IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 14, May 2026
Impact Factor: 8.2

Phytochemical and Antidiabetic Studies of Some Indigenous Medicinal Plants

Shaikh Muskan Musa Sab, Asst. Prof. Shubham L. Hange, Dr. Surwase K.P
Kishori College of Pharmacy, Beed

Abstract: *The use of medicinal plants in the management of diabetes mellitus has gained significant attention due to their natural origin, therapeutic potential, and lower side effects compared to synthetic drugs. Indigenous medicinal plants contain a wide range of phytochemicals such as alkaloids, flavonoids, tannins, saponins, glycosides, terpenoids, and phenolic compounds that play an important role in controlling blood glucose levels. These bioactive constituents exhibit antidiabetic activity through different mechanisms, including stimulation of insulin secretion, enhancement of glucose uptake, inhibition of carbohydrate-digesting enzymes, and antioxidant effects.*

Several indigenous plants such as Azadirachta indica, Momordica charantia, Gymnema sylvestre, Ocimum sanctum, and Trigonella foenum-graecum have shown promising antidiabetic properties in experimental and clinical studies. Phytochemical screening of these plants has revealed the presence of compounds capable of reducing oxidative stress and improving pancreatic β-cell function. In addition, many of these plants possess antioxidant, anti-inflammatory, and hypolipidemic activities, which help in preventing diabetic complications.

This study focuses on the phytochemical constituents and antidiabetic potential of selected indigenous medicinal plants. It highlights the importance of traditional herbal medicine as an alternative and complementary approach for diabetes management. Further scientific investigation and clinical validation are necessary to ensure the safety, efficacy, and standardization of these medicinal plants for future therapeutic applications..

Keywords: Phytochemicals, Antidiabetic activity, Indigenous medicinal plants, Diabetes mellitus, Herbal medicine, Flavonoids, Alkaloids, Antioxidants, Medicinal plants, Bioactive compounds

I. INTRODUCTION

1.1 Diabetes

Diabetes is a disease of metabolism due to deficiency of insulin. Blood sugar level is maintained constant at a value of 70 to 120 mg of glucose/100 ml. Though several hormones are involved in the maintenance of diabetes, the most important ones are insulin and glucagon. Diabetes is caused as a result of loss balance effect of these hormones, usually due to less insulin production. Sugarstarts toaccumulate inthebloodandbloodsugarlevel increases and sugar passes into urine along with otherminerals. Therearetwotypes of diabetes.Theyare diabetes insipidus and diabetes mellitus[1, 2].

Diabetes mellitus is a condition in which a person's blood sugar level rises more than normal due to the deficiency of insulin or improper response to the insulin produced by the body cells. This disturbs metabolism of protein and other factors in the body.

Diabetes mellitus is a common and very prevalent disease affecting the citizens of both developed and developing countries. 6% population of human beings affected by Diabetes mellitus, which is an endocrine disorder and this will affect 5 times more people in next 10 years (WHO/Acadia, 1992; ADA, 1997). Diabetes mellitus is not disease but a syndrome with combination of hereditary and environmental causes that results in high blood sugar levels may know as Hyperglycemia. Our body always maintain sugar level by chemicals and hormones especially beta cells of pancreas that produce insulin and defects in either insulin secretion or insulin action leads to diabetes mellitus (Tierney 2002).

DOI: 10.48175/IJARSCT-36140

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 14, May 2026
Impact Factor: 8.2

And this disease results in high urine production, thirst and blurred vision, lethargy and changes in energy metabolism[4, 5].

Plants, can provide biologically active molecules and lead structures for the development of modified derivatives with enhanced activity and reduced toxicity. The small fraction of flowering plants that have so far been investigated have yielded about 120 therapeutic agents of known structure from about 90 species of plants. (Joy et al., 1998). Indigenous medicinal practices of various communities throughout the world have always proved to be an excellent route to discovery of many important modern drugs (Balick and Cox, 1996; Gilani and Rahman, 2005). In some cases, the crude extract of medicinal plants may be used as medicaments. About 121 (45 tropical and 76 subtropical) major plant drugs have been identified for which no synthetic one is currently available (Kumar et al., 1997). It has been estimated that more than 400 traditional plants or plant-derived products have been used for the management of type 2 diabetes across geographically (Bailey and Day, 1989) and about 800 plants have anti-diabetic potential (Alarcon-Aguilara et al.,1998). Plants have their chemical compounds which demonstrate alternative and safe effects on diabetes mellitus. Most of plants contain glycosides, alkaloids, terpenoids, flavonoids, carotenoids, etc., that are frequently implicated as having antidiabetic effect (Malviya et al., 2010). Galega officinalis is plant from which hypoglycemic drugs was obtained traditionally. Insulin,biguanides, sulfonylureas and thiazolinediones are mordern pharmacotherapeutics , but still except glycemic control with insulin, need to look new drugs for more efficacious agents with less side effects is needed (Gover et al., 2002). Herbal medicine also known as phytomedicine, refers to usage of roots, leaves, bark, flowers, seeds and berries for medicines. Herbalism is becoming focusing point due to research on herbs and their use in treatment of diabetes and its prevention (Ang-Lee et al.,2001). The scientific study of traditional medicines, concerned medicinal plants are thus of great importance.

II. REVIEW OF LITERATURE

2.1 Diabetes Mellitus

Diabetes mellitus observed to be one of the major disorders which start altering body cells capacity to produce and /or utilize the Insulin. The transport of glucose that is blood sugar circulating through bloodstream into body cells where it is broken down with the help of Insulin liberated in pancreas and used for the energy production.

Changes in the bloodstream glucose levels are observed due to diabetes, which results in the acute and chronic complications including nervous system damage, amputations and cardiovascular diseases. Hyperglycemia is resulted because of Diabetes mellitus (DM) and is considered as various metabolic diseases and identified due to difficulties in insulin secretion and/or changes related to the insulin cellular resistance. These conditions of chronic hyperglycemia and related other metabolic changes results in to various long term damage to tissues and organs along with effects on important organs such as eyes, kidneys, nervous and vascular systems.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 14, May 2026
Impact Factor: 8.2

2.2 History of diabetes mellitus

Before 1500 BC, the diabetes was described by the Hindu scholar writers. Around 250 BC, Apollonius of Memphis has given the name of diabetes, as it indicates to go through, or siphon means the person drains more fluid then he is able to consume. After words, as it makes urine sweet, a latin term Mellitus was added to it.

The initial treatment of diabetes was set by Sushruta, Arataeus, and Thomas Willis and they were considered as beginners for diabetes treatment. Consuming more fluids to minimize the fluid loss, changing diet plans, potato and oat diet therapy and various other remedies were included in the management of diabetes mellitus in olden days. One of the chemicals named as Insulin is said to be missing from the pancreas in the diabetic patients was indicated in 1916 by SharpeyShafer of Edinburgh. Based upon the term islet or island, the term insulin was derived which was a German name. Many of the Researchers including E.L. Scott,

2.3 Facts Of Diabetes

• The number of people living with diabetes rose from 200 million in 1990 to 830 million in 2022. Prevalence has been rising more rapidly in low- and middle-income countries than in high-income countries.
• More than half of people living with diabetes did not take medication for their diabetes in 2022. Diabetes treatment coverage was lowest in low- and middle-income countries.
• Diabetes causes blindness, kidney failure, heart attacks, stroke and lower limb amputation.
• In 2021, diabetes and kidney disease due to diabetes caused over 2 million deaths. In addition, around 11% of cardiovascular deaths were caused by high blood glucose.
• A healthy diet, regular physical activity, maintaining a normal body weight and avoiding tobacco use are ways to prevent or delay the onset of type 2 diabetes.
• Diabetes can be treated and its consequences avoided or delayed with diet, physical activity, medication and regular screening and treatment for complications.

2.4 Primary Risk Factors

The development of diabetes is influenced by a range of non-modifiable and modifiable factors.

• Non-Modifiable Factors

• Genetic Predisposition: Family history (first-degree relatives) significantly increases risk. Specific genes are associated with both T1DM (e.g., HLA complex) and T2DM.
• Age: The risk for T2DM increases with age, particularly after 45, though incidence in younger populations is rising.
• Ethnicity/Race: Certain groups, including Black, Hispanic, American Indian, and Asian American populations, exhibit a statistically higher incidence rate.
• History of Gestational Diabetes: A history of elevated blood glucose during pregnancy indicates a higher future risk for developing T2DM.

• Modifiable Factors

• Obesity and Body Fat Distribution: Excess visceral (intra-abdominal) fat is a major risk factor. It acts as a metabolically active tissue that secretes pro-inflammatory cytokines and non-esterified fatty acids, which directly interfere with insulin signaling.
• Physical Inactivity: Sedentary behavior reduces skeletal muscle glucose uptake and decreases insulin sensitivity.
• Dietary Habits: Diets high in processed carbohydrates, sugar-sweetened beverages, and saturated fats, and low in fiber, contribute to metabolic dysregulation.
• Chronic Stress: Elevated cortisol levels can increase hepatic glucose production and promote insulin resistance.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 14, May 2026
Impact Factor: 8.2

2.5 Causes of diabetes mellitus

The complete Etiology related to most of the cases of diabetes is not certain, but some factors which are contributing to it may be summarized as followed:

Type 1 Diabetes:

It is considered as an autoimmune disorder, resulted because of the aggressive behavior of cells available, which ultimately results in destruction of β cells. Genetic factors, malnutrition, environmental factors such as pancreas which are affected by virus, are considered as some of etiological and risk factors associated as per some researcher's findings. Some hormones which are released abnormally which acts as antagonist to that of insulin and can result into the development of diabetes is considered as another reason. Few examples related to these hormones may be given as adrenocortical hormone, adrenaline hormone, thyroid hormone.

Type 2 Diabetes:

This type of diabetes can be considered as a very common disease in case of elderly, comparatively obese and those patients having a family history related to diabetes and also those suffered from gestational diabetes.

Causes of diabetes may include:

• Hereditary or Inherited sources: The disease can be passed from one generation to the other generation due to some genes, and this is the strong belief for developing diabetes. This is majorly dependent upon the blood relationship closeness, as from mother, 2 to 3 % chances to carry it to next generation, the risk is more when the father is diabetic and the chances will be much more if both the parents are suffering from diabetes, child is at higher risk.

• Age: It can be more likely to develop this disease in elder patients as compared to that of the younger ones. Incidences found to be increased as per age, majorly around 80% cases, it will be developed after 50 years of age.

• Poor diet or the diabetes which is related to the malnutrition: If there is high intake of refined products, low intake of proteins and fibers in diet, malnutrition then, the chances of developing diabetes will be increased.

• Sedentary lifestyle: The people who exercise atleast thrice in a weak as compared to the sedentary lifestyle of people, risk of developing disease is lowered.

• Stress: The initial cause of developing diabetes can also be considered as physical injury or any mental or emotional stress conditions.

• Induced by some drugs: Some of the medicaments including Clozapine, Olanzapine, Risperidone, Quetiapine, Ziprasidone are found to develop this diseased conditions.

• Infections: Some of the pancreatic infections generally caused by strephylococci may result in development of diabetes.

• Hypertension: It is found in number of literatures indicating the direct link between the higher systolic pressure and diabetes mellitus.

Diagnosis

Diabetes is diagnosed based on blood sugar tests measuring high levels of glucose or HbA1c. Key criteria include an A1C 6.5%, a fasting plasma glucose 126 mg/dL, or a random blood glucose 200 mg/dL accompanied by symptoms. Common symptoms include extreme thirst, frequent urination, fatigue, and blurry vision.

Primary Diagnostic Tests

• A1C Test: Measures average blood sugar over 2-3 months; 6.5% or higher indicates diabetes.

This blood test, which doesn't require not eating for a period of time (fasting), shows your average blood sugar level for the past 2 to 3 months. It measures the percentage of blood sugar attached to hemoglobin, the oxygen-carrying protein in red blood cells. It's also called a glycated hemoglobin test.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 14, May 2026
Impact Factor: 8.2

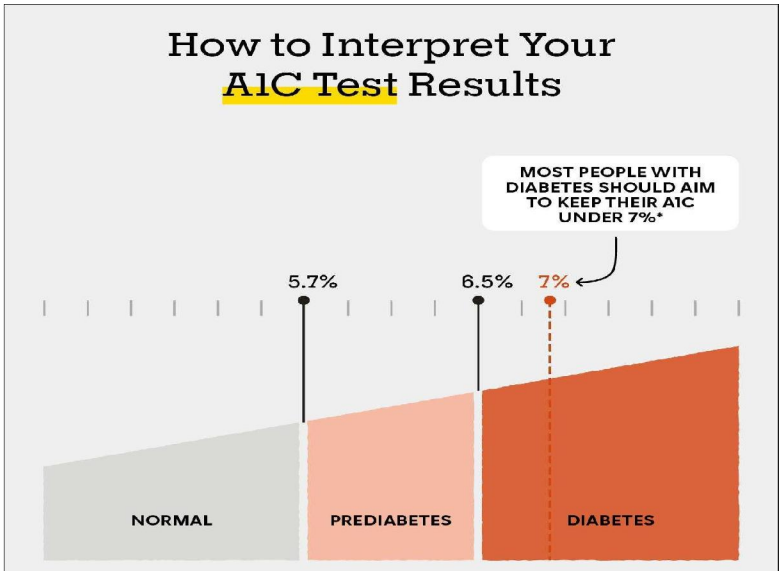


Fig: 1 AIC Test

The higher your blood sugar levels, the more hemoglobin you'll have with sugar attached. An A1C level of 6.5% or higher on two separate tests means that you have diabetes. An A1C between 5.7% and 6.4% means that you have prediabetes. Below 5.7% is considered normal.

• Fasting Plasma Glucose (FPG):Requires 8+ hours of fasting; 126 mg/dL or higher indicates diabetes.

A Fasting Plasma Glucose (FPG) test measures your blood sugar levels after you have avoided eating or drinking (except water) for 8 to 12 hours. It is the most common, cost-effective screening tool used by healthcare providers to diagnose prediabetes and diabetes.

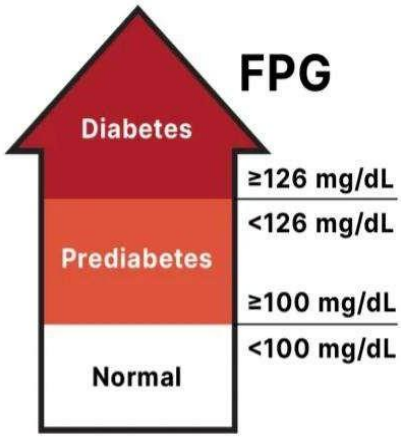


Fig: 2 FPG Test

• Random Plasma Glucose Test:

A random plasma glucose (RPG) test measures the concentration of sugar in your blood at any given time, regardless of when you last ate. It requires no fasting and is primarily used in clinical or emergency settings to quickly evaluate high blood sugar.200 mg/dL or higher, combined with symptoms like
frequent urination or fatigue, indicates diabetes.

Normal: Generally falls between 70mg/dL and180mg/dL (depending on the time of your last meal).

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 14, May 2026
Impact Factor: 8.2

Fig: 3 OGTT Test

• Oral Glucose Tolerance Test (OGTT):An Oral Glucose Tolerance Test (OGTT) is a diagnostic procedure that measures how effectively your body processes sugar. It is commonly used to diagnose prediabetes, type 2 diabetes, and gestational diabetes (pregnancy-related) by tracking blood sugar levels after consuming a highly concentrated sugary drink. Measures blood sugar 2 hours after consuming a sugary drink; 200 mg/dL or higher indicates diabetes.

Diagnosis Thresholds

• Normal: A1C below 5.7%, Fasting Glucose below 100 mg/dL.
• Prediabetes:A1C 5.7%–6.4%, Fasting Glucose 100–125 mg/dL.
• Diabetes:A1C 6.5%+ , Fasting Glucose 126+ mg/dL.

6. Brief Management of Diabetes Mellitus

• Non pharmacological management

Diet: in the treatment of diabetes mellitus, diet management is very important and well recognized also.

Exercise: in the management of diabetes mellitus, physical exercise is an important parameter as it is also useful for getting several other parameters such as reducing the weight, increased fitness of cardiovascular system and improved physical working strength.

• Pharmacological management

Pharmacological management is considered as very important method for treating diabetes mellitus which also decreases the risks related to progression of microvascular and macrovascular complications related to diabetes mellitus.

• Insulin therapy

Insulin therapy is mentioned in the treatment of type 1 diabetes mellitus. Insulin can also be recommended in the type 2 diabetic individuals, as for them also diet and other oral hypoglycemic agents are insufficient for maintaining the targeted glucose levels. The insulin therapy is also suggested for those suffering from gestational diabetes mellitus and when the diabetes is not able to be controlled by managing the diet alone.

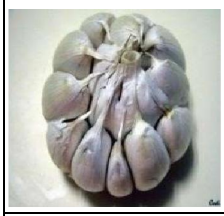
There are many side effects are reported after prolonged use of insulin such as hypoglycemia and weight gain. Cutaneous reactions and some allergic conditions related to insulin are reported to be rare as, majorly the insulin which is in use at present day are considered as recombinant human products. The patients are instructed to change the injection sites of insulin, so as to protect fromlipohypertophy.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 14, May 2026
Impact Factor: 8.2

7. Role of Herbal Drugs in Management of Diabetes Mellitus

Herbal treatments are gaining more importance, as there is increase in the toxic effects related the antidiabetic drugs such pharmacological treatments for the diabetes mellitus. So, the indigenous herbal treatments are used which are obtained from the plants, and found to play a potential role in the diabetes mellitus.

The various plant products may be importantly applied as alternately remedies as cure of diabetes mellitus and the activity is related to the phytoconsituents. Herbal remedies are containing important chemical constituents such as phenolic substances, terpenoids, coumarin compounds which have reported to indicate the decrease in the blood glucose levels. There are different varieties of the plants are mentioned in the ancient and documented literature which are having potential hypoglycemic activity. Due to the highly potential activity, lesser side effects in the clinical levels, more economical, these natural drugs are most preferred.

Botanical name	Parts used	Active constituents	Method of preparation and administration
Allium sativum (Liliaceae) 	Bulbs	Allyl propyl disulphide, allicin	Bulbs of *Allium sativum* are cooked and eaten as a currywith other foods. Bulbs are boiled in water and drink twice a day. Equal amounts of bulbs, leaves of *Murrayakoenigii* and rhizome of *Zingiberofficinale* are ground together to make a paste and this chutney is eaten with other foods.
	Momord ica charanti a		once or twice a day.
Murrayakoenigii (Rutaceae) 	Leaves	Carbazole alkaloids	Fresh leaves of are pounded and juice is extracted by squeezing. 120 ml. of the juice is given early morning to the empty stomach. Decoction is prepared with 60 gm. of dried leaves and 120 ml. is given twice a day. 60 gm. of dried leaves are to be boiled in 1920 ml. of water until the volume reduce to 240 ml. 120 ml. of the decoction is given twice a day.
Azadirachta indica (Meliaceae) 	Stem, Leaves	Nimbin, imbinine, nimbidine	Decoction is prepared with 60 gm. of dried stem bark and 120 ml. is given twice a day.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 14, May 2026
Impact Factor: 8.2

7.1 Aspects Of Global Diabetes Prevention Include:

• Public Health Strategies: The WHO aims to strengthen national responses by setting targets 2030, including ensuring 80% of people with diabetes are diagnosed and 80% have good control of glycemic levels.
• Lifestyle Interventions
• Diet: A diet rich in fruits, vegetables, and fiber-rich whole grains while low in processed sugars is crucial.
• Physical Activity: Regular activity—at least 150 minutes of moderate-intensity exercise per week—is recommended.
• Weight Management:Reducing obesity is the most effective approach for preventing Type 2 diabetes.
• Medical Interventions:For high-risk individuals, pharmaceutical agents such as metformin are used to delay or prevent the onset of diabetes in those with pre diabetes.
• Community Efforts: Implementing workplace wellness programs and policies for healthier food options are crucial.

7.2 Herbal medicine

Herbal remedies are considered as an alternative and complementary therapy for the chemical drug treatment, and used as art and science for restoring the diseased individual to the normal healthy conditions by the implementation of these remedies from the natural origin. The traditional medicine containing herbal remedies are defined as per World Health Organization consist of therapeutic treatments which is in existing from years of the years than that of initiation and spreading of the modern and newer treatment and is still practiced till date. Generations of the practicing physicians are using these traditional medicines over the past 100 years. The preparations from the traditional system of medicines consists of various products such as medicinal plants, mineral drugs, organic matters those are importantly applied for the treatments of diabetes mellitus. From the years 5000 ago, it has been reported to be used in the various countries such as India, China, Egypt, Greek and Rome. These traditional system is reported into Indian literature such as Atherveda, Rigveda, Charak and Sushrut Samhita. From the traditional ancient knowledge and scientific heritage these herbal remedies from natural sources are identified. These herbal remedies are considered as important in the treatment of various diseased conditions and considered as a still popular amongst various remedies. In these days, the entire world is concentrating research for evaluating these plant based and natural remedies for the search of newer remedies as one of the treatments of diabetes mellitus.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 14, May 2026
Impact Factor: 8.2

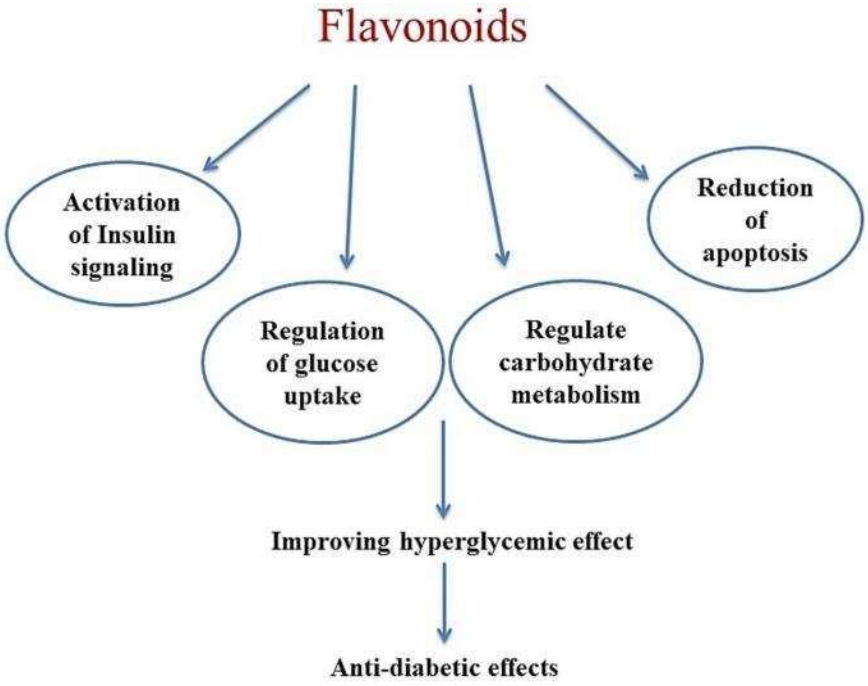


Fig: 5 Anti-diabetic mechanisms of flavonoids.

• Polysaccharides:

Polysaccharides are bioactive macromolecules originating from plants, fungi, and microbes. Polysaccharides function in multiple capacities, such as elevating serum insulin levels, reducing blood glucose levels, and improving glucose tolerance. Hypoglycaemia has been observed to respond favourably to natural polysaccharides. Cinnamomumzeylanicum separates L-arabino-D-xylan, cinnzeylanin, cinnzeylanol, and D-glucan. These chemicals regulate the breakdown and absorption of carbohydrates.

• Terpenoids in diabetes mellitus:

Terpenoids, or isoprenoids, constitute a diverse category of naturally occurring chemical substances derived from isoprene units. Their capacity to modulate blood glucose levels has been examined. Terpenoids with antidiabetic properties, such as olive leaves containing oleanolic acid, enhance insulin sensitivity. Apples and basil possess Ursolic acid, which

DOI: 10.48175/IJARSCT-36140

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 14, May 2026 Impact Factor: 8.2

7.5 Traditional Medicinal Plants with Antidiabetic Potential

Traditional medicine uses over 800 plant species worldwide to manage diabetes, focusing on lowering blood sugar and enhancing insulin sensitivity.Modern medicine is now looking at how these traditional sources can be used to treat and manage diabetes either along with conventional medications or on their own. The source and purity of an herb is crucial for effectiveness and to minimize any possible side effects. Professional guidance is always advised when using herbal remedies. Research has been conducted on many sources of medicinal herbs including the following:

1. Curcumin (Turmeric)

Curcuma longa Linn, belonging to family Zingiberaceae, is reported as a potent herb in Ayurveda system of medicine to combat diabetes. A commonly used food spice that has been traditionally used for pain and wound healing but also appears to inhibit autoimmune disease by regulating inflammatory cytokines. Research has shown that curcumin may be 400 times more powerful than the common diabetes drug Metformin in improving insulin sensitivity and helping to reverse type 2 diabetes. Curcumin, the active component in turmeric.

Fig: 6 Curcumin

Phytochemistry of C. longa: The rhizomes of C. longa consist of a large number of phenolic compounds. Curcuminoids are the major active constituents present in the rhizomes. Curcuminoids are the mixture of three related compounds namely Curcumin, Demethoxycurcumin, and Bisdemethoxycurcumin among this curcumin constitute about 60% of total curcuminoids.

• Antidiabetic effect of C. longa

Various studies have shown the hypoglycemic activity of rhizomes of C. longa. Seo et al. investigated the glucose-lowering potential of curcumin in diabetic db/db mice. A significant decrease in blood glucose and HbA1c levels were observed in animals treated with curcumin. A further study reported the improvement in glucose homeostasis, glucose tolerance, and elevated plasm insulin levels by the administration of curcumin. A study reported the suppression of increased blood glucose levels in Genetically Diabetic KK-Ay Mice by ethanolic extract of C. longa.

2. Eugenia jambolana

Eugenia jambolana (black plum or jamun) belongs to the family Myrtaceae. The most commonly used plant parts are seeds, leaves, fruits, and bark. Eugenia jambolana is an evergreen tropical tree of 8 to 15 m height, with smooth, glossy turpentine-smelling leaves. The bark is scaly gray, and the trunk is forked. There are fragrant white flowers in branched clusters at stem tips and purplish-black oval edible berries. The berries contain only one seed. The taste is generally acidic to fairly sweet but astringent. This tree is known to have grown in Indian subcontinent and in other regions of South Asia such as Nepal, Burma, Sri Lanka, Indonesia, Pakistan, and Bangladesh from ancient time.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 14, May 2026
Impact Factor: 8.2

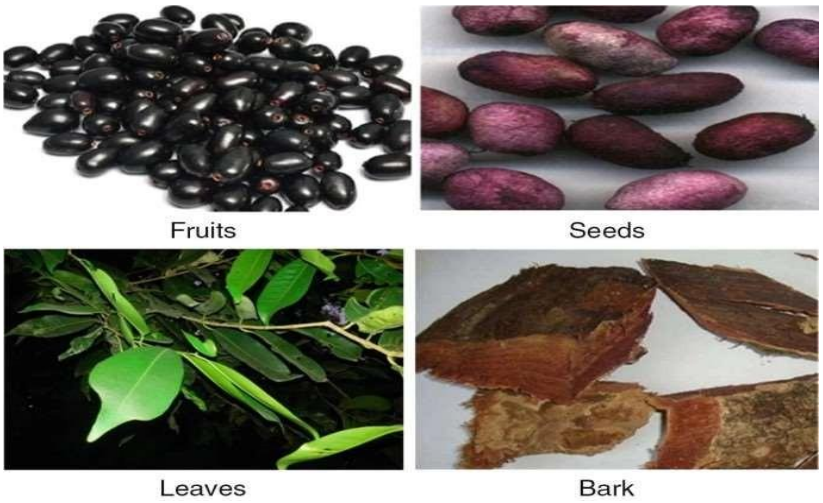


Fig: 7 Eugenia jambolana

Jamun has been reported to be used in numerous complementary and alternative medicine systems of India and, before the discovery of insulin, was a frontline antidiabetic medication even in Europe. The brew prepared by jamun seeds in boiling water has been used in the various traditional systems of medicine in India

Eugenia jambolana is one of the widely used medicinal plants in the treatment of diabetes and several other diseases. The plant is rich in compounds containing anthocyanins, glucoside, ellagic acid, isoquercetin, kaempferol, myricetin, and hydrolysable tannins (1-0-galloyl castalagin and casuarinin). The seeds also contain alkaloid jambosine and glycoside jamboline, which slows down the diastatic conversion of starch into sugar.

The whole plant of Eugenia jambolana is reported to show antioxidative defence due to numerous phytochemical constituents present in it. The bark of jamun is rich in several bioactive compounds including quercetin, betulinic acid, B- sitosterol, eugenin, ellagic and gallicacid,bergenin, tannins and flavonoids. Fruits contain glucose, fructose, raffinose , malic acid , and anthocyaninsleaves are rich in acylatedflavonol glycosides , quercetin, myricetin, and tannins all of which have hypoglycemic ability.

3. Costuspictus D. Don

Costuspictus D. Don (family: Zingiberaceae) is a rhizomatous medicinal herb which is popularly known as 'Insulin plant' for its strong antidiabetic efficacy. It demonstrated antidiabetic action by the inhibition of α-amylase and α–glucosidase activity. C. pictus can also improve the secretion of insulin in diabetic rat models along with improvement in glucose utilization. It has been found that upon the administration of aqueous extract of C. pictus to diabetic rats, C. pictus causes a marked reduction in blood glucose levels and an increase in plasma insulin level.Earlier researchers also found that β-amyrin and methyl tetracosanate are

the major bioactive phytoconstituents which exhibited ameliorated glucose uptake in3T3-L1 adipocytes. In another study conducted on C. pictus, β- L-Arabinopyranose methyl glycoside was reported responsible for antidiabetic property .

DOI: 10.48175/IJARSCT-36140

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 14, May 2026
Impact Factor: 8.2

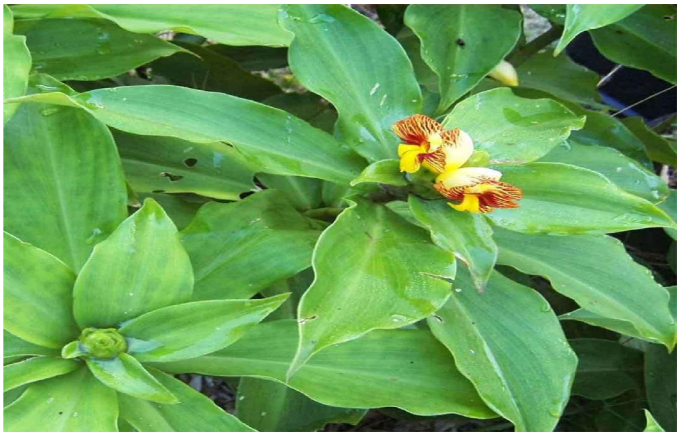


Fig:8 Costuspictus D. Don

4. Momordica charantia

Momordica charantia (bitter gourd or karela) belongs to the family Cucurbitaceae. Fruit as a whole and fruit's seeds are the parts most frequently used for therapeutic benefits. Momordica charantia is a popular fruit used for the treatment of diabetes, cardiovascular diseases, and related conditions amongst the indigenous population of Asia, South America, and East Africa. It is often used as a vegetable in diet. Bitter gourd contains bioactive substances with antidiabetic potential such as vicine, charantin, and triterpenoids along with some antioxidants .Several preclinical studies have documented the antidiabetic and hypoglycaemic effects of Momordica charantia through various hypothesised mechanisms.

Several studies have demonstrated antibacterial, antiviral, anticancer, and antidiabetic activities, in Momordica charantia.however, the antidiabetic activity has been widely reviewed. In several animal studies, bitter gourd has been reported to ameliorate the metabolic syndrome, where diabetes is one of the risk factors .

Fig:9 Momordica charantia

5. Pterocarpus marsupium

Pterocarpus marsupium (indiankino tree, bijasar) belongs to the family Fabaceae. Plant parts used most commonly are heart wood, leaves, flowers, bark, and gum. Pterocarpus marsupium grows very well in India, Nepal, and Sri Lanka. As

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 14, May 2026
Impact Factor: 8.2

per Ayurveda, it is one of the most versatile medicinal plants with a wide spectrum of biological activities. Every part of the tree has been acknowledged for its therapeutic potential. This tree grows up to 30 metres in height. Compositional studies on bijasar have shown this plant to be a good source of polyphenols. P. marsupium contains terpenoids and phenolic compounds: β-sitosterol, lupenol, aurone glycosides, epicatechins, and iso-flavonoids.P. marsupium is known for its antidiabetic activity.

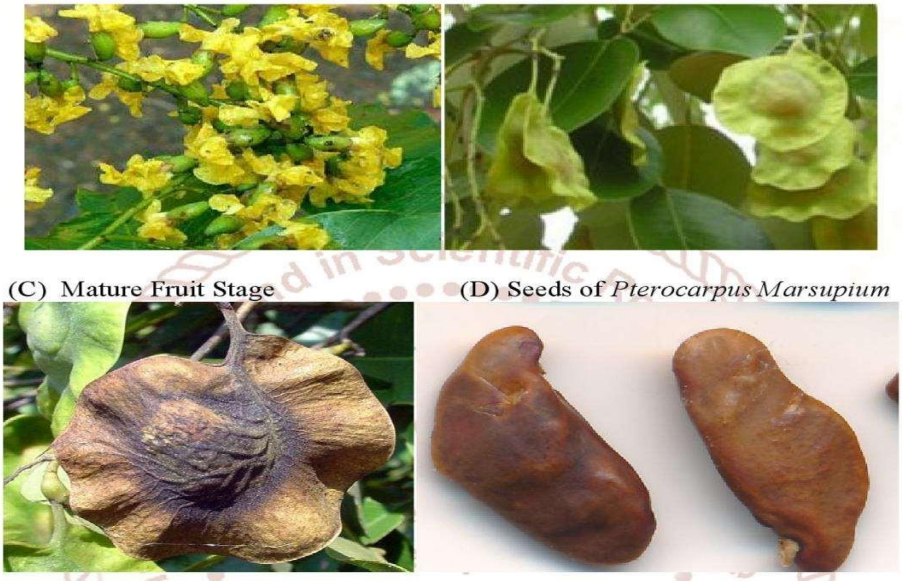


Fig: 10 Pterocarpus marsupium

Important Of Plant Products

Plant products are crucial for managing diabetes by providing natural, cost-effective, and low-side-effect compounds that help manage blood sugar, enhance insulin sensitivity, and combat oxidative stress. Rich in phytochemicals like flavonoids, alkaloids, and polyphenols, these plants act through various mechanisms—such as slowing carbohydrate absorption or improving pancreatic function—to support glucose regulation.

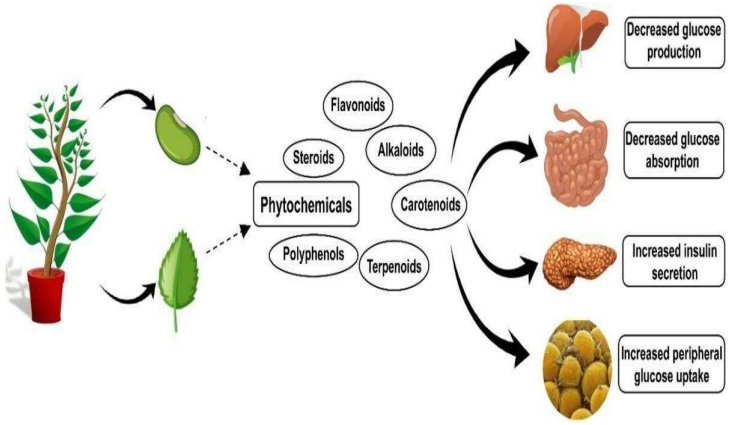


Fig: 11 Role of bioactive phytochemicals in plant seeds and leaves

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 14, May 2026
Impact Factor: 8.2

CONCLUSION & FUTURE PERSPECTIVES

A collection of anti-diabetic plants used in the treatment of diabetes mellitus has been reviewed in this article. Several shreds of scientific evidence have proved that those phytochemicals possess antihyperglycemic potentials and can be effectively implicated in the management of diabetic and metabolic complications avoiding notable side effects exerted by conventional drugs. Although dietary and non-dietary plants are always considered as promising avenues of remedies to treat different types of disease states, together with diabetes and others, many plants and plant-derived bioactive phytoconstituents have not yet been researched well. In order to explore and validate proper mechanistic pathways of pharmacological activities demonstrated by the reported antidiabetic phytochemicals, further investigations are warranted. In spite of considering plants and/or dietary plant materials as safe for intake, yet the prospective antidiabetic phytochemicals should also be evaluated for toxicity studies for the establishment of there peutically effective and safe phytomedicines.

Future Perspectives

The plants are to be effectively implemented according to the traditional literature, also WHO Guidelines applied for their safer use, to ensure consistency, potency and standards of these Medicines. Many of the research centers are now working to overcome challenges in plant based Drug discovery resulting into number of clinically important leads thus, can considered to be one Of the essentially important sources for establishing newer medicinal agents. For identification of Newer lead molecules used in the treatment of diabetes theses different herbal sources should be Studied in detail. Various different methods are available for confirming and establishing these Newer molecules from natural sources especially related to the plant sources from higher Taxonomy. One of the approaches is just finding newer molecules and their evaluation for Various pharmacological activities, but this approach is considered as a wide one. A second Approach is considered as the random collection and wide screening which includes, collection of Easily available plants, extractions, testing of these extracts for more number of pharmacological Potentials.

REFERENCES

1. Alberti KG, MM, Zimmet PZ (1998); Definition, diagnosis and classification of diabetes mellitus and its complications. Part 1: Diagnosis and classification of diabetes mellitus. Provisional report of a WHO Consultant. Diabetes Medicine 15: 539-553
2. Samreen Riaz, Diabetes mellitus, Scientific Research and Essay, May 2009, Vol. 4 (5):367-373
3. Gordon B. Myers, The Oral Glucose Tolerance Test: A Review of the Literature, American Journal of Clinical Pathology, Volume 5, Issue 4, 1 July 1935, page, 299-312.
4. V. Mohan, S. Sandeep, R. Deepa, B. Shah, C. Varghese, Epidemiology of type 2 diabetes: Indian scenario, Indian J Med Res 125, March 2007: 217-230
5. Turner R, Cull C, Holman R, United Kingdom Prospective Diabetes Study 17: a 9-yearupdate of a randomized, controlled trial on the effect of improved metabolic control on complications in non-insulin-dependent diabetes mellitus, Ann. Intern. Med.124: 136-145
6. Amarnath shukla, H. M. Shukla, ANTIDIABETIC HERBAL DRUGS: A REVIEW, International Ayurvedic Medical Journal, IAMJ: Volume 3; Issue 1; January – 2015,134-147
7. Sonia Verma, Madhu Gupta, Diabetes Mellitus Treatment Using Herbal Drugs, International Journal of Phytomedicine 2018;10(1):1-10