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List of Anti-Diabetic Plants: A Review

B. Aruthra

B.Tech, Department of Genetic Engineering 3rd year

Abstract: ***Diabetes is a serious disease worldwide which may even lead to death. It is a metabolic disorder characterized by the increased blood glucose level. This condition is known as hyperglycemia. It is associated with various diseases like neuropathy, peripheral vascular diseases, retinopathy etc. Patients with diabetic experiences symptoms like polydipsia, polyuria,and weight loss, poor heeling, fatigue blurred vision etc. There are 3 types of diabetes mellitus. They are: type 1 diabetes, type 2 diabetes, gestational diabetes. Increased blood glucose level is due to lack of insulin secretion. Insulin is a hormone secreted by beta cells of the Islets of Langerhans ofpancreas. Insulin act like a key which opens the cell membrane through which glucose from the bloodstream are absorbed and such glucose enters into the cellular metabolism in which it breakdowns into several compound and provides energy in the form of ATP. For several cellular metabolism glucose seems to be a starting compound. Breakdown of glucose is known as glycolysis. Complication in insulin secretion leads to diabetes. In nature, many plants have phytochemicals which has an ability to treat diabetes. Secondary metabolites are isolated from those medicinal plants and are being used in diabetic medicines. This review article, reviews some of the list of anti-diabetic plants which are commonly used to treat diabetes mellitus.***

Keywords: Insulin, cellular metabolism, hyperglycemia, phytochemicals, diabetes mellitus, retinopathy, neuropathy

1. Introduction

Diabetes mellitus is a life threatening metabolic disorder, characterized with increased blood glucose level known as hyperglycemia. Glucose in the blood isup taken by the cells of gastrointestinal, liver, muscles and fat cells. Glucose gets break down into various compound, thus provides energy in the form of ATP for the cellular metabolism. Wherein, excess of glucose are stored in the liver in the form of glycogen.

Insulin is aendocrine hormone secreted by beta cells in islets of Langerhans act as a transport medium of glucose into the cell. Insulin binds to the cell membrane and thus facilitates glucose molecules inside the cell, which involves in cellular metabolism. When the blood glucose level decreases, alpha cells of pancreas secrete another type of hormone called glucagon, which stimulate liver cells to produce glucose. On the other hand small amount of insulin is also produced by beta cells of pancreas called basal insulin. If, beta cells fail to produce insulin in an appropriate amount, glucose in the blood gets increased since it was not absorbed by the cells of gastrointestinal, liver, muscles and fat. This condition leads to diabetes in general.

Types of Diabetes Mellitus

This condition may fall in 3 types namely:

1) Type 1 diabetes
2) Type 2 diabetes
3) Gestational diabetes

Type1 Diabetes
Type1 diabetes is also known as insulin dependent diabetes. Around 10–15% of people with above the age of 60 years are found to fall in this type1 diabetes. Here islets of Langerhans are destructed by various factors like genetics, toxic, immunologic etc. destruction of pancreatic cells seem to be an autoimmune response of antibodies against the normal tissues of the pancreas.

Destruction of pancreatic cells results in

1) Decreased insulin production
2) Uncontrolled production of glucose by the liver
3) Hyperglycemia
4) Decreased glycogen and thus glucose remains in the bloodstream.

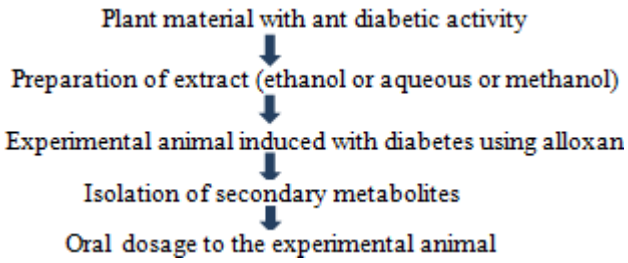
Thus, glucose remains to be excess in the blood. Because, of this kidney loss its ability to reabsorb all the filtered glucose. And so glucose appears to be excess in urea known as glycosuria. Excess of glucose in the urine leads to excessive loss of fluids and electrolytes. This condition is known as osmotic diuresis. Insulin inhibits glycogenolysis (breakdown of the stored glucose) and gluconeogenesis (production of new glucose). This takes place in an unresting manner in the patient with insulin deficiency. As a result fats get breakdown which leads to increased production of ketones. Ketones are acids that imbalances the acid-base balance of the body.

Type2 Diabetes:
This type of diabetes is commonly seen in people above 30 years. It is found that nearly 95% among people with diabetes falls in type2 diabetes. This type of diabetes is also known as non-insulin dependent. Type2 diabetes is even common among adolescence due to obesity. Insulin, a key for the glucose to get in to the cell loss its ability i.e. insulin is less effective at stimulating glucose uptake. Thus glucose from the food remains to be in the bloodstream, which results in hyperglycemia. This condition is also known as insulin resistance. This can be overcome by increased production of insulin by beta cells.

2. Gestational Diabetes

Diabetes caused during pregnancy, because of the secretion of placenta hormones, which inhibits the action of insulin. Gestational diabetes leads to hypertensive disorders during pregnancy. After delivery blood glucose level become normal and in some cases it may also develop into type2 diabetes.

3. General Methods of Phytochemical Analysis



List of Medicinal Plants with Anti Diabetic Activity

BOTANICAL NAME	COMMON NAME	FAMILY	PARTS USED
Trigonella foenum graecium	fenugreek	Fabaceae	Seeds
Ocinum tenuiflorum	tulasi	Lamiaceae	Leaves
Aegle marmelos	Bengal quince	Rutaceae	Leaves
Planta goovata	Isabgol	Plantaginaceae	Seeds
Catharanthus roseus	Madagascar periwinkle	Apocynaceae	Leaves
Allium cepa	Onion	Libiaceae	Bulbs
Azadirachta indica	Neem	Meliaceae	Leaves
Aloe vera	Aloe vera	Libiaceae	Juice / leaves
Magnifera indica	Mango	Anacardiaceae	Leaves, seeds, kernel
Terminalia chebula	chebulicmyrobelan	Combretaceae	Seed
Eugenia jambolana	jambul	Myrtaceae	Leaves
Linum ustiatissimum	flax	Linaceae	Seeds
Acacia arabica	wattles	Fabaceae	Bark
Alchemilla mollis	Lady's mantle	Rosaceae	Root
Annona squamosal	Sugar apple	Annonaceae	Leaf
Acacia nilotica	babool	Fabaceae	Leaf
Artemisia pallens	Davana	Asteraceae	Leaf arial parts
Areca catechu	Palm tree	Arecaceae	Leaf
Beta vulgaris	chukkander	Amaranthaceae	Leaf
Boerhavia diffusa	punarnava	Nyctaginaceae	Leaf
Bombax ceiba	Cotton tree	Malvaceae	Bark
Butea monosperma	palara	Fabaceae	flower
Camellia sinensis	Black tea	Theaceae	leaves
Capparis decidua	pinju	Capparaceae	Fruit
Caesalpinia bonduc	Grey nicker	Caesalpiniaceae	Seed
Coccinia indica	Ivy gourd	Cucurbitaceae	Fruit
Emblica officinalis	amla	Phyllanthaceae	Fruit
Eugenia uniflora	Pitanga	Myrtaceae	leaf
Enicostema littorale	Krimihrita	Gentianaceae	Whole plant
Ficus bengalenesis	Banyan	Moraceae	Bark
Gymnema sylvestre	Cow plant	Apocynaceae	Leaf
Hemidesmus indicus		Apocynaceae	Root
Hibiscus rosa sinesis	Shoe flower	Malvaceae	Flower
Ipomoea batatas	Sweet potato	Convolvulaceae	Leaf
Momordica cymbalaria	Kadavanchi	Cucurbitaceae	Tuber, fruit
Momordica charantia	Bitter melon	Cucurbitaceae	Leaf, whole plant
Murraya koenigii	Curry leaf	Rutaceae	Root
Musa sapientum	Banana	Musaceae	Fruit peel, leaf, flower, stem
Phaseolus vulgaris	White kidney bean	Fabaceae	Bean
Punicagranatum	Pomegranate	Lythraceae	Leaf, Fruit peel.
Salacia reticulate	Kothalahimbutu	Celastraceae	Root, bark stem
Scoparia dulcis	Sweet broom, licorica weed	Plantaginaceae	
Swertia chirata	Chirayata	Gentianaceae	Whole plant
Syzygium alternifolium	Shahajire	Myrtaceae	Fruit pulp
Terminalia belerica	Bebric	Combretaceae	Fruit
Tinospora crispa	Heart- leaved moonseed	Menispermaceae	Stem
Vinca rosea	Madagascar periwinkle	Apocynaceae	Whole plant
Withania somnifera	Ashwagandha	Solanaceae	Root and leaf
Allium sativum	Garlic	Amaryllidaceae	Bulbs
Arctium lappa	Burdock	Asteraceae	Root
Berberis lyceum	Indian barberry	Berberidaceae	Root
Cinnamomum zeylanicum	Cinnamon	Lauraceae	

Cinnamomum tamala		Tejpat		Lauraceae		Leaf
Costus pictus		Painted spiral ginger		Costaceae		Leaf
Ficus racemosa		Cluster fig tree		Moraceae		Root
Ginkgo biloba		Ginkgo tree		Ginkgoaceae		
Helichrysum italicum		Curry plant		Asteraceae		Leaf
Lagerstroemia speciosa		Giant crape myrtle		Lythraceae		Leaf
Vitis vinifera		Grapes		Vitaceae		Seed
Panax ginseng				Arabiaceae		Root
Phyllanthus amarus		Stone breaker		Euphorbiaceae		Leaf
Prunus dulcis		Almond		Rosaceae		Nut
Abelmoschus esculentus		Ladies finger		Malvaceae		Fruit, Peel
Pterocarpus marsupium		Indian kino Vijayasar		Fabaceae		Wood
Stevia rebaudiana		Candy leaf		Asteraceae		
Tinospora cordifolia		Guduchi		Menispermaceae		Roots
Vaccinium myrtillus		Blue berry		Ericaceae		Leaf
Anacardium occidentale		Cashew		Anacardiaceae		Leaf
Cuminum cyminum		Cumin seeds		Apiaceae		Seeds
Galega officinalis		Goat's Rue seeds		Fabaceae		Seeds
Gymnema sylvestre		Gymnema		Apocynaceae		Leaf
Olea europaea		Olive		Oleaceae		Leaf
Oplopanax horridus		Devil's club		Arabiaceae		Root, Bark
Opuntia sps		Prickly pear		Cactaceae		Stem, Fruit
Taraxacum officinale		Dandelion plant		Asteraceae		Whole plant
Urtica dioica		Stinging nettle plant		Urticaceae		Whole plant
Apium graveolens		Celery		Apiaceae		Seeds
Bupleurum falcatum		Sickle leaved hare's ear		Apiaceae		Root
Centella asiatica		Gotu kola		Apiaceae		Leaf
Rosmarinus officinalis		Rosemary		Lamiaceae		Leaf
Artemisia absinthium		Wormwood		Asteraceae		
Morus allea		White mulberry		Moraceae		Stem, bark
Agaricus bisporus		White button mushroom		Agaricaceae		PSC extract
Zingiber officinals roscoe		Ginger		Zingiberaceae		Juice
Myrcia uniflora		Pedahumecaä		Myrtaceae		Leaf
Myrcia bella				Myrtaceae		Leaf
Opuntia streptacantha		Nopal		Cactaceae		Stem
Silybum marianum		Milk thistle		Asteraceae		Seeds
Eriobotrya japonica		Loquat		Rosaceae		Leaf
Artocarpus heterophyllus		Jack fruit		Moraceae		Leaf
Eucalyptus globulus		Eucalyptus		Myrtaceae		Leaf
Syzygium cumini		Jambul, jambolan		Myrtaceae		Seeds, Leaf
Lupinus albus		White lupin		Fabaceae		Seed
Solanum lycopersicum		Tomato		Solanaceae		Seeds
Citrullus lanatus		Water melon		Cucurbitaceae		Seed
Carica papaya		Papaya		Caricaceae		Leaf
Ananas comosus		Pineapple		Bromeliaceae		Leaf
Citrus lemon		Lemon		Rutaceae		Peel
Jasminum trichotomum		Jasmine		Oleaceae		Arial part
Mentha balsamea		Peppermint		Lamiaceae		juice
Phyllanthus niruri		Keezhanelli		Euphorbiaceae		Leaf

4. Conclusion

Thus, this review article contains a collection of some of the medicinal plants having anti diabetic activity with their family and the parts containing anti diabetic property. This would help researchers to get collection of data regarding plants with anti diabetic activity.