

## A Review- Phytomedicines Used In Treatment of Diabetes

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**ABSTRACT:** Diabetes mellitus (DM), which can be insulin- or non-insulin-dependent, is a common and dangerous metabolic illness that affects people all over the world. By the year 2025, it is predicted that the global prevalence of diabetes will increase from 4% in 1995 to 5.4%.

Around the world, traditional plant remedies have been utilised to cure diabetes mellitus. Several plants, in addition to numerous prescription drugs and complementary therapies, have been shown to effectively treat and manage diabetes. They also have no negative side effects.

The use of plants in the treatment of many human maladies is mentioned in Ayurveda and other Indian literature. There are over 45000 plant species in India, and thousands of them are said to have therapeutic characteristics. China and India have a long history of employing plant-based remedies to treat diabetes; their medications are either powdered or aqueous extracts of various plant sections, either by themselves or in combination with other plant extracts. This article compiles and discusses a few of these herbal plants and their chemically active components that play a part in the treatment of diabetes mellitus.

**Keywords:** Diabetes mellitus, Herbal medicines, Insulin, Blood glucose level

### I. INTRODUCTION:

The metabolic condition known as diabetes mellitus affects and hinders the body's ability to absorb blood glucose. Drugs used to treat diabetes may result in various micro- and macro-vascular disorders that can be avoided with herbal remedies. In India, 400 of the 800 plants with anti-diabetic effects have been clinically established. Diabetes has historically been treated with herbs in China and India. Normally, the hormone insulin, which is created by the pancreas, strictly regulates blood glucose levels. Blood sugar levels are reduced by insulin. When blood glucose levels rise (such as after eating), the pancreas releases insulin to bring them back to normal. Hyperglycemia in diabetic patients is brought on by a lack of or insufficient synthesis of insulin.

Due to their natural origins and lack of side effects, herbal medicines have experienced an exponential rise in popularity in recent years, both in developing and developed nations. Medicinal plants, minerals, and organic material form the basis for many traditional medicines still in use today [1]. In Indian traditional medical systems' herbal formulations, a number of therapeutic plants known as rasayana—which have been utilised for over a thousand years—are present [2]. Most doctors in Indian medical systems create and administer their own prescriptions [3].

Worldwide, 21,000 plants are utilised for therapeutic purposes, according to the World Health Organization (WHO). There are 2500 species total, of which 150 are employed economically on a sizable scale in India. India, known as the world's botanical garden, is the country that produces the most medicinal herbs.

### Causes of Diabetes:

Diabetes has several possible causes, including inadequate insulin synthesis (absolutely or relative to the body's needs), faulty insulin production (which is rare), or cells' failure to utilise insulin effectively and correctly. Insulin resistance is the result of the latter condition, which mostly impacts the cells of fat and muscular tissues. The main issue with type 2 diabetes is this.

Essentially, if someone is resistant to insulin, the body can, to some degree, increase production of insulin and overcome the level of resistance. After time, if production decreases and insulin cannot be released as vigorously, hyperglycemia develops. Glucose is a simple sugar found in food. Glucose is an essential nutrient that provides energy for the proper functioning of the body cells. Carbohydrates are broken down in the small intestine and the glucose in digested food is then absorbed by the intestinal cells into the blood stream, and is carried by the bloodstream to all the cells in the body where it is utilized. However, glucose cannot enter the cells alone and needs insulin to aid in its transport into the cells. Without insulin, the cells become starved of glucose energy

despite the presence of abundant glucose in the blood stream.

Insulin is a hormone that is produced by specialized cells (beta cells) of the pancreas.

After a meal, the blood glucose level rises. In response to the increased glucose level, the pancreas normally releases more insulin into the bloodstream to help glucose enter the cells and lower blood glucose levels after a meal. When the blood glucose levels are lowered, the insulin release from the pancreas is turned down. It is important to note that even in the fasting state there is a low steady release of insulin than fluctuates a bit and helps to maintain a steady blood sugar level during fasting. In normal individuals, such a regulatory system helps to keep blood glucose levels in a tightly controlled range. As outlined above, in patients with diabetes, the insulin is either absent, relatively insufficient for the body's needs, or not used properly by the body. All of these factors cause elevated levels of blood glucose (hyperglycemia).[4]

#### Herbal Treatment of Diabete Mellitus

**BITTER MELON:**It is obtained from edible fruit of *Momordica charantia*, belonging to the family Cucurbitaceae. Bitter melon is used as anti-diabetic. It contains lectin that has insulin like activity due to its nonprotein specific linking together to insulin receptors. This lectin lowers blood glucose level by acting on peripheral tissues. Lectin is a major contributor to hypoglycemic effect.[6]It is used as fresh juice, tincture, juice extract & powdered leaf.**FIERY COSTUS:**It is obtained from the leaves of the plant *Costus igneus*, belonging to the family Costaceae. The leaves of insulin plant reduced the fasting and postprandial blood sugar levels, bringing them down towards normal. Reduction in the fasting and the postprandial blood sugar levels with leaves of insulin plant was comparable with that obtained with Glibenclamide 500 µg/kg at 250 mg/kg/day and 500 mg/kg/day of powdered leaves of the insulin plant. (8) **TURMERIC:**It consists of dried fresh rhizomes of the plant *Curcuma longa* belonging to the family Zingiberaceae. Turmeric contains 5% of volatile oil, resin, zingiberaceous starch grains & yellow coloured curcuminoids. The chief component of curcuminoids is known as curcumin. Volatile oil is composed of mono and sesquiterpens such as alpha & beta pinene, alpha-phellandrene, camphor, camphene, zingiberene, alpha & beta curcumenes.[9]It is used as anti-diabetic drug.[10]

**BAEL:**It consists of unripe or half ripe fruits of the plant known as *Aegle marmelos*, belonging to the family Rutaceae. It is used as anti-diabetic drug.[11] Scientific work done Leaf & callus extract of *Aegle marmelos* has shown antidiabetic activity. [12]

#### Clinical research of CAM supplements in diabetes

Herbs, vitamins, and mineral supplements have not yet been sufficiently examined for diabetes glucose management. In addition to somewhat subpar study methodology, this area of supplement research has been complicated by a number of other issues.

First, standardisation has proven to be a difficult endeavour due to the numerous constituent natures of botanical goods. In standardising to one element, extracts may have lost some of the benefits compared to the whole plant, herbal remedy proponents warn [17]. The age of the plant (particularly the roots), the source area, the season of harvest, the manner of drying and crude processing, etc., may all have a significant impact on the precise considerations of purity, chemical composition, and potency of derivatives. Numerous herb studies in the literature we reviewed employed "homemade" or other vague formulations. Although some businesses have started to standardise supplements, the market as a whole lacks' uniformity. With vitamin and mineral supplements, these issues are less relevant. In addition, the development of proper supplement regulation and safety codes has been slow. Currently, all dietary supplements (including herbal products) are regulated under the Dietary Supplement Health and Education Act of 1994 (DSHEA), which specifically differentiates supplements from drugs.

Consequently, DSHEA does not require the extensive premarket approval that the Food and Drug Administration requires for a prescription drug, and although it calls for "good manufacturing practices [GMP]," the burden of proof that a supplement is unsafe lies with the government, leaving manufacturers to operate unchecked. This has contributed to scepticism among clinicians, and makes it especially difficult for physicians to responsibly recommend supplements to patients. In the absence of external regulation, the industry has taken steps to police itself.

For example, the National Nutritional Foods Association (NNFA), representing about one-third to one-half of retailers and manufacturers of natural products in the U.S., has encouraged the adoption of strict, self-imposed GMP standards, as

well as initiatives such as the TruLabel program (in which products are subjected to random laboratory testing by independent third-party auditors to verify contents) 179 Research of vitamin and mineral supplements has also been hindered by a lack of accurate and meaningful assays that detect functional micronutrient deficiencies.

#### Abbreviation:

DM-(Diabetes-mellitus), IDDM-(Insulin dependent diabetes mellitus), NIDDM-(Non insulin dependent diabetes mellitus), WHO-(World Health Organisation), I.V. Injection-(Intravenous Injection), TSP-(Teaspoon), APDS-(Acyl propyl disulphide), GE-MS-(Gas chromatography Mass spectrometer), CAM-(Complementary and alternative medicine), DSHEA-(Dietary supplement Health and Education Act), GMP-(Good Manufacturing Practise), NNFA-(National Nutritional foods association), U.S-(United State).

## II. CONCLUSION:

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 & are often too costly, especially for the developing world. Therefore, treating diabetes mellitus with plant derived compounds which are accessible & do not require laborious pharmaceutical synthesis seems highly attractive. All the herbal drugs discussed in the review exhibit significant clinical & pharmacological activity. The potency of herbal drugs is significant & they have negligible side effects than the synthetic anti diabetic drugs. In this review article an attempt has been made to focus on hypoglycemic plants & may be useful to the health professionals, scientists and scholars working in the field of pharmacology & therapeutics to develop evidence based alternative medicine to cure different kinds of diabetes in man & animals. Isolation & identification of active constituents from these plants, preparation of standardized dose & dosage regimen can play a significant role in improving the hypoglycemic action.

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