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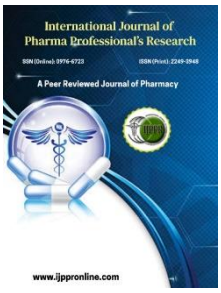

A REVIEW ON ROLE OF PHYTOMEDICINES IN TREATMENT OF DIABETES MELLITUS

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ABSTRACT:
Diabetes mellitus, both insulin dependent and insulin independent is a common & serious metabolic disorder throughout the world. Traditional plants have been used throughout the world or the treatment of diabetes mellitus. The present paper is an attempt to list of the some medications having anti diabetic and related beneficial effects. These phytomedications besides having natural therapeutic values against various diseases, describes that the anti-diabetic activity is due to the presence of phenolic compounds, flavanoids, terpenoids, coumarins. Some of these medications and their constituents which have role in the management of diabetes mellitus are compiled here and discussed in this review.

Introduction:

"Diabetes mellitus" is one of the most common non-communicable disease in the world and it is a chronic disorder of carbohydrates, fats and proteins metabolism. It is characterized by hyperglycemia, glycosuria, negative nitrogen balance, hyperlipidaemia, ketonaemia. Some phytomedicine preparations helps in lowering blood glucose level and are effective orally.[11, 12]

Blood Glucose Chart

Mg/DL	Fasting	After Eating	2-3 Hours After Eating
Normal	80-100	170-200	120-140
Impaired Glucose	101-125	190-230	140-160
Diabetic	126+	220-300	200+

Causes of Diabetes

The major cause of diabetes is the β cells destruction in the pancreatic islets and this results in insufficient and defective production of insulin which is uncommon. After some time this condition affects most of the cells of muscle and fat tissues, and results in a condition known as "Insulin resistance." Excess

of hyperglycaemic hormones or obesity cause the relative deficiency of insulin and due to this β cells lag behind.[4, 12]

MAHOGANY INSULIN PLANT

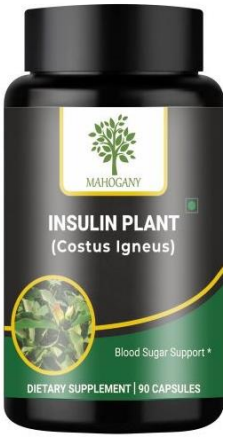

Figure 1: Mahogany Insulin Plant

- Biological source: It is obtained from the plant *Costus igneus*, belonging to the family Costaceae.[6]
- Synonyms: Fiery Costus, Spiral flag, Insulin plant, Step ladder.
- In southern India, it grow as a decorative plant and it's leaves are used in the treatment of diabetes mellitus. It is commonly known as insulin plant in India. Its leaves aid in the production of insulin in the human body . Since oral antidiabetic agents has various side effects, so there is a growing demand of phytomedicine for the treatment of diabetes mellitus.
- Plant description: Costus igneus N.E. Br. is a perennial, upright, tropical evergreen plant and it belongs to the family Costaceae.It contains evergreen leaves which are simple, alternate, entire and oblong, having 4-9 inch length with parallel venation. It reach a height of about 60cm and have tallest stems falling over and lying on the ground. Beautiful orange flowers are produced in the affable months having a 2.6-12.5cm diameter, appears as cone-like heads at the tips of branches. Propagation of insulin plant is done by stem cutting.[7]
- **Chemical Constituents**

  In Leaves: Proteins, saponins, tannins, carbohydrates, roseoside, hexadeconoic acid, oleic acid, squalene, tetradecanoic acid etc present.

  In Stem: Steroid component stigmasterol and terpenoid component lupeol present.

  In Rhizome: Diosgenin, quercetin, a steroidal sapogenin etc.

  In roots: Tannins, alkaloid, etc.[8]
- **Phamacological Actions**
  1. Corosolic acid -Glucose uptake activity.
  2. Diosgenin- Hypoglycemic property.
  3. sitosterol β- Increases plasma insulin level and also increases glucose uptake activity.
  4. Quercetin- Increases insulin mediated glucose uptaking and activity of antioxidant enymes.
  5. catechin- Inhibit α- glucosidase activity and antioxidant activity Insulin like protein- Hypoglycemic activity.
  6. Oleic acid- Hypoglycemic activity.[9]

Other activities- Hypolipidemic, antiurelothiatic, antiproliferative, antioxidant, antimicrobial, antiinflammatory.

Adverse effects- The leaves of the insulin plant contains high quantities of palmitic acid and this substance causes damaging of the heart muscles in rats and increasing the "bad" (LDL) cholesterol in humans.[14]

Dose: 2 capsules twice daily[15]

Price: ₹600 for 90 cap.[15]

MADHUNASHNI VATI

Figure 2: Madhunashni Vati

Divya Madhunashini Vati tablets contains several dietary and medicinal herbs as key ingredients. These tablets helps in the treatment of diabetes and its related

problems. It helps in strengthen the immunity, boosts brain and nervous system activities, and ensures overall well-being.

ImpKey Ingredients:

- Giloy (*Tinospora cordifolia*)
- Karela (*Momordica charantia*)
- Belpatra (*Aegle marmelos*)
- Gudmar (*Gymnema sylvestre*)
- Harad Chhoti (*Terminalia chebula*)
- Gokhru (*Tribulus terrestris*)
- Haldi (*Curcuma longa*)
- Methi (*Trigonella foenum gracum*)
- Neem Patra (*Azadirachta indica*)
- Ashwagandha (*Withania somnifera*)[16]

Giloy:

Biological source: It is obtained from whole part of *Tinospora cordifolia* which belongs to the family Menispermaceae.

One of the alkaloid compounds in giloy is **berberine**. It's a traditional herbal remedy that human studies have shown reduces blood sugar. It also increases glycogenesis in liver & storage of glucose in liver (hepatocytes).[18]

Bitter Melon

Biological source: It is obtained from the edible fruit of *Momordica charantia*, belonging to the family Cucurbitaceae.[1]

Bitter melon is used as anti-diabetic. It contains lectin having insulin like activity due to it's non-protein 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. It also contain an alkaloid, momordicine which also contain hypoglycaemic activity.[5]

Belpatra

Biological souce: It is obtained from the leaf of tree *Aegle marmelos* which belongs to the family rutaceae.

A methanolic extract of Aegle marmelos was found to reduce blood sugar in alloxan diabetic rats. It's extracts showed remarkable ($p<0.05$) changes in plasma insulin secretion at 30 min and 60 min, respectively.[17]

Gudmar

Biological source: It is obtained from the plant of *Gymnema sylvestre*, belonging to the family Asclepiadaceae.

It contains saponin glycoside **(**Gymnemic acids) and alkaloid (Gymnamine) which prevents the pancreatic cells against damage caused by free radicals and increases insulin secretion thereby lowers the blood sugar level.[1]

Gokhru

Biological source: Gokhru is the dried ripe seeds of *Tribulus terrestris* linn., belonging to family Zygophyllaceae

Gokhru has active compound present in gokshura called saponin which on hydrolysis yields steroidal saponin-gitogenin, chlorogenin, diosgenin having antioxidant properties which causes lowering blood glucose level. It also contains alkaloids like harmine & harman.[6]

Turmeric

Biological source: Turmeric is a product of *Curcuma longa*, a rhizomatous herbaceous perennial plant belonging to the ginger family Zingiberaceae.

Turmeric contain about 5 per cent volatile oil, crystalline colouring matter curcumin I along with curcumin II and curcumin III and resins, which controls blood sugar level.[3]

Methi

Biological source: Fenugreek (*Trigonella foenum graecum)* is an annual plant belongs to the family Leguminosae.

Fenugreek consist a constituent called galactomannan which having promising anti-diabetic properties. It also contains saponin glycoside (Trigonelline) showing antidiabetic property.[1]

Neem

Biological souce: It is obtained from the leaves of the tree of *Azadirachta indica* belonging to the family Meliaceae.

Neem constituents such as azadirachtin, rutin and quercetin having hypoglycemic/antihyperglycemic effects whereas, nimidin have the weight management ability.

It also contains limonoids, like gedunin, having invitro antiplasmodicidal activities.[1]

Ashwagandha

Biological source: Ashwagandha is derived from the root of the *Withania somnifera* plant which belongs to the family Solanaceae.

Ashwagandha helps in increasing insulin secretion and improves insulin sensitivity in muscle cells.

It increase the cell capacity to utilize glucose. It should contain not less than 0.2% of total Withanolide A & Withaferin A. The leaves contain steroidal lactones, which are commonly called withanolides. It also causes decrease in serum cholesterol, triglycerides, and low density liopoproteins.[10]

Harad Choti

Biological souce: It is obtained from the dried ripe and fully mature fruit of *Terminalia chebula* belonging to the family Combretaceae.

Chebulic acid is one of the main ingredient in increasing the vital production of insulin which is produced by the pancreas. Chebulagic acid is a reversible and noncompetitive inhibitor of maltase and use in management of type 2 DM.[2]

Adverse effects: If a person is already taking other medicines for diabetes, they should consult registered physician before consuming it to prevent sudden decrease in blood sugar level which may become life threatening.[13]

Dose: 1 to 2 tablets twice daily empty stomach with water or as directed by the physician.

Price: ₹56.25 for 30 tab.[16]

Conclusion:

Diabetes Mellitus be managed very effectively with range of treatments. It is most common endocrine disorder. Treatment with allopathic medicines are limited in efficacy, having risk of adverse effects, and also costly. Therefore treatment of Diabetes Mellitus from plant derived medicines are highly in demand and attractive, as it contains additional constituents which help in treating other disorders also. The medications discuss in this review article exhibit pharmacological & clinical activity.

The efficacy and potency of these drugs are significant and have negligible side effects. In this review article an attempt has been made to focus on antihyperglycaemic drugs having tremendous actions.

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