



## TRADITIONAL PLANT USED AS A ANTIDIABETIC

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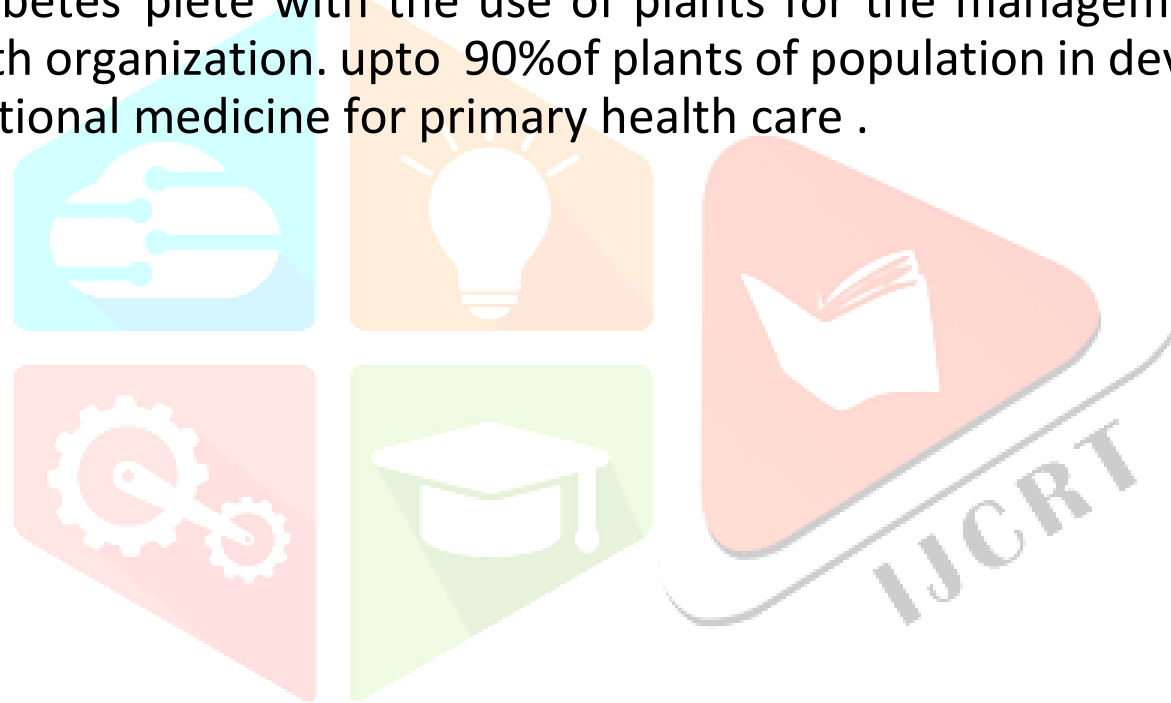
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- **ABSTRACT** : Diabetes mellitus is one of the major health problem in the world. The incident of associated mortality are increasing inadequate regulation of blood sugar imposes serious consequences for health . Conventional antidiabetic drugs are effective .however ,also with unavoidable side effects . The Indian traditional system of medicine is replants are always a source of drugs for human use since ancient time . The Indian traditional system of medicine is based on the use of plants for the management of diabetic condition . There are about 800 plants which have a potential to cure a diabetes . Diabetes mellitus is one of the major health problems in the world because of improper regulations of the blood sugar imposes a serious consequences for health. Diabetes has become a major public health problem across the globe . Diabetes is a chronic metabolic disorder characterized by increased glucose level in the blood due to a

absolute deficiency of insulin action . India is a large country composed of people of different traditions, and heritages . This rich cultures and traditions is reflected not in daily life but also in health practice . Plants are used traditionally throughout the globe to treat various disease . Traditionally used medicinal plants are an essential part of health . Rural people from developing country are greatly dependent on traditional source of medicine. Diabetes plete with the use of plants for the management of diabetic conditionts . According to world health organization. upto 90%of plants of population in developing countries use plants and its products as traditional medicine for primary health care .



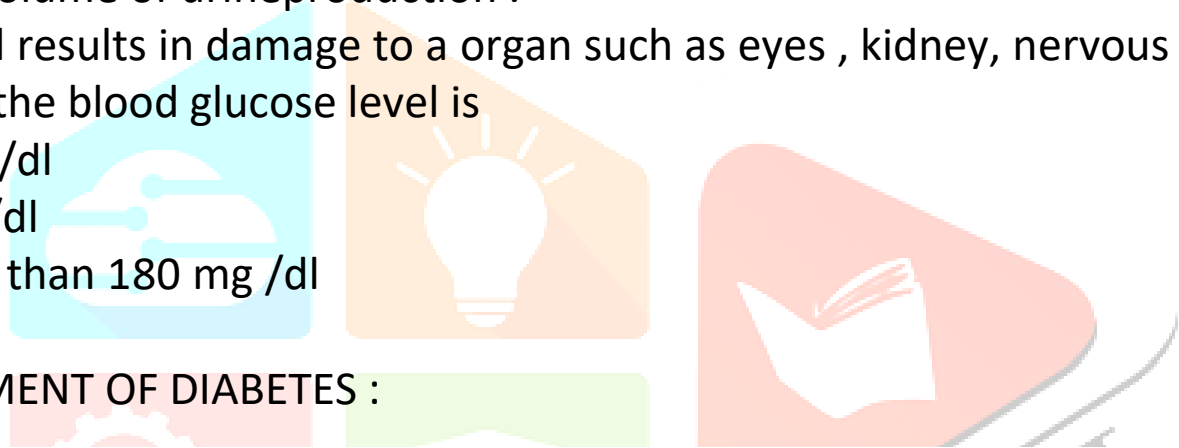
**KEY WORD** - diabetes, medicinal plants ,antidiabetic , hypoglycemic, antihyperglycemic . **INTRODUCTION**

– Diabetes is a serious disease that occurs when your body has difficulty in properly regulating the amount of dissolved sugar in your blood stream . Symptoms of diabetes mellitus include : 1] increased thirst  
2] increased frequency and volume of urineproduction .

increased blood glucose level results in damage to a organ such as eyes , kidney, nervous system and blood vessels. In normal individual the blood glucose level is

- 1) fasting – less than 100 mg/dl
- 2) before meal – 70 -130 mg/dl
- 3) after meal (1-2 hrs ) – less than 180 mg /dl
- 4) bed time – 100- 140 mg/dl

**PLANTS USED IN THE TREATMENT OF DIABETES :**



FAMILY	SPECIES	DISTRIBUTION AREA TRADITIONALLY USED	AND PART USED	COMMENT
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Ephedraceae	Ephedra distachya	E . Africa	All	A,B,C,D,E and L-ephedrine have antihyperglycemic activity
Lauraceae	Actinodaphne hookeri	India	Leaf	Used to treatment of diabetes



FAMILY	SPECIES	DISTRIBUTION AREA	AND PART USED TRADITIONALLY USED	COMMENT
Araceae	Scindapsus officinalis	India	All	Fruit have a antidiabetic activity
Diosceraceae	Dioscorea japonica	E.Asia	Tuber	Dioscerans Aand F have hypoglycemic activity
Liliaceae	Lilium acratum	Japan	Bulb	Used to treat diabetes
Orchidaceae	Orchis latifolia	India	Root	Used to treat diabetes
Poaceae	Oryzasativa	subtropics	Root, Seeds	Contains oryzaqbrans with antidiabetic activity



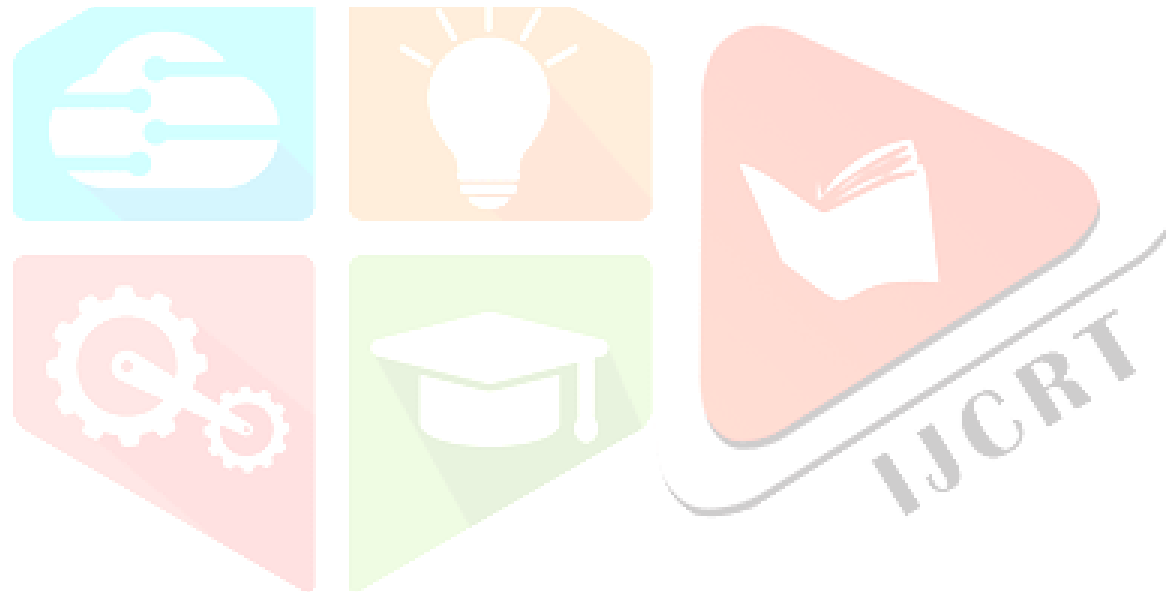
FAMILY	SPECIES	DISTRIBUTION AREA TRADITIONALLY USED	AND PART USED	COMMENT
Berberidaceae	Berberis vulgaris	India, Africa, Europe	Root	Berberine decreases the blood glucose
Ranunculaceae	Aconitum violaceum	India	Root	Used to treat diabetes
Liliaceae	Alivum sativum	China, East and southern Africa, Asia	Bulb	Allicin help to decreases the blood glucose level
Laminaceae	Oscimum sanctum	India, Southern Asia	Fresh and dried leaves	Eugenol, Methyl , Ether used for Antidiabetic purpose .

Fabaceae

Trigonella foenum  
graceum India

Leaves,Seeds

Trigonelline used to  
decrease the glucose  
level.





Asphodelaceae

Aloe vera

south-east Arabian Peninsula in the Al Hajar Mountains in north-eastern Oman.

Gel and latex obtained from the leaf

Used for overcome the diabetes

Diabetes mellitus is a disorder in with common end result of raised blood glucose. Two main types of diabetes account for more than 95% of all cases of diabetes . A minority of cases are due to various specific metabolic or genetic causes. Type 1 Diabetes usually present in or young adults with symptoms of diabetes [ Thirst , increased urination, tiredness , blurred vision ] associated with weight loss . Peak incidence is between 11and 13 years , although it may present at any age . Hyperglycemia occurs due to a lack of the effect of insulin to production of glucose by the liver . In the absence of insulin lipolysis occurs and increased amounts of free fatty acids reach the liver . Type 2 Diabetes usually presents in adults

over the age of 30 with the symptoms of diabetes or a complication related to diabetes or as a chance finding in an asymptomatic individual . Patients with type 2 diabetes may be managed by dietary

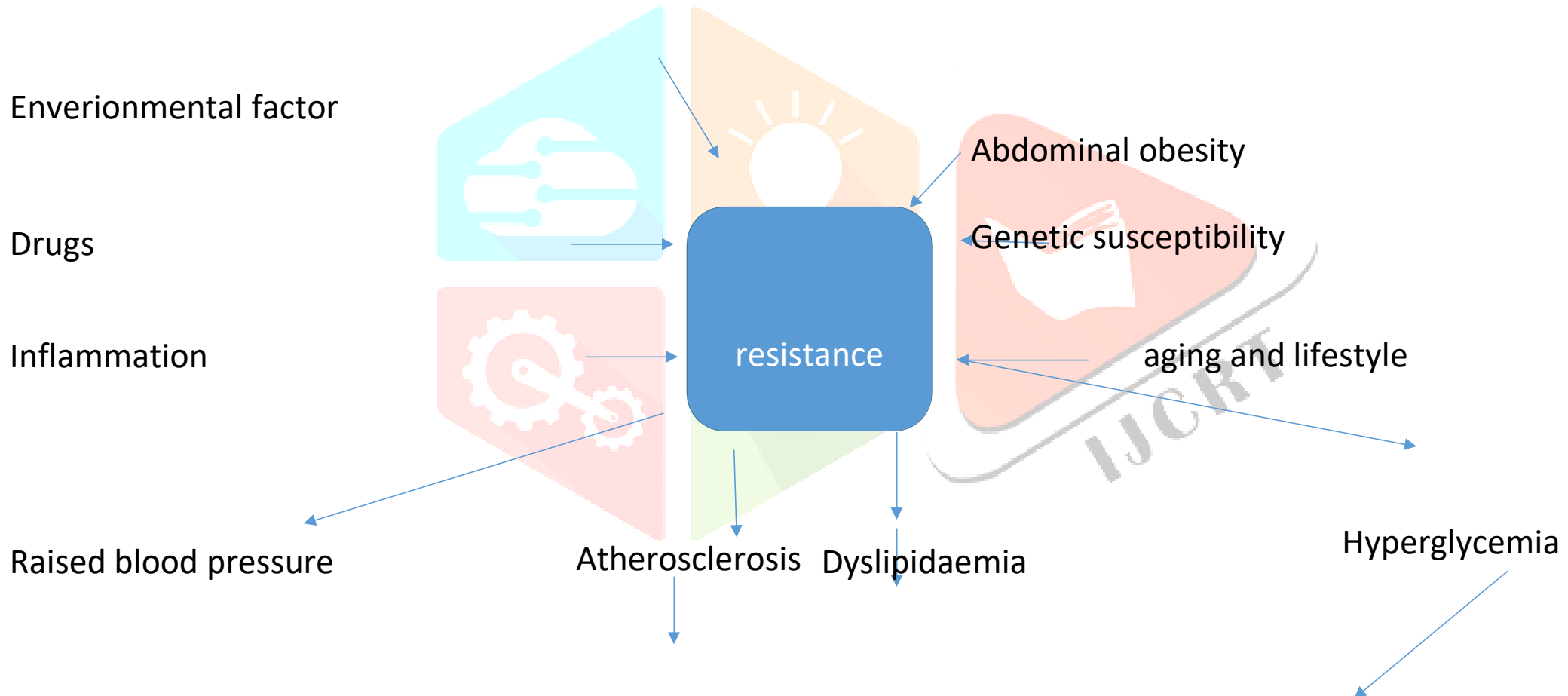


<b>FAMILY</b>	<b>SPECIES</b>	<b>DISTRIBUTION AND AREA TRADITIONALLY USED</b>	<b>PART USED</b>	<b>COMMENT</b>
Piperaceae	Piper nigerum	Africa, India	All	Used to treat diabetes
Poaceae	Zea mays	Universal	Styles, seed	Contains resistant starch thought to have antidiabetic properties.
Zingiberaceae	Curcuma Longa	India	Root	Hyponid that reduces the blood glucose.

Berberidaceae	Berberis vulgaris	India, Africa, Europe	Root	Berberine decreases the blood glucose level
Ranunculaceae	Aconitum violaceum	India	Root	Used to treat Diabetes



Change, exercise prescription, oral drug therapy, or insulin therapy .Near about 1000 plants have property to reduce the hyperglycemia.



## Coronary heart disease peripheral vascular disease

Fig. A schematic representation of the insulin resistance syndrome . Insulin resistance with or without compensatory hyperinsulinemia is associated with a clustering of a risk factors for premature coronary heart disease



## 1. NEEM

### BIOLOGICAL SOURCE



### CHEMICAL CONSTITUENT: Azadiractin

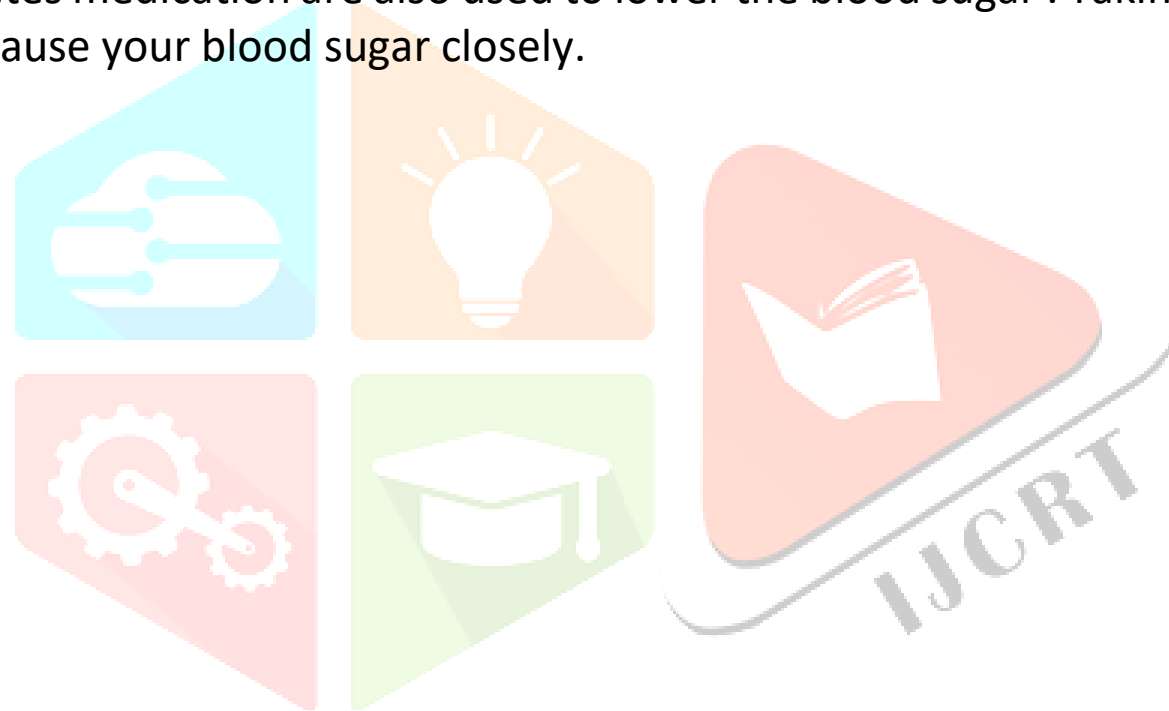
Azadirachta indica FAMILY :  
Meliaceae

Azadirachta Indica has been used medicinally throughout history of many different cultures . The compounds which are found in the azadirachta indica plant that have been used medically by human being . We have examined the pharmacological hypoglycemic action of azadirachta indica in diabetes rats . After treatment for 24hrs azadirachta indica 250 mg/kg demonstrated glucose levels were significantly less compared to the control groups .Azadirachta indica [Neem ] is a medicinal plant , used in ayurveda for treating various disease, one of which is a diabetes mellitus .Azadirachta indica anti-inflammatory , antidiabetic, antimicrobial antipyretic and other pharmacological properties . Azadirachta indica is well known in India and its neighbouring countries as one of the most versatile medicinal plants having wide spectrum of biological activity . During the last five decades considerable progress has been achieved regarding the biological activity and medicinal applications of a neem .

Neem whole plant is extensively used in ayurvedic system medicine for various skin disorder and diabetes . Nature has served this plant with various organic compounds that are used as insecticides and pesticides .

Neem is a major herb with antifungal , antibacterial, antidiabetic , antiviral , and antihelminthic properties in Ayurveda.

5gm dry leaves/ fruit powder with lukewarm water empty stomach twice in a day helps in certain cases of NIDDM [ initial stage] . Diabetes medication are also used to lower the blood sugar . Taking neem along with diabetes medication might cause your blood sugar closely.





\* Advantages of Neem leaves for diabetes :

1. Neem leaves are loaded with glycosides , triterpenoids , antioxidants and flavonoids , which posses anti inflammatory , antimicrobial and atidiabetic properties several studies have revealed that the antidiabetic properties of neem leaves aid insulin to increase the uptake of glucose into fat and muscle cells . And hence , helps in monitoring glucose level in the body.
2. we can consume neem leaves depending upon your lifestyle and comfort . It is beneficial to have neem leaves on an empty stomach early in the morning .
3. Some time in rare cases overconsumption of neem leaves may cause your blood glucose levels to go too low. hence , it is always best to monitor your blood glucose level .



## 2. TURMERIC

BIOLOGICAL SOURCE : *Curcuma longa*

FAMILY : Zingiberaceae

CHEMICAL CONSTITUENT: Curcumin



Turmeric [*curcuma longa*] a rhizomatous herbaceous perennial of the ginger family has been used for the treatment of diabetes in ayurvedic and traditional Chinese medicine. The active component of a turmeric, curcumin has caught attention as a potential treatment for a diabetes because it is a safe and inexpensive drug that

Curcumin can inhibit hyperglycemia, oxidative stress, and the inflammatory process caused by Diabetes Mellitus in addition, and consequently inhibits the systemic complications of the disease such as hypertension, dyslipidaemia, Neuropathy, According to studies or investigation the safety of turmeric, standardized powder and extract of turmeric and curcumin are for human use even in high doses of 6gm/day for seven weeks.

Hyperglycemia

Oxidative stress

Inflammatory process

Hypertension

Dyslipidemia

(-)

Curcuma longa [Curcumin]

(-)

Systemic complication

Neuropathy

Endothelial dysfunction

Fig: Effects of curcumin [Note – (-) decreases]

### 3. Acacia Arabica



BIOLOGICAL SOURCE: Acacia Arabica FAMILY : Leguminosae

CHEMICAL CONSTITUENT: Agarose and agarpectin

The currently available oral hypoglycemic and antihyperglycemic drug for type 2 diabetes have their own limitations. Reduce cost and adverse effect focus is shifted towards medical herbs for safe and effective use. year ago lots of medical herbs investigated for their role in pharmacotherapy of diabetes .(Asia , Israel , Somalia , Pakistan , India ) . Various extracts of babool plants used as like smooth muscle relaxant , antimicrobial activity against Bacillus subtilis , Staphylococcus aureus , Candida albicans , Antiplasmodial activity . Acacia Arabica extract has hypoglycemic , hypolipidemic and antioxidant properties and used in the treatment of diabetes in human. It acts as a antidiabetic agent by acting as secretagogue to release insulin . It induces hypoglycemia in control rats but not alloxanized animals , Powder seeds of acacia Arabica when administered. After investigation the antidiabetic effect of ethanolic extracts of acacia tortilis leaves and its protective effect in

Preventing the secondary complications of diabetes mellitus . Decrease the lipid level is a traditional use of plant Acacia Nilotica can be used as a better therapeutic approach for management of both 1 and type 2 diabetes as it may improve beta cell regeneration , biochemical indicator and reduce the cellular stress . It is found in Asia , Africa , Australia . It is used against cancer , diabetes mellitus , inflammation , fever , menstrual problems and diarrhea . Agar gum is the plant extract of acacia its combination with gliclazide to increase its antidiabetic activity , antioxidant activity , and decreases its adverse effect in the treatment of diabetes mellitus . , also increase HDL-C was observed in the treated diabetic group compared to untreated diabetic group .

acacia Senegal ( gumarabic) - gumarabic is a dietary supplement for improving nutrition of type 2 diabetic patients . Acacia ferruginea – fresh stem bark collected from well grow and matured trees from andhrapradesh , india , for treatment of diabetes , skin disease , . Methanol extract of acacia ferruginea act as an antidiabetic activity . Acacia has been also used for relieve pain and irritation . Helps wound healing , reduce body fat , restrict blood loss , good source of fiber .

#### 4. Jamun

BIOLOGICAL NAME : Eugenia jambolana FAMILY : Myrtaceae

CHEMICAL CONSTITUENT : Anthocynin , glucoside , euagic acid , isoquercetin, kaempferol



Eugenia The most commonly used plants parts are seeds , leaves , and barks .Eugenia jambolana is an evergreen tropical tree 8 to 15 cm height . Eugenia jambolana is one of the widely used medicinal plant in the treatment of diabetes and several disease . The plant is rich in compound containing anthocynins , glucosides , ellagic acid , isoquercetin , kaempferol , myricetin and hydrolysable tannins .

The seed contains alkaloids jambosine and glycoside , jamboline which slows down the diastatic conversion of starch into sugar. Effect of Eugenia jambolana due to increased secretion of insulin from the pancreas or by inhibition of insulin degradation . The blood glucose lowering effect of Eugenia jambolana is also reported to have lipid lowering effect evidenced by reduction of blood cholesterol . Eugenia jambolana presence of flavonoids in the seeds provided the gastric ulcer protective activity to jamun . Jamun shows antiviral activity against goat pox and the highly pathogenic avian influenza virus [ H5N1] . The efficiency of Eugenia jambolana has been tested in preclinical and clinical studies for hypolipidemic , anti-inflammatory , neuropsychological , antiulcer , antibacterial, anti-HIV and antihypertensive activities.

\* Way to include jamun in your diet :

You can eat jamun raw or consume it seed after drying them. Dried jamun seeds can be powdered and consumed with warm milk and water . This drink can be consumed before meals for managing blood sugar level.

The exact mechanism of action of jamun is lowering blood sugar and cholesterol level is not known . Jamun have a property of reducing free radicale and improve the functioning of beta cells of pancreas reducing the sugar level. Glutathione-s-transferase and increased synthesis of glutathione and depletes lipid peroxidation that may have also helped to reduce the sugar level in blood . At molecular level presence of jamun may have upregulated the PPAR gamma and PPAR alpha leading to the suppressed activation of transcription factor including NF-KB,. Nitric oxide synthesis (iNOS). Tumour necrosis factor-alpha (TNF-alpha)and cyclooxygenase causing reduced inflammation and protection against diabetes .

Aside from this jamun may have also upregulated the argement of NrF2 leading to increase in the antioxidant that show the proper functioning of beta cells of pancreas.

## \*Antidiabetic action of Jamun

Jamun

Activation of PPAR gamma

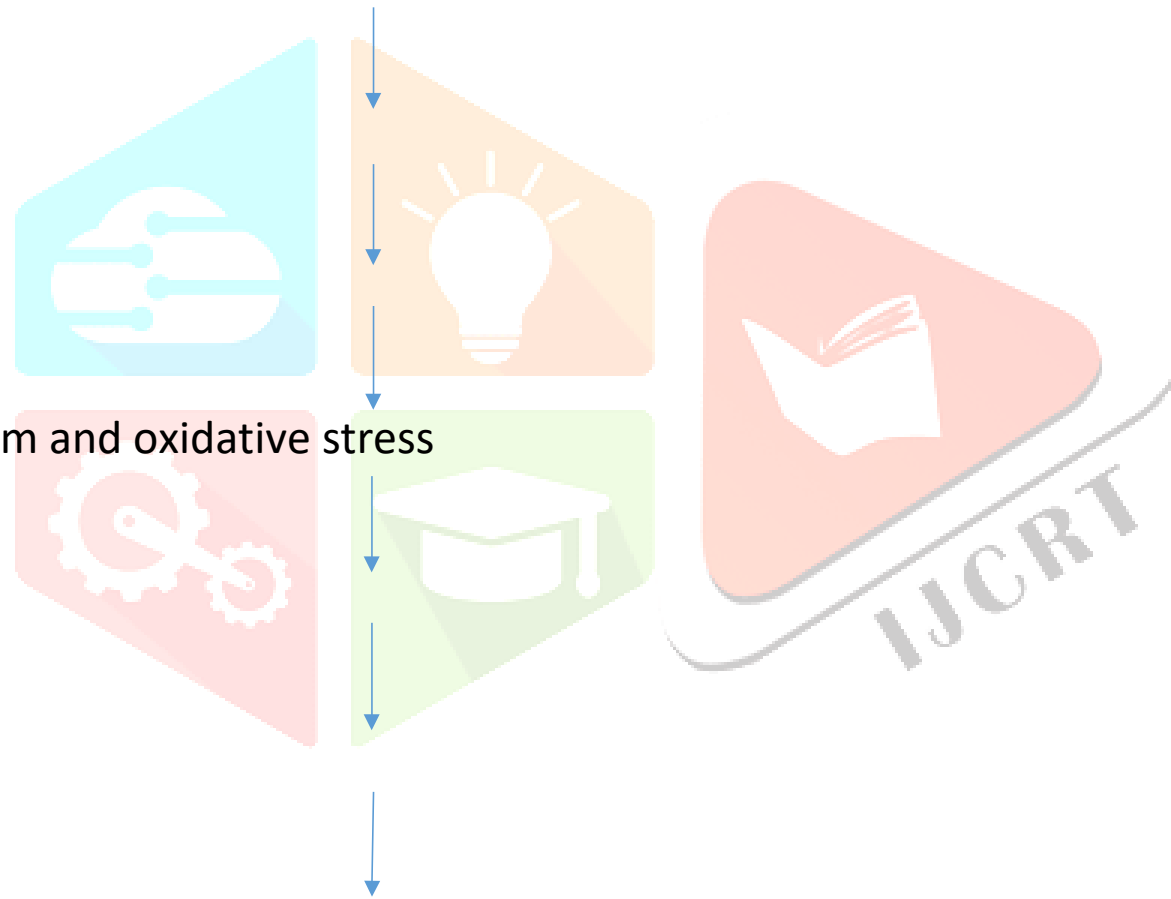
Inhibition of NF-KB

Suppression of inflammation and oxidative stress

Up regulation of insulin

Glucose metabolism

Glycogen synthesis






Hypoglycemic effect



BIOLOGICAL SOURCE : Aloe barbadensis FAMILY : Asphodelaceae

CHEMICAL CONSTITUENT : Aloe emodin

A photograph showing several fresh Aloe vera leaves and a small white container filled with clear, viscous Aloe vera gel. The background is a soft-focus green.

Aloe is obtained from the dried juice of the leaves of . Aloe is green containing more than 500 species of flowering succulent plant .Diabetes is a complex group of disorder characterized by hyperglycemia . Diabetes is a complex group of disorders characterized by hyperglycemia. Aloe vera ( synonym : A. barbadensis Miller ] is a cactus like a plant with green . Dagger shaped leaves which are fleshy . Tapering , spiny, margined and filled with a clear viscous gel . Aloe vera is a old civilization and throughout history it has been used as a popular folk medicine . Aloe vera is mainly present in arid region of india . It is believed to be effective in treating stomach ailments . Gastrointestinal problems, skin disease , anti inflammatory effect , anti ulcer , for wound healing and burns and antidiabetes . Currently Aloe vera is mainly used in skin care , cosmetics , and as nutraceuticals .

\* Active constituents in aloe vera :

Water is major constituent of aloe vera gel , And about 98% of leaf matter . The soluble solids are 0.56% with some seasonal fluctuation and total solid content of aloevera gel is 0.66% . Aloe vera consist of phenolic compound (2%) , lipids (5%) , proteins ( 7%) , minerals (16%) sugars (17%) and and polysaccharide (53% ) .

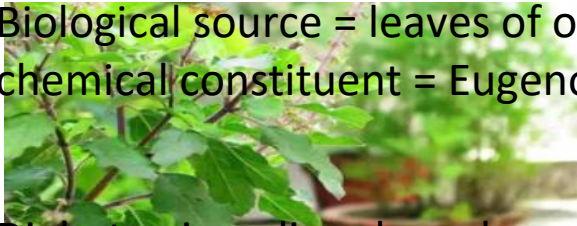
Multiple mechanisms have been reported antidiabetic effects of aloevera plant parts especially its gel , but its antihyperglycemic effect are controversial .

Mechanism includes that alloxan acts as a cytotoxic agents on the insulin secreting beta cells of pancreas and f type . There are frequent time quantities of aloevera does in diabetic mice have shown the hypoglycemic influence by stimulating the synthesis of insulin in the beta cells of pancreas . The frequent supplements of aloevera juice are known to benefit the diabetic patients .



## 6. Tulsi

Biological source = leaves of oscimum sanctum or holy basil Family =Fabiaceae  
chemical constituent = Eugenol



Diabetes is a disorders characterized by the chronic elevated level of blood glucose. Tulsi have a effective property against secretion of glucose. Oscimum sanctum is an Ayurvedic medicine. It manages the diabetes and blood sugar level. Tulsi leaves contains eugenol. Which have a hypoglycemic effect. It also have a antibacterial , antifungal, antipyretic , antioxidant, antiseptic, and anticancer property . Antidiabetic effect of oscimum sanctum in type 2 diabetes patients as so many studies have showed its antidiabetic effect experimentally but from them very few studies are performed to investigate the efficacy in humans . Whole plant extract of oscimum sanctum was for its antidiabetic potential and ability to counter oxidative and inflammatory stress through various in vitro assay. Also tetracyclic triterpenoid isolated from arial part of oscimum sanctum has a great antidiabetic potential . Gene oscimum is a group of apprtoximately 150 species of aromatic plant found mainly in the tropical and subtropical region of the world . of unidentified active substance belonging to these group . Oscimum sanctum is commonly used as cooking vegetables , has shown its potency as a therapeutic herb and has already been proven to safe for long term consumption . Antidiabetic and antioxidant effect of fixed oil extracted from oscimum sanctum leaves . lowered the diabetically elevated blood glucose level and serum lipid levels, they increasing serum insulin level. Oscimum sanctum also called

queen of herb. prandial blood sugar levels in the patients of type 2 diabetes mellitus than who consumed only oral hypoglycemic agent .



\* Health benefits of Holy basil

Helps combat stress

Lower blood glucose level

Has antibacterial properties

Promotes healthy liver function



Lower cholesterol

Boosts immune system

Help in cold and seasonal flu

## 7. Onion

BIOLOGICAL SOURCE: Bulb of allium cepa

FAMILY: Amaryllidaceae

CHEMICAL CONSTITUENT : Allinase , carbohydrate, protein, sugars

Onion ( Allium cepa) is one of the most important crops having extensive application as food and medicine. Onion is a multipurpose plant used in traditional medicines for centuries due to its excellent nutritional and health promoting effect. S-methyl-L-cysteine sulfoxide isolated from onion has antidiabetic , antioxidant and antihypolipidemic effect in alloxan diabetic rats . Fructans are the principal storage carbohydrates in onions with fructooligosaccharides as the main component .

\*health benefits of onion : there are several evidences of onion playing vital role in lowering blood sugar level . The chemical constituent of onion have been found effective in modulating conditions responsible for diabetes. Study suggests that flavonoids result increased secretion of insulin by controlling hormonal release from pancreatic cells which in turn increase the glucose level . Several studies have also highlighted the beneficial effect os flavonol, quercetin in controlling diabetes . Which lowers the glucose level by competing with insulin for insulin inactivating sites in the liver . Resulting an increase in free insulin in the blood have also proved to possess antidiabetic potential by stimulating secretion of insulin . The extract of Onion bulb (Allium cepa) is strongly lowered high blood glucose and total cholesterol level in diabetic rats when the antidiabetic drug metformin , dietary onions and isolated or synthesized active compound in onions. The effect of onion extract prepared by mashing and stirring skin of peeled onion in 1000ml of 95%concentration of ethyl alcohol at 40

degree celcius for 24 Hrs . On increase in postprandial glucose level of SD(Sprague- dawley) rat model where studied by kim.





The experiment revealed a significant reduction in spike of blood glucose level of rat fed with sucrose than the rats where were not treated with onion extracts indicating that the onion extract may be beneficial in lowering the spike in blood glucose level due to inhibition of sucrose in upper and middle part of intestine thereby delaying carbohydrate absorption.

\* onion help control blood sugar: 1. eating onions may help control blood sugar . Which is especially significant for people with diabetes ir prediabetes.

2. A study in 42 people with type 2 diabetes demonstrated that eating fresh red onions reduced fasting blood sugar level by about 40mg/dl after4 hours .

3. the sudy showed that diabetes rat fed food containing 5% onion extrct for 28 days experience decreased fasting blood sugar and had substantially lower body fat than the control group.

5. specific compound found in onions such as quercetin and sulfur compounds possesses anti diabetic effects.

6. for ex. Quercetin has been shown to interact with cells in small intestine, pancreas, skeletal muscles, fat tissue and liver to control whole blood sugar regulation .

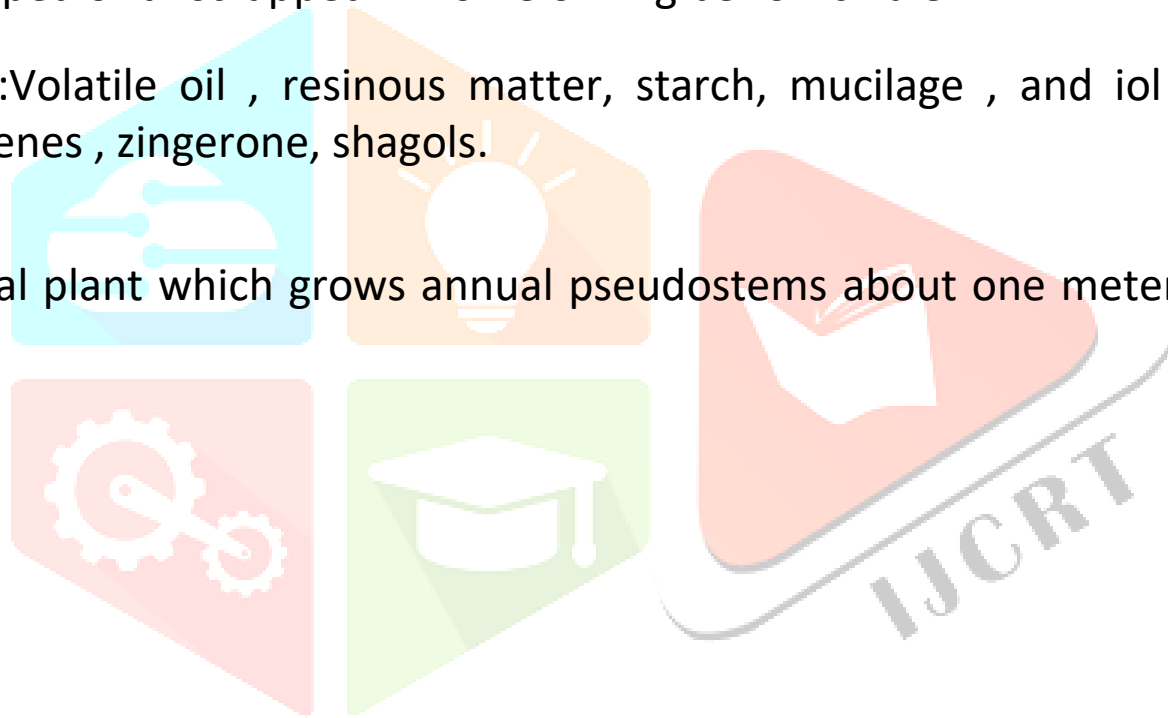
## 8. Ginger :



**BIOLOGICAL SOURCE:** scrapped or unscrapped rhizome of zingiber officinale. **FAMILY :** Zingiberaceae

**CHEMICAL COBNSTITUENT:** Volatile oil , resinous matter, starch, mucilage , and iol of ginger contains monoterpenes , sesquiterpenes , zingerone, shagols.

It is a herbaceous perennial plant which grows annual pseudostems about one meter tall bearing narrow leaf blade.



Most of the ginger arrives in our market. Soil necessary to growth of ginger is rich, loamy and well draining soil for planting. Ginger can be grown directly in ground or pots. Ginger grow upto 4 feet tall and many of the root will appear above ground and it is natural for type of plants. Soil type is important and also hydration, because it need water every day, always keeping the soil moist like it is native rainy environment. Ginger has been used for weight loss and to prevent motion sickness. Ginger, it has antioxidant property, anticancer, antidiabetic, antiinflammatory, antihyperlipidemic, and antiemetic property. Garlic can rightfully be called one of nature's wonderful plants with healing powder. It can inhibit and kill bacteria, fungi, prevented blood clotting and contains anti tumor properties. It also boost the immune system to fight off potential disease and its maintain health. Sulfur compound present in garlic to protection of stimulating the production of certain beneficial enzymes. Diabetes mellitus is a complex metabolic disease characterized by hyperglycemia resulting from defects in insulin secretion. Abnormalities in absorption to metabolism of carbohydrates, proteins, and fat are also keys factors for diabetes and related complication. The ginger family consist of 53 Genera and over 1200 medicinal plant. A primary metabolite (s)-[6]-gingerol-4'-o-B-glucuronide, was detected in the bile and several minor metabolites were found in beta glucuronides treated urine, suggesting that – gingerol undergoes conjugation and oxidation of its phenolic side chain. Oral administration of an ethanolic extract of ginger significantly decrease fasting blood glucose level after 1 hour treatment. It is expected that multiple components in ginger may lead to multiple effects on metabolic pathway and to involve multiple effects on metabolic pathway and to involve multiple mechanisms affecting various aspect of chronic metabolic disorder such as diabetes. Crude ginger contains upto 9%lipids, or glycolipids and about 5-8% o;eoresin. A number of coactive constituents could also contribute to the treatment of vsrious disease. Ethanolic ginger extract (100-140 mg/kg) given by oral given for 6 weeks it suppressed the weight of the body.

Ethanollic ginger extract also lowered the serum glucose and insulin induced by the high fat diet, and it is a dose dependently increase the insulin sensitivity this effect was similar to the control rosiglitazone . It especially insulin resistance , providing a rational basis for the potential medicinal value of the rhizome of zingiber officinale and its traditional consumption for the prevention glucose and lipid disorder . Gingerol increase intracellular  $ca^{2+}$  concentration in a dose dependent manner within 1 minute . type 2 diabetes , but further studies on ginger preparation of defined chemical composition and their specific mechanisms are required . Marketed product such as Insulas it contains ginger also sugar tone it is an anti diabetic tea powder . Oxidative stress and other stresses cause by overnutrition are through to induce inflammatory response that play an important role in pathogenesis of type2 diabetes .

\*uses and effectiveness:

- 1) Painful menstrual periods
- 2) morning sickness
- 3) osteoarthritis
- 4) A bleeding or clotting disorder
- 5) diabetes
- 6) any heart condition

\* side effects :

- 1) sign of an allergic reaction occurs
- 2) difficulty in breathing
- 3) swelling of face, lips, throat , or tongue.
- 4) heartburn , stomach discomfort .
- 5) skin irritation.

## 8 fantastic health benefits of ginger :

Lowers the cholesterol level

Helps to fight Diabetes

Reduces joint and muscles pain

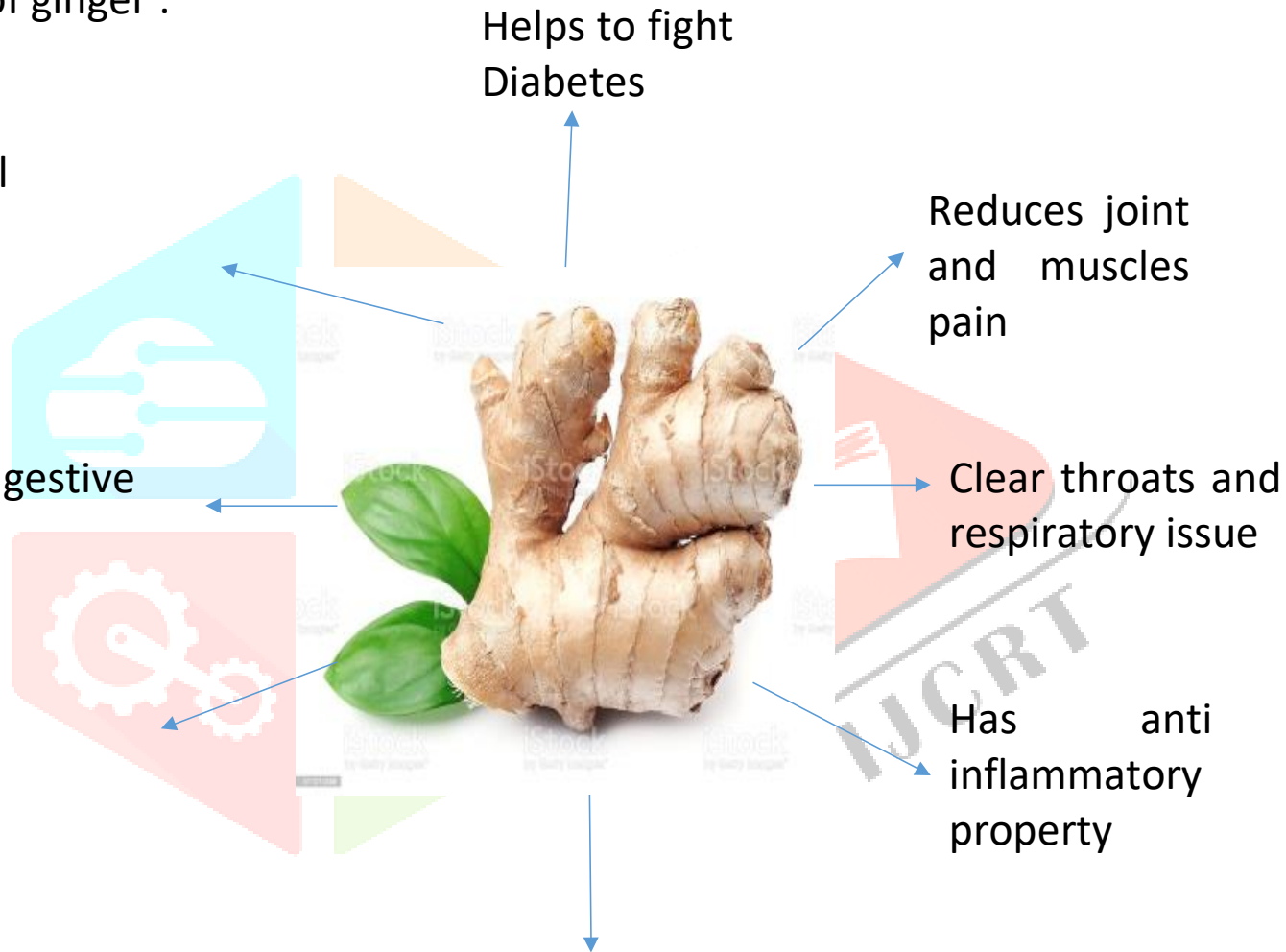
Helps to mitigate the digestive problems

Clear throats and respiratory issue

Fights against infection

Has anti inflammatory property

Helps to maintain brain health



## 9. Bael

**BIOLOGICAL SOURCE :** Slices or irregular pieces of *Aegle marmeloes* corr.

**FAMILY :** Rutaceae

**CHEMICAL CONSTITUENT :** coumarin, xanthotaxol , imperatorin, aegeline, and marmeline.



*Aegle marmelos* (L.) Corr. Is a popular medicinal plant in the ayurvedic and siddha system of medicine. The plant popularly known as bael tree , is native to Indo-Malayan region and is currently cultivated in India , Pakistan , Shrilanka, Burma, Thailand . The tree is slender , perennial , 6-7.5m tall and 90-120 cm in girth. Root is used to treat the diarrhea, dysentery, and dyspepsia . Unripe fruit is useful to treating diarrhea , dysentery, and stomachalgia. The aqueous extract of stem and root bark are used to treat malaria , fever, jaundice, and skin disease such as ulcers, urticarial, and eczema.

*Aegle marmeloes* correa.(bael) fruit exhibits antidiabetic , antihyperlipidemic and antioxidant properties. Oxidative stress induced by alloxan has been shown to damage pancreatitis beta cell and produce hyperglycemia . Oxidative stress produced diabetes related complication in human being . Role of oxidative stress in etiology of human diabetes is not known . Treatment of crude aqueous extract of the leaf and three month old callus brought about to decrease in blood sugar . Organic extract proved to be anti-diabetic . Alloxan is toxic glucose analogue, which selectively destroy insulin producing pancreatic beta cells because it preferentially accumulate in beta cell through uptake via the GLUT2

glucose transporters. The metabolic extracts of aegle marmeloes was found to reduce blood sugar in alloxan diabetes rats.



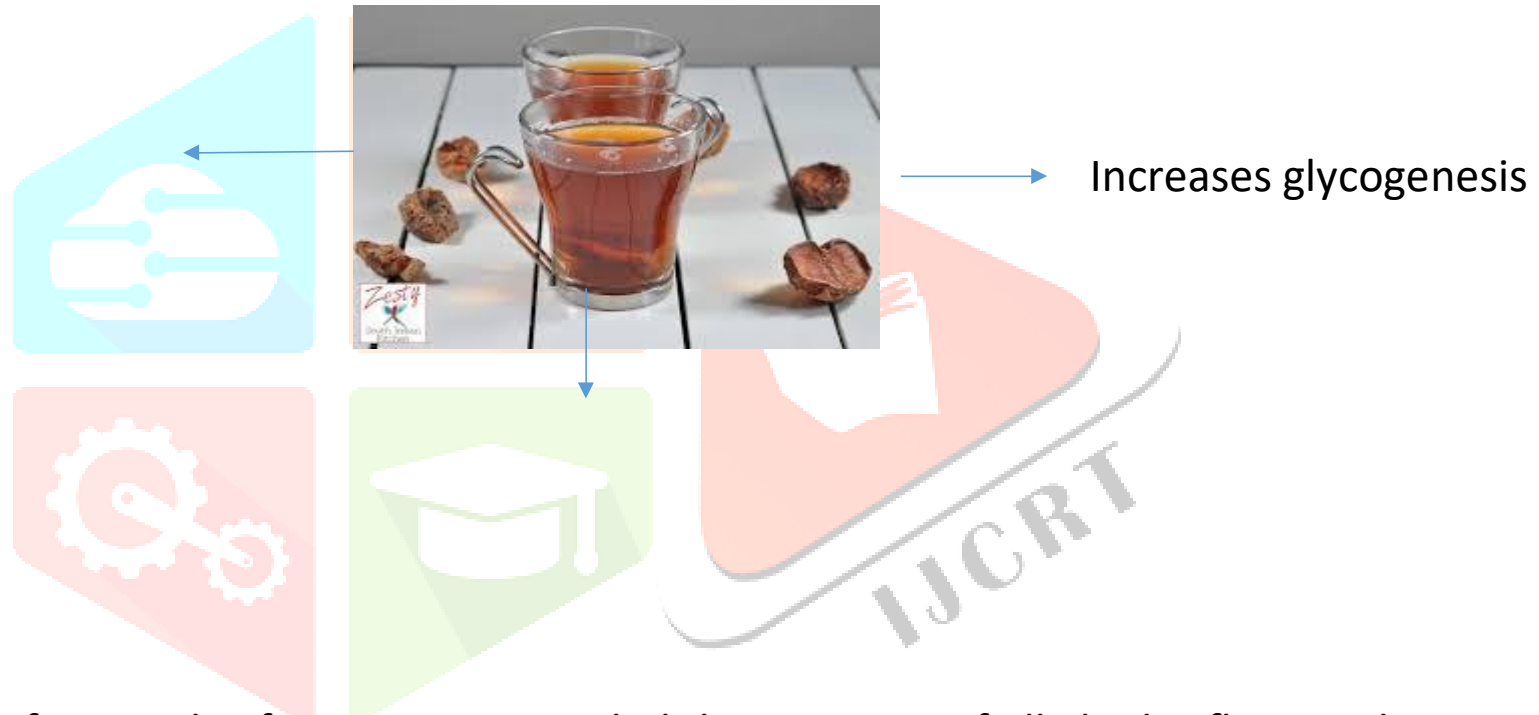
Reduction of blood sugar could be seen for 16<sup>th</sup> day after continuous administration of the extract and on 12<sup>th</sup> day sugar level were found to be reduced by 54%. Bael or wood apple also known as bilva in Sanskrit , Bilva , bilva or maredu phalam in telugu and Bengal quince is a native in India , Malaysia , Thailand, Shrilanka, and southeast Asian countries . Bael fruits are a power punch of various nutrients like beta –carotene, protein , riboflavin, and vitamin c. it is loaded with vitamin B and B2 , thiamine , riboflavin, niacin, carotene, and possesses good amount of minerals like calcium, potassium fiber, and good fats . The antioxidants present in fruit cure gastric ulcer , aid in digestion and treat diabetes. The laxative property prevent constipation and the antifungal components keep infections at bay . Bael leaves have several medicinal benefits , controlling diabetes being just one of them .these leaves are commonly used while performing religious rituals or god Shankar or mahadev. Hence, These leaves are easily available across the country in most local markets. Ayurvedic bael patra powder 100gm. blood sugar management diabetes control. Brand name of ayurvedic bael powder is dindayal ayurved bhawan, dosage such as 5 to 10 gm and ingredients Arjun 100%.bilva leaves are renowned for controlling the blood glucose levels in ones body. Bael is an important medicinal plant in India. Leaves , fruits, stem and roots of A. marmeloos have been used in ethano medicine to exploit its medicinal properties including astringent , antidiarrhoeal, antipyretic and anti inflammatory activities. Compounds purified from bael have been proven to be biologically active against several major disease including cancer, diabetes, and cardiovascular disease.



Increase insulin release

Decrease blood glucose levels

Decrease gluconeogenesis

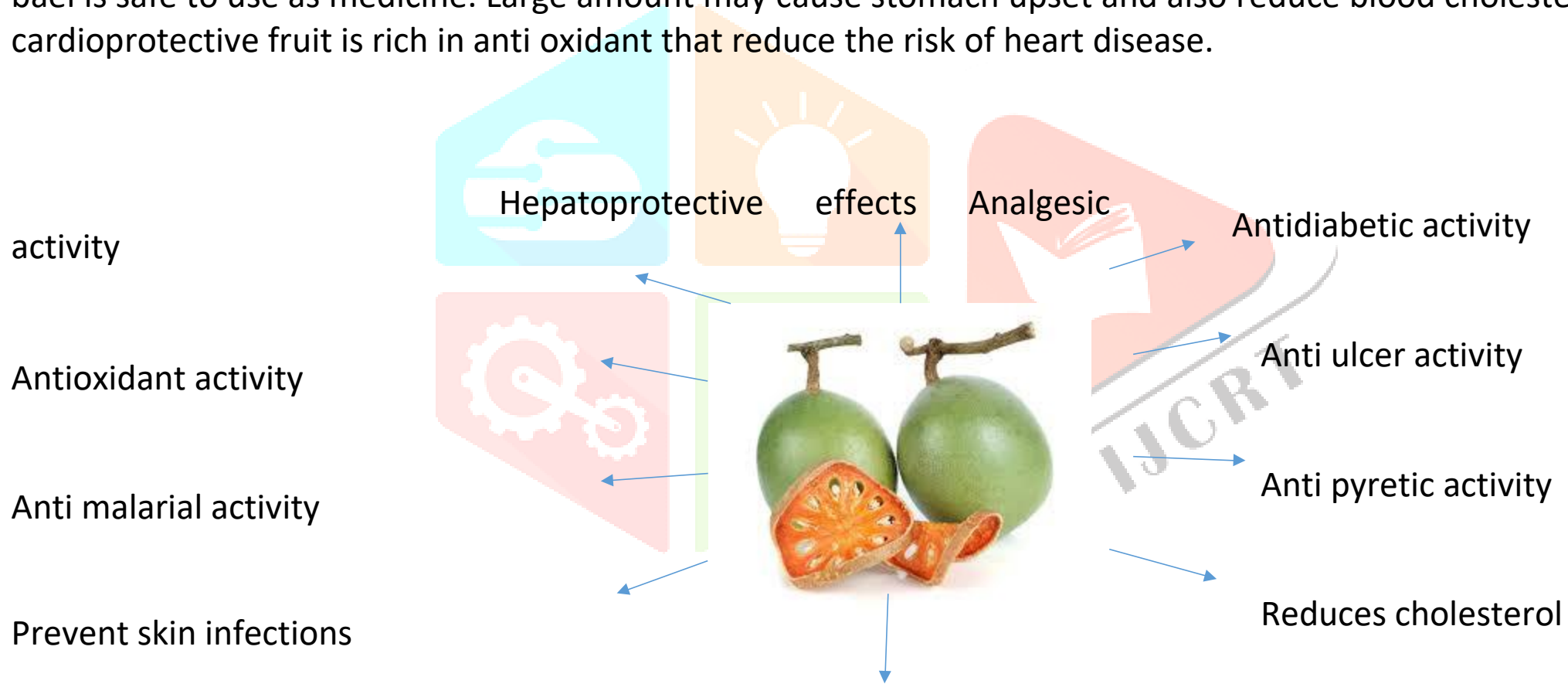


Phytochemical screening of marmelos fruit extract revealed the presence of alkaloids, flavonoids, tannins, coumarin etc. treatment with A. marmeloes fruit extract its improve the biological evaluations, lipid profile, glucose, insulin level. Diabetes mellitus control without side effects is a challenge, drug derived from plant may play important role in the treatment of diabetes mellitus. A. marmeloes fruit possess high nutritional value. The fruit is used to make juice, jam,

syrup, jelly, toffee and other products . A lectin from fruit extract of aegle marmeloes increases glucose uptake in yeast cell 71%at the highest concentration (5 mg /ml) where the standard (metformin) increased the glucose uptake in the yeast cell 4.6% at the highest concentration.



Glucose uptake by yeast cell is more than drug metformin . diabetes it regulates the production of insulin from the cells into the blood stream and low glycemic index of bael maintains the blood sugar level. Control diabetes , digestion , cholesterol by consuming bael or bael fruits when taken by mouth there isn't enough reliable information to know if bael is safe to use as medicine. Large amount may cause stomach upset and also reduce blood cholesterol levels . it is a cardioprotective fruit is rich in anti oxidant that reduce the risk of heart disease.



## Anti bacterial activity



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