti-diabetic properties (3). Many triterpenes show blood sugar-lowering properties in diabetic patients by affecting target enzyme activities. In

some Human studies conducted, it has been shown that guar gum reduces plasma glucose level by increasing plasma levels of plasma

gastric inhibitor polypeptide and glucagon-like peptide-1 (GLP-1) (4).

**Table 1.** Some working examples for the mechanisms of action of blood sugar-lowering plants in diabetic patients are;

|                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------|
| <i>Abutilon indicum</i> : Inhibited glucose absorption and stimulated insulin secretion in rodents (5),             |
| <i>Detarium microcarpum</i> :Regeneration of $\beta$ -cells in diabetic rats(6),                                    |
| <i>Acer saccharum</i> :Inhibition of $\alpha$ -glucosidase activity in both in vivo and in vitro (7),               |
| <i>Indigofera arrecta</i> :Insulinotropic requiring functional $\beta$ -cells (8),                                  |
| <i>Abroma augusta</i> :Reduced absorption of glucose in fasted rats (9),                                            |
| <i>Aloe vera</i> :Increased insulin levels (10),                                                                    |
| <i>Astragalus membranaceus</i> and <i>Pueraria thomsonii</i> :Activation of PPAR- $\alpha$ and PPAR- $\gamma$ (11), |
| <i>Cleome droserifolia</i> :Protection of $\beta$ -cells from oxidative stress-mediated damage (12),                |
| <i>Buddlejae flos</i> :Inhibition of aldose reductase in vitro (Matsuda et al. 1995) (13),                          |
| <i>Fraxinus excelsior</i> :Caused a potent inhibition of renal glucose reabsorption (14),                           |
| <i>Hemionitis arifolia</i> :Stimulated glucose uptake in isolated rat hemidiaphragm(15),                            |
| <i>Rhizoma Anemarrhenae</i> :Reducing insulin resistance (16)                                                       |
| <i>Anemarrhena asphodeloides</i> :Stimulation of insulin secretion from isolated islet of rats (17),                |

And many other similar pathways, effect mechanisms, target-specific aspects, and demonstrated mechanisms of action that will take so long to count here, reducing blood sugar in patients with diabetes, as well as hundreds more plants for which the mechanism of action is yet to be understood.

These are the insulin resistance-lowering effects shown, partial or complete insulin-like effects, PPAR- $\gamma$  activation effects, GLP-1 level enhancing effects, AMPK activating properties, carbohydrate absorption reducing effects in intestines, glucose absorption inhibiting effects in intestines, inhibition of Aldose Reductase enzyme and many other well-known and yet incompletely understood mechanisms and these plants that we have seen all over our planet seem to play a groundbreaking role in the prevention and treatment of Diabetes by further investigations.

**DISCUSSION**

It is also known that not only all these effects of plants but also the blood sugar reducing and regulatory / preventive effects of some plants are made by multiple methods using various different mechanisms of action and pathways. It is known that many touchstone medicines in basic and modern medical science are discovered as a result of long-term research in the environment of chance or laboratory. Examples of these drugs are antibiotics, cardiac drugs, antitumor drugs, and many more.

The positive effects of the plants in the treatment of diabetes have been studied at many

centers around the world and have resulted in data that could possibly interfere with further deep-rooted changes in the treatment of diabetes. We also hope that plant-based molecular studies can provide new treatment and treatment methods for diabetes and obesity, and hope that if these studies are deeper and more detailed, they may be useful in the treatment of many other diseases. However, since plant-based studies have been carried out on a majority of animal subjects, we believe that more and more detailed and multidisciplinary studies are needed in this regard in order to see that these remarkable and impressive studies in animal experiments can have the same effect on humans.

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