

# A review: on herbal medicine used in the treatment of diabetes mellitus.

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## ABSTRACT:

Diabetes mellitus (DM) is a metabolic disorder of the endocrine system. This frightful disease is found in all parts of the world and is becoming a serious threat to healthcare providers. Nowadays DM is a most spreading disease in the world. In rapidly growing world a number of treatment options are available for treatment of DM. Traditional medicines derived from medicinal plants are used by about 60% of the world's population. In India it is proving to be a major health problem, especially in the urban areas. Though there are various approaches to reduce the ill effects of diabetes and its secondary complications, herbal formulations are preferred due to lesser side effects and low cost. A list of medicinal plants with proven anti diabetic and related beneficial effects and of herbal drugs used in treatment of diabetes is compiled. Long term use of allopathic medicinal agents may cause unwanted side effects, resulting uncontrolled blood sugar as well as complications of DM, also DM is highly prone to different types of microorganism and it will affect immune system of body. The use of herbal medicine for the prevention and treatment of DM has been in practice since ancient time. Medicinal plants as a traditional medicine is being used by about 60% of the world's population and India is major contributor to produced herbal medicines. Generally it is believed that the risk associated with herbal medicine is very less, but reports on serious reactions of herbal drugs are also necessary. Numerous herbal plants have been investigated for their potential to treat different types of diabetes. Herbal anti diabetics may delay the development of diabetic complications or correct the metabolic abnormalities. Many of herbal plants and formulations founded effective in treatment of DM. This systemic review paper mainly is focused on herbal plants as anti- diabetics in various traditional medicines and explores the herbal plant, isolated active principle and formulation with anti-diabetic activity. These include *Allium sativum*, *Eugenia jambolana*, *Momordica charantia*, *Ocimum sanctum*, *Phyllanthus amarus*, *Pterocarpus marsupium*, *Tinospora cordifolia*, *C. indica*, *Helicteres isora*, *Stevia rebaudiana*, *Gymnema sylvestre*, *Enicostemma littorale* Blume.

## Keywords:

Antidiabetics, Diabetes mellitus, Herbal plants and Medicinal plants, Hypoglycemic.

## INTRODUCTION:

Etymologically, the term diabetes can be defined as to "pass through". The word diabetes has been derived from Greek Word ('dia' means through; 'betes' means pass). More appropriately it has been defined as the secretion of an inordinate quantity of sweet tasting, urine with a peculiar smell, accompanied with great thirst, dryness of skin, extreme debility, and general emaciation. In diabetes, the deficiency of insulin leads into a complex series of reactions which are clinically manifested as hyperglycemia. It is well known that glucose is an important source of energy for the cerebral tissue. Diabetes mellitus is a systemic metabolic disease characterized by hyperglycemia, hyper lipedemia, hyper aminoacidemia, and hypo insulinaemia it leads to decrease in both insulin secretion and insulin action. It is frequently associated with the development of micro and macro vascular diseases which include neuropathy, nephropathy, cardiovascular and cerebrovascular diseases. The disease is associated with reduced quality of life and increased risk factors for mortality and morbidity. Diabetes mellitus, commonly referred to as diabetes was first identified as a disease associated with "sweet urine," and excessive muscle loss in the ancient world. Elevated levels of blood glucose (hyperglycemia) lead to spillage of glucose into the urine, hence the term sweet urine. Normally, blood glucose levels are

tightly controlled by insulin, a hormone produced by the pancreas. Insulin lowers the blood glucose level. When the blood glucose elevates (for example, after eating food), insulin is released from the pancreas to normalize the glucose level in patients with diabetes, the absence or insufficient production of insulin causes hyperglycemia. Diabetes is a chronic medical condition, meaning that although it can be controlled, it lasts a lifetime. There are different approaches to the treatment of diabetes, like insulin treatment in type 1 diabetes: Sulphonylureas, which release insulin from pancreas by blocking the ATP-sensitive potassium channels. Biguanides, which decrease the insulin resistance; Thiazolidinediones, which increase the insulin sensitivity; alpha-glucosidase inhibitors like acarbose, which decrease glucose absorption from intestine, thereby decreasing postprandial hyperglycemia; metiglinides like repaglinide and nateglamide, which are insulin secretagogues. Traditional herbal mineral plays an important part in the treatment of diabetes. If we are able to even identify some 5-6 herbal drugs that can reduce dose of insulin by increasing resistance sensitivity, reducing insulin resistance, then we would have positively contributed in the treatment of diabetes. Impairment of growth and susceptibility to certain infections may also be associated with chronic hyperglycemia. Uncontrolled diabetes characterized with hyperglycemia with ketoacidosis or the nonketotic hyperosmolar syndrome is an acute life-threatening consequence. Long-term complications of diabetes include nephropathy, neuropathy, retinopathy, amputations, foot ulcers, Charcot joints, autonomic neuropathy causing genitourinary, gastrointestinal, and cardiovascular symptoms and sexual dysfunction. Diabetic subjects have an increased incidence of peripheral arterial, atherosclerotic cardiovascular and cerebrovascular disease. Abnormalities of lipoprotein metabolism and hypertension are often found in diabetics. In past few years, field of herbal medicines are growing exponentially and these drugs are gaining popularity both in world because of it is derived from natural origin and having minimum side effects. Many traditional medicines in use are derived from medicinal plants, minerals and organic matter. A 60% of world population is using traditional medicines which are derived from medicinal plants. This review basically focused on Indian herbal drugs and plants used in the treatment of diabetes, especially in India. Diabetes is an important human ailment afflicting many from various walks of life in different countries. In India it is proving to be a major health problem, especially in the urban areas. Though there are various approaches to reduce the ill effects of diabetes and its secondary complications, herbal formulations are preferred due to lesser side effects and low cost. Many of allopathic medicines are available for the treatment of diabetes but somehow they have their own side effect & adverse effect like hypoglycemia, nausea, vomiting, hypernatremia, flatulence, diarrhea or constipation, alcohol flush, headache, weight gain, lactic acidosis, pernicious anemia, dyspepsia, dizziness, joint pain. So instead of allopathic drugs, herbal drugs are a great choice which is having more or less no side effect & adverse effects.

### **Different pharmacological action of herbal anti diabetic remedies:**

Mechanism of action of herbal antidiabetic is depending on presence of active chemical component in plant material. Different mechanism of action of herbal medicine is given below

- Adrenomimeticism, pancreatic beta cell potassium channel blocking, cAMP (2nd messenger) stimulation
- Stimulation of insulin secretion from beta cells of islets or/and inhibition of insulin degradative processes
- Prevention of pathological conversion of starch to glucose
- Stimulation of insulin secretion
- Preventing oxidative stress that is possibly involved in pancreatic  $\beta$ -cell dysfunction found in diabetes
- Reduction in insulin resistance
- Providing certain necessary elements like calcium, zinc, magnesium, manganese and copper for the beta-cells
- Inhibition in renal glucose reabsorption
- Regenerating and/or repairing pancreatic beta cells
- Increasing the size and number of cells in the islets of Langerhans
- Protective effect on the destruction of the beta cells
- Inhibition of  $\beta$ -galactosidase and  $\alpha$ -glucosidase
- Improvement in digestion along with reduction in blood sugar and urea

- Cortisol lowering activities
- Stimulation of glycogenesis and hepatic glycolysis
- Inhibition of alpha-amylase

**Potential future research challenges:** Although many plant species have been validated for their anti diabetic properties and related complications, a need exists for research in the following areas <sup>135</sup>:

- Develop the potentially easy to consume food products fortified with extracts of plant species with clinically proven hypoglycemic or anti-hyperglycemic properties that can be incorporated into diabetic diets.
- Determine the long-term side effects.
- Identify active phytochemical compound(s) directly associated produce hypoglycemia.
- Investigate combination dosages of natural plant product and synthetic drugs to determine the optimal combination for cost-effective therapies.
- Determine the exact mechanisms behind hypoglycemic and antihyperglycemic activity of the medicinal plant species.
- Assess the inter- and intra-specific variation in secondary metabolite
- Investigate production potential of plant species with clinically proven antidiabetic properties in the USA.
- Conduct extensive, large-population clinical studies is required for selected species such as *M. charantia*, *Foenum graecum*, *E. jambo/ana* and *O. tenuiflorum* and many other potential antidiabetics.

**Antidiabetic herbal product:** Today, more than 600 medicinal plants have been reported to have antidiabetic potential. Many numbers of medicinal plant preparation and different formulations are available for the treatment of diabetes. Some of potential herbal formulation such as Hyponidd tablets, Mersina capsules, DWN-12, Pancreas tonic, Tincture of Panchparna, Pancreas tonic, Glucomap tablets, GlucoCare, Diaveda capsule, Diagon tablets, Glucolev capsule, Madhumeha churna, Glucolib, Glucolev capsule, Sharang Dyab-Tea, Herbal Hills Jambu, Stevia-33, Diab-FIT, Madhumar Capsule, Daya Stone powder, Diabetone Tablet, Kumari-SAAR, Blue berry and Episulin are available in market.

#### HOME REMEDIES FOR DIABETES:

- **Ispaghula husk** (*Plantago ovata*) is natural safe for treatment of diabetes.
- **Bilberry** (*Vaccinium mytillus*) and Blueberry are effective herbs that cure diabetes by lowering blood sugar and cholesterol levels.
- **Bitter gourd** (*Momordica charantia*) fruit decoction in the morning in empty stomach at least for one month is helpful in bringing the blood sugar level to normal.
- **Gurmar** (*Gymnema sylvestre*) cures diabetes by lowering high sugar level in the blood and lead to proper functioning of insulin and also minimize the urge of taking sweets in the diabetes patients.
- **Curry pâté, curry leaves** (*Murraya koenigii*) controls diabetes so is one of the important home remedies for diabetes. Hereditary diabetic patients also get the best benefit from its intake. Chewing (8-10) curry leaves in empty stomach is very effective for bringing sugar level in urine and blood to normal.
- **Gooseberry, amla** (*Emblica officinalis*) is a natural herb that cures diabetes and brings the blood sugar to normal.
- **Green tea** (*Camellia sinensis*) consumption has been used traditionally to control blood sugar in the body. It is associated with prevention of type 2 diabetes, lowering fasting blood levels of glucose, reducing triglycerides and free fatty acids, and enhancing ability of adipocytes to respond to insulin and absorb blood sugar. Its consumption also increases the body's ability to



utilize blood sugar. Green tea polyphenols regulates the expression of genes involved in glucose uptake and insulin signaling.

- **Maidenhair tree** (*Gingo biloba*) is very effective in controlling diabetes.
- **Mango leaves** (*Mangifera indica*) are helpful in controlling diabetes. Take mango leaves, soak them in water and keep it over night then in an empty stomach take this liquid. Dry the leaves of mango trees and make its powder in a grinder. Mix the dry powder (1 teaspoon) of mango leaves in a glass of water and drink it every day. This is one of the useful home remedies for diabetes and good natural cure for diabetes.
- **Papaya** (*Carica papaya*) are boiled and made into a paste and given with a pinch of common salt and jeera powder for six months to cured diabetes.
- **Sweet potato leaves** (*Ipomoea batatas*) when taken with ash gourd or when taken with any herbal tea are effective in curing diabetes.

### **Allium sativum**

It is locally name as garlic belongs to Liliaceae, a family of *Allium sativum*. Ethanolic extract of garlic (10 ml/kg/day) frequently shows hypoglycemic activity. Extract of garlic was more efficient than anti diabetic drug glibenclamide. Ethyl acetate, ethanol and petroleum ether extract was observed to show an anti diabetic activity in STZ induced rats. Garlic shows various therapeutic effect such as anti platelet, antibacterial, lowering the blood pressure and lowering the cholesterol level in the body.

### **Aloe borbadensis**

It is known as Ghikanvar which belongs to Liliaceae family. It looks like a cactus plant with green blade shaped leaves that are heavy narrowing, hairy and filled with clear viscid gel. Oral administration of aqueous extract of aloe Vera in a dose of 150mg/kg of body weight significantly lowering the blood glucose level. Aloe Vera gel consist various therapeutic effects such as anti diabetic, antioxidant, increases the decrease level of glutathione by four times in diabetic rats.

### **Azadirachta indica**

It is locally name as neem which belongs to family Meliaceae. It is available in India and Burma. Ethanolic and aqueous extract of *Azadirachta indica* shows reduction in blood glucose level in high dose. It can be combined with allopathic drugs in type 2 diabetic patients whose diabetes is not maintained by allopathic drugs only. Worldwide large numbers of patients are treated by natural neem tablets. Its extract improves the blood circulation by enlarging the blood vessels and useful in reducing the blood glucose level in the body.

### **Brassica juncea**

It is known as Rai which belongs to family cruciferae. It is widely used as spice in various food items. Aqueous seed extract has blood sugar lowering activity which was observed in alloxan induced diabetic rats. 250, 350, 450 mg/kg doses of extract shows hypoglycemic activity.

### **Carica papaya**

It is known as papaya which belongs to family caricaceae. Seed and leaves extract shows lowering of blood sugar level, lowering of lipid in the body and healing of wound activities in alloxan induced diabetic rats.

### **Catharanthus roseus**

It is known as *Vinca roseus* which belongs to family Apocynaceae. Methanolic extract of leaves and twigs shows decrease in blood sugar level in the alloxan induced diabetic rats. Oral administration of 500 mg/kg dose of leaves and twigs extract was beneficial in animals for lowering in blood sugar level. The mechanism of action of *Catharanthus roseus* is increases the synthesis of insulin from  $\beta$  cells of Langerhans.

### **Coriandrum sativum**

It is mainly known as coriander which belongs to family Apiaceae. It is widely used as spice in various food items. 200 mg/kg seed extract frequently increases the action of the  $\beta$  cells of Langerhans and decreases serum sugar in alloxan induced diabetic rats and synthesis insulin from  $\beta$  cells of the pancreas. Extract of *Coriandrum sativum* shows blood sugar lowering property and insulin synthesizer.

**Eugenia jambolana**

It is known as jamun belongs to Myretaceae family. It contains dried seeds and mature fruits of *Eugenia jambolana*. It contains malvidin 3-laminaribioside and ferulic acid as active constituents. Extract of dried seeds (200 mg/kg) used for treatment of diabetic patients .

**Gymnema sylvestre**

It is commonly known as Gudmar which means "sugar destroying" and consists of Asclepidaceae family. Leaf extract of *G. sylvestre* (3.4/13.4 mg/kg) showed significant reduction of blood sugar level in streptozotocin induced rats. It is mostly used in Indian ayurvedic medicines for treatment of diabetes. The active constituents in *G. Sylvester* are alkaloids, flavonoids, saponins and carbohydrates. It is also used for treatment of cancer, treatment of inflammation and treatment of various microbial diseases .

**Mangifera indica**

It is commonly known as mango and consists of family Anacardiaceae. Anti diabetic activity shows by leaves extract (250 mg/kg) but oral administration of aqueous extract did not change the blood glucose level in alloxan induced diabetic rats.

**Momordica charantia**

It is commonly known as bitter melon (karela) and belongs to Cucurbitaceae family. The active constituents of *Momordica charantia* are momordic I and momordic II, cucurbitacin B. It is used in the treatment of diabetes. It consist lectin which has insulin like activity. Lectin is non protein which is linked to insulin receptors. This lectin decreases the blood sugar level by acting on peripheral tissues. Fruit extract of *M. charantia* (200 mg/kg) shows hypoglycemic activity.

**Aegle marmelos**

It is known as Bael and belongs to Rutaceae family. It is inherited to India and parts of plant such as leaves, barks, roots and fruits are used in the ayurveda and in various medicines which is used for cure of various diseases. Leaves of neem and tulsi in combination with leaves of *A. marmelos* are dried, powdered and administered three times a day for 15 days. Animal studies proved that *Aegle marmelos* (100,200 and 500 mg/kg) are used for treatment of various diseases such as treatment of cancer, treatment of various viral diseases, treatment of various microbial diseases.

**Ocimum sanctum**

It is known as tulsi and belongs to Labiateae family. It is widely found all over India. It is used in Indian ayurvedic medicines for treatment of various diseases. Various animal studies proved that aqueous extract of *Ocimum sanctum* leaves (200 mg/kg) showed the hypoglycemic activity in streptozotocin induced rats. It is also used for treatment of viral infection, treatment of fungal infection, reduces stress, treatment of tumor and treatment of gastric ulcer.

**Tinospora cardifolia**

It is well-known as guduchi and consists of the Menispermaceae family. The active constituents of *T. cardifolia* are diterpene compounds which consists tinosporone, tinosporic acid, Syringen, berberine and giloin. Root extract of *T. cardifolia* (50-200mg/kg) shows decrease in blood and urine sugar in streptozotocin induced diabetic rats during oral administration for 6weeks. It is mostly used in Indian ayurvedic medicines for treatment of diabetes. Root extract also forbid the reduction of body weight.

## IMPORTANT MEDICINAL PLANTS HAVING ANTIDIABETIC POTENTIAL

<b>Sr. no</b>	<b>Plant</b>	<b>Family</b>	<b>Part used</b>
1	<i>Aquilaria agallocha</i>	Thymelaeaceae	Stem
2	<i>Aquilaria sinensis</i>	Thymelaeaceae	Leaves
3	<i>Aralia elata Seem</i>	Araliaceae	Root
4	<i>Arctostaphylos uva ursi</i>	Ericaceae	Fruit
5	<i>Areca catechu</i>	Areaceae	Seeds
6	<i>Argyreia nervosa</i>	Convolvulaceae	Root
7	<i>Aronia melanocarpa</i>	Rosaceae	Fruit
8	<i>Artemisia absinthium</i>	Compositae	Leaves, aerial parts
9	<i>Artemisia dracuncululus</i>	Compositae	Whole plant
10	<i>Artemisia pallens</i>	Compositae	Aerial parts
11	<i>Artemisia ludoviciana</i>	Compositae	Leaves
12	<i>Artemisia herba-alba</i>	Compositae	Leaves
13	<i>Caesalpinia sappan</i>	Fabaceae	Stem
14	<i>Caesalpinia digyna</i>	Leguminosae	Roots
15	<i>Caesalpinia decapetala</i>	Leguminosae	Seeds
16	<i>Caesalpinia crista</i>	Fabaceae	Seeds
17	<i>Caesalpinia bonducella</i>	Leguminosae	Seeds
18	<i>Butea monosperma</i>	Fabaceae	Fruit, Leaves, root
19	<i>Bumelia sartorum</i>	Sapotaceae	Root bark
20	<i>Buddleia americana Linn.</i>	Buddleaceae	Whole plant
21	<i>Buchanania axillaries</i>	Anacardiaceae	Seeds
22	<i>Bryonia cretica</i>	Cucurbitaceae	Aerial parts
23	<i>Bryonia alba L.</i>	Cucurbitaceae	Roots
24	<i>Brophyllum pinnatum</i>	Crassulaceae	Leaves
25	<i>Bridelia ndellensis</i>	Euphorbiaceae	Leaves
26	<i>Brickellia veronicaefolia</i>	Asteraceae	Aerial parts
27	<i>Brickellia veronicaefolia</i>	Asteraceae	Whole plant
28	<i>Brickellia squarrosa</i>	Asteraceae	Aerial parts
29	<i>Brickellia cavanillesii</i>	Asteraceae	Aerial parts
30	<i>Brassica rapa</i>	Brassicaceae	Root
31	<i>Brassica oleraccia</i>	Brassicaceae	Leaves
32	<i>Brassica nigra</i>	Brassicaceae	Seeds
33	<i>Bougainvillea spectabilis</i>	Rubiaceae	Seeds
34	<i>Bouvardia ternifolia</i>	Rubiaceae	Leaves
35	<i>Brassica juncea</i>	Brassicaceae	Seeds
36	<i>Brassica juncea Coss</i>	Brassicaceae	Leaves
37	<i>Brassica napiformis</i>	Brassicaceae	Leaves
38	<i>Bixa orellana</i>	Bixaceae	Leaves
39	<i>Blighia sapida</i>	sapindaceae	Fruit
40	<i>Boerhaavia diffusa</i>	Nyctaginaceae	Root
41	<i>Bombax ceiba</i>	Bombacaceae	Seed
42	<i>Boswellia serrata</i>	Frankincense	Whole plant
43	<i>Bougainvillea glabra</i>	Rubiaceae	Leaves
44	<i>Bougainvillea spectabilis</i>	Rubiaceae	Seeds
45	<i>Bouvardia ternifolia</i>	Rubiaceae	Leaves
46	<i>Berberis aristata</i>	Berberidaceae	Stem bark

47	<i>Berberis vulgaris</i>	<i>Berberidaceae</i>	Root
48	<i>Bergenia stacheyi</i>	<i>Saxifragaceae</i>	Root
49	<i>Bergia capensis</i>	<i>Elatinaceae</i>	Root
50	<i>Beta vulgaris</i>	<i>Chenopodiaceae</i>	Root bark
51	<i>Bhighia sapida</i>	<i>sapindaceae</i>	Unripe fruits & seeds
52	<i>Bidens pilosa</i>	<i>Asteraceae</i>	Whole plant
53	<i>Billia hippocastanum</i>	<i>Hippocastanaceae</i>	Aerial parts
54	<i>Biophytum sensitivum</i>	<i>Oxalidaceae</i>	Leaves
55	<i>Bauhinia variegata</i>	<i>Caesalpinaceae</i>	Flowers
56	<i>Benincasa hispida</i>	<i>Cucurbitaceae</i>	Fruit
57	<i>Abelmoschus moschatus</i>	<i>Malvaceae</i>	mucilage
58	<i>Abroma augusta</i>	<i>Sterculiaceae</i>	Leaves
59	<i>Abrus precatorious</i>	<i>Leguminosea</i>	Seeds
60	<i>Abutilon indicum</i>	<i>Malvaceae</i>	Whole plant
61	<i>Acacia Arabica</i>	<i>Rubaceae</i>	Seeds
62	<i>Acacia bilimekii</i>	<i>Fabaceae</i>	Leaves
63	<i>Acacia catechu</i>	<i>Rubaceae</i>	Bark
64	<i>Acacia farnesiana</i>	<i>Fabaceae</i>	Leaves, bark
65	<i>Acacia</i>	<i>nilotica</i>	Bark
66	<i>Acacia pennata</i>	<i>Rubaceae</i>	Shoot tips
67	<i>Acanthopanax senticosus</i>	<i>Araliaceae</i>	Leaves
68	<i>Achyranthes aspera</i>	<i>Amaranthaceae</i>	Whole plant
69	<i>Achyranthes aspera</i>	<i>Amaranthaceae</i>	Whole plant
70	<i>Achyrocline satuireioides</i>	<i>Asteraceae</i>	Aerial parts
71	<i>Aconitum carmichaeli</i>	<i>Ranunculacea</i>	Roots
72	<i>Aconitum ferox</i>	<i>Ranunculacea</i>	Root
73	<i>Aconitum palmatum</i>	<i>Ranunculacea</i>	Roots
74	<i>Acosmium panamense</i>	<i>Leguminosea</i>	Bark
75	<i>Acrocomia mexicana</i>	<i>Leguminosea</i>	Roots
76	<i>Adansonia digitata</i>	<i>Bombacaceae</i>	Stem bark
77	<i>Adhatoda vasica</i>	<i>Acanthaceae</i>	Leaves
78	<i>Adiantum capillus</i>	<i>Polypodiaceae</i>	Whole plant
79	<i>Adiantum caudatum s</i>	<i>pteridaceae</i>	Leave
80	<i>Aegle marmelos</i>	<i>Rutaceae</i>	Flower, leaves
81	<i>Aerva lanata</i>	<i>Amaranthaceae</i>	Leaves
82	<i>Aesculus hippocastanum L.</i>	<i>Hippocastanaceae</i>	Seeds
83	<i>Afzelia africana</i>	<i>Fabaceae</i>	Stem bark
84	<i>Aframomum memegueta</i>	<i>Zingiberaceae</i>	Leaves
85	<i>Agapetes sikkimensis</i>	<i>Ericaceae</i>	Aerial parts
86	<i>Agarista mexicana</i>	<i>Ericaceae</i>	Aerial parts
87	<i>Agrimonia eupatoria</i>	<i>Rosaceae</i>	Leaves
88	<i>Agrimonia pilosa</i>	<i>Rosaceae</i>	Leaves
89	<i>Aloe barbadensis</i>	<i>Liliaceae</i>	Leaves
90	<i>Aloe vera</i>	<i>Liliaceae</i>	Leaves
91	<i>Alpinia galanga</i>	<i>Zingiberaceae</i>	Rhizome
92	<i>Alstonia macrophylla</i>	<i>Apocynaceae</i>	Whole plant
93	<i>Alstonia scholaris</i>	<i>Apocynaceae</i>	Bark
94	<i>Anacardium occidentale</i>	<i>Anacardiaceae</i>	Bark
95	<i>Anacardium occidentale</i>	<i>Anacardiaceae</i>	Leaves
96	<i>Andrographis lineata</i>	<i>Acanthaceae</i>	Leaves
97	<i>Andrographis paniculata</i>	<i>Acanthaceae</i>	Root



98	<i>Andrographis paniculata</i>	<i>Acanthaceae</i>	<i>Whole plant</i>
99	<i>Anthocephalus indicus</i>	<i>Rubiaceae</i>	<i>Bark</i>
100	<i>Aporosa lanceolata</i>	<i>Euphorbiaceae</i>	<i>Leaves</i>

## Conclusion :

Worldwide peoples are successfully using and trusting herbal medicine for the treatment of various health problems. Many of the diabetic patients are getting side effect due to allopathic medication so now patients are relying on alternative therapies with anti-hyperglycemic effects. This comes as no surprise since alternative treatments have been most widely used in chronic diseases, which may be only partially alleviated by conventional treatment. Herbal medications are the most commonly used alternative therapy for lowering blood sugar. However, their safety and efficacy need to be further evaluated by well-designed, controlled clinical studies. However, there are numerous other plants still await scientific inquiry, which have mentioned in the indigenous systems of health care all over the world. A large number of plants, screened for their anti-diabetic effect, have yielded certain interesting leads as mentioned in present article, but till date many plant-based drug is remain to reached such an advanced stage of investigation or development as to substitute or reduce the need for the currently-available oral synthetic drugs. Nevertheless, the interest in herbal drug research continues with an expectation that someday or other, we would be able to bring a safer, efficacious and more effective compound with all the desired parameters of a drug that could replace the synthetic medicines. In recent time interest has been grown toward plant remedies. Plant has definite promises in the management of diabetes. Isolation and identification of active chemical principle from plant and preparation of standardized dosage can play vital role in management of diabetes.

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