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Review Article

A Review on Herbal Drugs used for the Treatment of Diabetes Mellitus

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Abstract

Traditional Medicines derived from therapeutic plants are utilized by around 60% of the total populace. This review focuses on Herbal medications and plants utilized as a part of the treatment of diabetes, particularly in India. Plants have dependably been a wellspring of medications for people since time immemorial. The Indian customary arrangement of pharmaceutical is packed with the utilization of plants for the administration of diabetic conditions. The World Health Organization (WHO) has recorded 21,000 plants, which are utilized for therapeutic purposes far and wide. Natural meds have been exceedingly regarded source of prescription all through the mankind's history. Various studies have affirmed the advantages of therapeutic plants with hostile to hyperglycemic impacts in the administration of diabetes mellitus. History demonstrated that therapeutic plants have been utilized as a part of customary recuperating far and wide for quite a while to treat diabetes; this is on account of such natural plants have hypoglycemic properties and other gainful properties.

Key words: Antidiabetic, Medicinal plant, India, Herbal drugs.

INTRODUCTION

Diabetes mellitus is a developing issue overall involving huge monetary weight and therapeutic care arrangement issues.[1]According to International Diabetes Federation (IDF), the quantity of people with diabetes in 2011 crossed 366 million, with an expected 4.6 million passing's every year.[2]The plants gave sustenance, garments, safe house and prescription. A significant part of the restorative utilization of plants appears to have been created through perceptions of wild creatures and by trial what's more, blunder. As time went on, every tribe included the therapeutic force of herbs in their general vicinity to its learning base. Herbal restorative items are characterized as any therapeutic item, only containing at least one dynamic substances. Herbs had been utilized by all societies throughout history.

HERBAL DRUGS

"Home grown plan mean a dose frame comprising of one or, then again more herbs or handled herb(s) in indicated amounts to give particular nourishing, corrective advantages, or potentially other benefits implied for use to analyze treat, relieve sicknesses of individuals or creatures as well as to modify the structure or physiology of individuals or creatures". Natural arrangements are acquired by subjecting entire plant, divided or cut plants, plants parts to medications, for example, extraction, refining, expression, fractionation, refinement, fixation or aging. These incorporate comminuted or powdered home grown substances, tinctures, extricates, basic oils, communicated squeezes and handled exudates.[3]

Advantages[4]

1. Generally home grown medications are all around endured by the tolerant, having less unintended results and less reactions than conventional medication, and might be more secure to utilize.
2. Home grown medications are more successful for long-standing wellbeing objections that don't react well to conventional prescription.

3. Herbs are accessible without a medicine. Straightforward herbs, for example, peppermint and chamomile, can be developed at home.

Limitations[4]

1. Self-treatment with herbal drugs may consist of many risk factors. Moreover with no proper direction ofdoses may lead to overdose.
2. Consumption of herbal drugs without correct identification of plant i.e. use of wrong part of plant may lead to poisoning.
3. All herbal drugs are not safe; some may be poisonous or may cause allergenic reactions.

Symptoms

1. Insulin deficiency eventually leads to weight loss despite an increase in appetite.
2. Fatigue, nausea and vomiting
3. More chances of developing infections of the bladder, skin, and vaginal areas.

Mechanism of Action of Herbal Anti-diabetics[5-6]

The antidiabetic activity of herbs depends upon variety of mechanisms. The mechanism of action of herbal anti-diabetic may be

a) α-amylase inhibition.
b) Inhibition in renal glucose reabsorption.
c) Stimulation of insulin secretion from beta cells of islets or/and inhibition of insulin degradative processes.
d) Cortisol lowering activities.
e) Insulin resistance reduction.
f) Providing certain necessary elements like calcium, zinc, magnesium, manganese and copper for the β -cells.
g) Regenerating and/or repairing pancreatic β cells.
h) Increasing the size and number of cells in the islets of Langerhans.
i) Stimulation of insulin secretion.
j) Stimulation of glycogenesis and hepatic glycolysis.
k) Inhibition of β -galactocidase and α– glycosidase.
l) Protective effect on the destruction of the β cells.
m) Improvement in digestion along with reduction in blood sugar and urea.

Table no 1: Classification of Diabetes

Type 1(1a,1b)	ß-cell destruction with little or no endogenous insulin secretory capacity Autoimmune Idiopathic
Type 2	Ranges from relative insulin deficiency to disorders of insulin secretion and insulin resistance
Other specific types	Genetic defects of ß-cell function Genetic defects in insulin secretion Diseases of the exocrine pancreas Endocrinopathies Drug-induced or chemical induced Infections (congenital rubella, cytomegalovirus and others) Uncommon forms of immune mediated diabetes Other genetic syndromes sometimes associated with diabetes Gestational diabetes

Table No 02:Anti-Diabetic Medicinal Plants & their Mode of Action

Botanical Name	Family	Parts used	Mode of action
Adenialobata[7]	Passifloraceae	Stem	Significantly reduce the blood glucose level in STZ induced Diabetic rats.
Acosmiumpanamense[8]	Fabaceae	Bark	Glucose lowering activity in streptozotocin diabetic rats
Acourtiathurberi[9]	Asteraceae	Root	Reduces blood glucose in normal mice & Lowered
Panaxquinquefolius[10]	Araliaceae	Root	Significant effects on fasting blood glucose levels and glucose tolerance test
Anacardiumoccidentale[11]	Anacardiaceae	Leaf	Significantly reduced the blood glucose levels in a dose dependent manner in streptozotocin-induced diabetic rats
Arachishypogaea[12]	Fabaceae	Nut	Hypoglycemic activity in normal and in streptozotocin induced diabetic rats
Artemisia pallens[12]	Asteraceae	Aerial part	Blood glucose lowering effects in hyperglycaemic and alloxan induced diabetic rats
Artemisia judaica[13]	Asteraceae	Whole plant	Significantly reduce the blood glucose level in diabetic rats.
Artemisia Afra[14]	Asteraceae	Leaves	Hypoglycemic activity in alloxan-induced diabetic rabbits
Beta vulgaris [15]	Amaranthaceae	Rhizome	Reversed the effects of diabetes on blood glucose and tissue lipid peroxidation and glutathione levels.
Biophytumsensitivum[16]	Oxalidaceae	Leaf	Significantly reduce the blood glucose and glycosylated haemoglobin level
Barlerialupulina[17]	Acanthaceae	Aerial part	Reduction of blood glucose in streptozotocin hyperglycemic Rats
Bauhinia candicans[18]	Fabaceae	Leaf	Hypoglycemic activity in alloxan-induced diabetic rabb
Berberisaristata[19]	Berberidaceae	Root	Strong potential to regulate glucose homeostasis through decreased gluconeogenesis and oxidative stress.
Begonia malabarica[20]	Begoniaceae	Stem	Reduction in fasting and postprandial plasma

			glucose levels, increase inSerum insulin levels and liver glycogen levels
Benincasahispida[21]	Cucurbitaceae	Fruit	Improve the glucose level and metabolic derangements in lipid caused by alloxan induced diabetes in rats
Bougainvillea spectabilis[22]	Nyctaginaceae	Bark	Sugar-lowering capacity streptozotocin induced diabetic albino rats
Brassica juncea[23]	Brassicaceae	Seed	Significant dosage dependent augmenting effect of the seed extract on the serum insulin was recorded on streptozotocininduced diabetic male albino rats.
Brassica oleracea[24]	Brassicaceae	Stem	Hypoglycaemic activity in alloxan induced hyperglycaemic rats
Buteamonosperma[25]	Fabaceae	Leaf	Significant hypoglycemic and anti-oxidant activity in alloxan induced diabetic male adult mice
Caesalpiniabonducella[26]	Caesalpiniaceae	Seed	Significant recovery in the activities of metabolic enzymes along with correction in FBG and glycogen carbohydrate levels
Calaminthaofficinalis[27]	Lamiaceae	Aerial part	Hypoglycemic effect independently of insulin secretion in streptozotocin induced diabetic rats
Camellia sinensis[28]	Theaceae	Leaf	Effective to reduce most of the diabetes associated abnormalities in a steptozotocin-induced diabetes model of rats
Carica papaya [29]	Caricaceae	Leaf	Exerted a hypoglycemic and antioxidant effect and also improved the lipid profile in diabetic rats
Catharanthusroseus[30]	Apocynaceae	Leaf	Lowering of plasma glucose and an increase in plasma insulin were observed
Carallumaattenuata[31]	Asclepidaceae	Whole plant	Glucose lowering activity in both diabetic and normal rats
Cucumistrigonus[32]	Cucurbitaceae	Fruit	Significant increase in the body weight, liver glycogen and serum insulin level and decrease in the blood glucose, glycosylated hemoglobin levels.
Curcuma longa [33]	Zingiberaceae	Rhizome	Significantly suppressed an increase in blood glucose level in type 2 diabetic KK-A(y) mice

Cucurbitaficifolia[33]	Cucurbitaceae	Fruit	Hypoglycemic action, improve GSH redox state, increasing glutathione pool
Daturametel[34]	Solanaceae	Seed	Blood glucose lowering effect in normoglycemic and in alloxan-induced hyperglycemic rats
Dilleniaindica[34]	Dilleniaceae	Leaf	Beneficial effect on blood glucose level and enhance serum insulin level
Dalbergiasissoo[35]	Fabaceae	Bark	Significant reduction in blood glucose levels increase in glycogen content in liver of Alloxan-induced diabetic rats
Emblicaofficinalis[39]	Euphorbiaceae	Leaf	Showed a significant decrease in fasting blood glucose and increase insulin level as compared with the diabetic rats
Eugenia uniflora[40]	Myrtaceae	Leaf	Inhibitory activities on increase plasma glucose level in sucrose tolerance test
Eucalyptus globulus[41]	Myrtaceae	Leaf	Reduces the oxidative stress in alloxan-induced rat
Ficusracemosa[42]	Moraceae	Bark	Glucose lowering efficacy in alloxan induced diabetic rats
Ficus hispida[43]	Moraceae	Bark	Hypoglycemic activity in normal and diabetic rats
Garugapinnata[44]	Burseraceae	Bark	Significant increase in the liver glycogen and serum insulin level and a significant decrease in fasting blood glucose and glycated hemoglobin levels
Gymnemasylvestre[45]	Asclepiadaceae	Leaf	Significant reduction in fasting blood glucose, cholesterol and serum triglyceride content
Ipomoea aquatic [46]	Convolvaceae	Leaf	Reduces the fasting blood sugar level of streptozotocin induced diabetic rats
Inularacemosa[47]	Asteraceae	Root	Significant decrease in blood glucose levels,super oxide dismutase and glutathione
Momordicacharantia[48]	Cucurbitaceae	Fruit	Isolated compounds, bitter gourd extract, juices and powders have demonstrated potential in lowering blood sugar
Merremiaemarginata[49]	Convulvulaceae	Whole plant	Carbohydrate metabolizing enzymes such as hexokinase were significantly increased whereas G-6-P, fructose-1, 6-bisphosphatase were

			significantly decreased in diabetic rats.
Morindacitrifolia[50]	Rubiaceae	Fruit	Gluconeogenic genes, phosphoenolpyruvate C kinase (PEPCK) and glucose-6-phosphatase (G6P), were significantly inhibited
Murrayakoenigii[51]	Rutaceae	Leaf	Increases plasma insulin level in alloxan-induced diabetic rats
Mucunapruriens[52]	Fabaceae	Seed	Hypoglycemic activity in STZ induced diabetic rats.
Otostegiapersica[53]	Labiateae	Whole plant	Shows ant diabetic effects on STZ diabetic rats.
Paspalumscrobiculatum[54]	Poaceae	Grain	Significant increase in serum insulin level, liver glycogen and a significant decrease in glycatedhaemoglobin levels
Phoenix dactylifera[55]	Arecaceae	Leaf	Significantly reduced blood glucose &Plasma insulin level increased in alloxan-induced diabetic rats
Plectranthusamboinicus[56]	Lamiaceae	Leaf	Significant reduction in blood glucose, possesses hypoglycemic and antihyperlipidemic effects mediated through the restoration of the functions of pancreatic and insulinotropiceffect.tissues
Pterocarpussantalinus[57]	Fabaceae	Bark	Significant antidiabetic activity by reducing the elevated blood glucose levels and glycosylated hemoglobin, improving hyperlipidemia and restoring the insulin levels in treated experimental induced diabetic rats
Santalum album [58]	Santalaceae	Heart wood	Santalum album pet ether fraction has potential antihyperlipidemic activity that can help in overcoming insulin resistance
Sidatiagii[59]	Malvaceae	Fruit	Significant improvement in blood glucose level, glycated hemoglobin and liver glycogen contents
Syzygiumcordatum[60]	Myrtaceae	Leaf	Short-term hypoglycaemic effect in streptozotocin-induced diabetic rats
Vincarosea[61]	Apocyanaceae	Whole plant	Shows antidiabetic activity in Alloxan diabetic rats.

Viscum album [62]	Viscaceae	Leaf, stem	Shows anti-diabetic and anti-hyperlipidemic effects in STZ- diabetic rats
Withaniasomnifera[63]	Solanaceae	Root, Leaf	Possess hypoglycaemic and hypolipidaemic activities in alloxan-induced diabetes mellitus (DM) rats.
Woodfordiafruticosa[64]	Lythracea	Flower	Possess hypoglycaemic activity in alloxan-induced diabetes mellitus (DM) mice
Zingiberofficinale[65]	Zingiberaceae	Rhizome	Reduced fasting blood glucose, increased serum insulin level and also enhanced insulin sensitivity in alloxan- induced diabetic and insulin resistant diabetic rats
Zizyphusspina-christi[66]	Rhamnaceae	Leaf	Antidiabetic activity

CONCLUSION

Diabetes mellitus is the most widely recognized endocrine issue, influencing more than 300 million individuals worldwide An expansive number of plants screened in India and somewhere else for their hypoglycemic impact, have yielded certain fascinating leads, yet no plant-based medication has so far achieved such a propelled phase of examination as to substitute or decrease the requirement for the as of now accessible oral antidiabetics.it is advantageous to investigate the other conceivable gainful impacts of plant-based medications. Such an approach is especially directed to shorten the actually accessible choices of pharmaceuticals for the treatment of Diabetes mellitus.

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