



A Review of Herbal Drug used in the Diabetes Treatment:

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ABSTRACT:-

This research is based on diabetes, its treatments, and herbal products available on the market. Traditional medicine from medicinal plants is used by about 60% of the world's population. Globally, diabetes is the fourth leading cause of death in most developed countries. Diabetes, a condition of deregulated homeostasis of carbohydrate and lipid metabolism, is one of the major recent health problems. Diabetes is one of the most common infectious diseases today. People of all ages and their families are affected around the world.

Herbal formulations are preferred due to their fewer side effects and lower cost. Antidiuretic herbal preparations are believed to be more effective in treating diabetes. This overview focuses on Indian herbal medicines and plants used to treat diabetes, especially in India. The biggest drawback of herbal medicines in modern medicine is the lack of clinical and scientific data proving their safety and efficacy. A list of medicinal plants with proven anti-diabetic activity and associated positive effects, as well as herbal remedies for the treatment of diabetes, is compiled.

Therefore, this review article aims to provide up-to-date information on the nature of diabetes, and the patented AHF (anti-diabetic herbal preparation) adds to researchers' existing knowledge. The number of people with diabetes is increasing due to population growth, aging population, urbanization, increasing obesity and lack of exercise. Anti-diabetic compounds with antioxidant properties are more beneficial, as one of the etiologies involved in the development of diabetes and its complications is damage caused by free radicals. Therefore, it also contains information on the antioxidant activity of these medicinal plants.

Keywords: - diabetes mellitus; anti-diabetic herbal formulations; polyherbal formulations.

INTRODUCTION:-

In recent years, the field of herbal medicine has grown exponentially and these drugs are gaining popularity in both developing and developed countries due to their natural origin and few side effects. Diabetes is a chronic metabolic disease characterized by high blood sugar levels (hyperglycemia) caused by insufficient insulin and is often associated with insulin resistance. Non-insulin-dependent diabetes mellitus represents a heterogeneous group that includes a milder form of diabetes that occurs predominantly in adults and the majority of diabetics with non-insulin-dependent diabetes mellitus.

The World Health Organization (WHO) lists 21,000 plants used for medicinal purposes worldwide. Conventional drug treatment for diabetes including oral hypoglycemic agents such as sulfonylureas, biguanides, alpha glycosidase inhibitors, and thiazolidine diones have side effects. Herbal medicine, also known as botanical medicine or botanical medicine, refers to the use of any plant, seed, berry, root, leaf, bark, or flower for medicinal purposes.

WHO defined diabetes as a metabolic disorder with multiple etiologies characterized by chronic hyperglycemia with disturbances in carbohydrate, fat and protein metabolism resulting from defects in insulin secretion or action of one or two types of insulin. A number of medicinal plants traditionally used for more than 1000 years, called rasayna, present in the traditional Indian medical system. There are many plant ingredients that are useful in the treatment of diseases diabetes. These include alkaloids, glycosides, peptidoglycans, hypoglycans, steroids, guanidine, glycopeptides, terpenoids, amino acids and inorganic ions.

Types of diabetes mellitus :-

There are substantially three types of diabetes mellitus :-

- 1) **Type 1 Diabetes.** :-Type 1 diabetes is also known as insulin dependent diabetes. It was formerly known as juvenile diabetes because it usually appears in childhood. It's an autoimmune disease. when your body attacks your pancreas with antibodies. Type 1 diabetes damages the small blood vessels in your eyes, nerves, and kidneys.

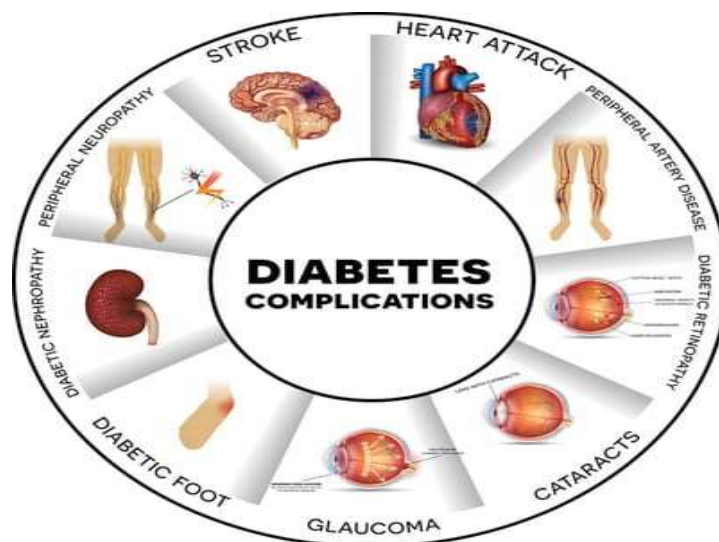
- 2) **Type 2 Diabetes** :- It's called non-insulin-dependent diabetes, but it has become more common in children and adolescents in the past 20 years. about 90% of people with diabetes have type 2. Type 2 also increases the risk of heart disease and stroke.
- 3) **Gestational diabetes** :-Gestational diabetes Pregnancy often causes some form of insulin resistance. If it becomes diabetes, it is called gestational diabetes. Doctors usually detect it in mid to late pregnancy. Because a woman's blood sugar passes through the placenta to her baby, controlling gestational diabetes is important to protect the baby's growth and development.

1. Signs and symptoms of diabetes mellitus :-

Early detection and treatment of diabetes can reduce the risk of developing diabetes complications. The following symptoms of diabetes are typical. However, some people with type 2 diabetes have symptoms so mild they go common symptoms of diabetes



○ Complications of diabetes:-



i. What tests are used to what are diagnose diabetes :-

Doctors use various tests to diagnose diabetes and prediabetes. Your doctor may recommend different tests depending on whether or not you have symptoms and whether you are pregnant.

There are mainly 4test which are used to diagnose diabetes -

1. Fasting plasma glucose test
2. A1C test

3. Random plasma glucose test

4. Oral glucose tolerance test

1). Fasting plasma glucose test

The fasting plasma glucose test (FPG) measures blood sugar levels at a specific point in time. For the most reliable results, your doctor will do the test in the morning after you have fasted for at least 8 hours. Fasting means not eating or drinking anything other than a sip of water.

2) A1C test

The A1C test is a blood test that measures your average blood sugar levels over the past 3 months. Other names for the A1C test are hemoglobin A1C test, HbA1C test, glycosylated hemoglobin test and glycosylated hemoglobin test. You can eat and drink before this test.

Before using an A1C test to diagnose diabetes, your doctor will consider factors such as: B. whether you are in the second or third trimester of pregnancy, whether you have certain types of anemia, or other blood problems. The A1C test may not be accurate in these cases.

Certain types of hemoglobin, called hemoglobin variants, can interfere with A1C measurements. Utmost A1C tests used in the United States are not affected by the most common variants.

If your A1C test results and your blood sugar levels do not match, your doctor should consider that the A1C test may not be a reliable test for you.

Your doctor will tell you the A1C test result as a percentage, for example A1C 7%. The higher the percentage, the higher the average blood sugar level.

3) Random plasma glucose test

Sometimes doctors use a random plasma glucose test to diagnose diabetes if you have diabetes symptoms and don't want to wait to fast for 8 hours. You can take this blood test at any time.

Example of a glucose test

If you are pregnant, your doctor may test you for gestational diabetes with a glucose challenge test. Another name for this test is glucose screening test. In this test, a healthcare professional takes a blood sample one hour after drinking a sugary, glucose-containing liquid. You don't need to fast for this test. If your blood sugar level is too high (135 to 140 mg/dL or higher), you may need to do an oral glucose tolerance test while fasting.

4) Oral glucose tolerance test

An oral glucose tolerance test (OGTT) helps doctors detect type 2 diabetes, prediabetes, and gestational diabetes. However, the OGTT is a more expensive test than the FPG test and the glucose test and is not as easy to perform.

You must fast for at least 8 hours before the test. After fasting, a healthcare professional will take a blood sample to measure your glucose levels. Next, drink a liquid that is high in sugar. Another blood sample will be taken after 2 hours to check your blood sugar levels. If your blood sugar levels are high, you may have diabetes.

If you are pregnant, you will have blood drawn every hour for 2 to 3 hours. If your blood sugar levels rise two or more times during the OGTT, you may have gestational diabetes.

• **Diabetes treatment :-**

- *Diabetes diet*
- *Exercise*
- *Alcohol use*
- *Smoking*
- *Self monitored blood Glucose*
- *Weight loss*
- **Weight loss :-**

pressure leads to better control of blood sugar, cholesterol, triglycerides and blood pressure. If you are overweight, you may see an improvement in these factors after losing just 5% of your body weight. However, the more weight you lose, the greater the benefits to your health. In some cases, a loss of up to 15% of body weight may be recommended.

Your doctor or nutritionist can help you set appropriate weight loss goals and advise you on lifestyle changes to help you reach those goals.

Weight loss losing extra pounds can help. While losing 5% of your body weight is good, losing at least 7% and staying there seems ideal.

This means that someone who weighs 180 pounds could change their blood sugar levels by losing about 13 pounds. Losing weight may seem like an overwhelming task, but controlling your portions and eating healthy foods is a good start. Healthy eating. There is no specific diet for type 2 diabetes. A registered dietitian can educate you about carbohydrates and help you create a diet plan you can stick to. Focus on:

- 1 Eat fewer calories
 - 2 Reduce consumption of refined carbohydrates, especially sweets.
 - 3 Add vegetables and fruits to your diet
 - 4 Get more fiber
- 2) Monitoring your blood sugar :-

Your health care provider will advise you on how frequently to check your blood sugar position to make sure you remain within your target range. You may, for illustration, need to check it a day and before or after exercise. If you take insulin, you may need to check your blood sugar multiple times a day.

Monitoring is generally done with a small, at-home device called a blood glucose condense, which measures the amount of sugar in a drop of blood. Keep a record of your measurements to share with your health care team.

Continuous glucose monitoring is an electronic system that records your glucose levels every few minutes using a sensor located under the skin. The information can be sent to a mobile device, such as a phone, and the system can send alerts if the levels are too high or too low

3). Exercise :-

Try to be physically active for 30 to 60 minutes every day. You can walk, bike, syncope, or do anything additional that gets your heart rate over. Brace that with strength training, like yoga or toning.

If you take a medication that lowers your blood sugar, you might need a snack before a workout. Watch your blood sugar levels. Depending on your treatment, especially if you're on insulin, your croaker will tell you if you need to test your blood sugar situation and how frequently to do it.

4). Diet :- A healthy diet is key to controlling blood sugar and preventing diabetes. Complications. If the patient is obese and has difficulty losing weight on their own, consult a doctor. Specialist or nutritionist. Eat a consistent, balanced diet that is high in fiber, low in saturated fat, and low in concentrated sweet.

5) Alcohol use :- Moderate or eliminate alcohol consumption. Excessive alcohol consumption is a known risk factor with type 2 diabetes. Drinking alcohol can cause low or high blood sugar levels and nerve pain. (neuritis) and elevated triglyceride levels.

6) Smoking:- If the patient has diabetes, smokes cigarettes or uses another form of tobacco, he must increased risks. Smoking damages blood vessels and contributes to heart disease, strokes and poor health. Blood circulation in the extremities. If a person needs help quitting tobacco, talk to a doctor Professional

Diabetes prevention :-

- 1) Weight loss
- 2) Exercise
- 3) Healthy diet
- 4) Quit smoking
- 5) Do not eat junk food
- 6) Drink lots of water
- 7) Quit alcohol
- 8) Avoid sedentary lifestyle
- 9) Eat high fiber diet
- 10) Split meals

Ayurvedic Herbs Used in Treatment of Diabetes Mellitus :-

Several Ayurvedic formulations used to treat diabetes mellitus for centuries.

Herbal medications are best taken under the guidance of a trained professional. Be sure to consult with your croaker or an herbalist before self treating.

Diabetes mellitus in Ayurveda is known as Madhu-meha

Herbs for diabetes treatment are not new. Since ancient times, shops and factory excerpts were used to combat diabetes.

Eugenia jambolana:- (black plum or jamun)

Eugenia jambolana (black plum or jamun) belongs to the family Myrtaceae. The most commonly used plant parts are seeds, leaves, fruits, and bark.

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.

Jamun has been reported to be used in numerous complementary and alternative medicine systems of India and, before the discovery of insulin, was a front line antidiabetic medication even in Europe.

The plant is rich in compounds containing anthocyanins, glucoside, ellagic acid, isoquercetin, kaempferol, myricetin, and hydrolysable tannins (1-O-galloyl castalagin and casuarinin).

The seeds also contain alkaloid jambosine and glycoside jamboline, which slows down the diastatic conversion of bounce into sugar.

The blood glucose-lowering effect of Eugenia jambolana may be due to increased secretion of insulin from the pancreas or by inhibition of insulin degradation.

Drop in glycosuria and blood urea situations has also been reported.



Trigonella foenum graecum: (fenugreek)

It is found all over India and fenugreek seeds are found commonly used as one of the main ingredients of spice.

4-hydroxyleucine, a new amino acid from Fenugreek seeds increase insulin stimulation and glucose released by islet cells isolated from mice and humans.

Mouth administration of 2 and 8 g/kg of plant extract was produced dose-dependent reduction in blood sugar levels both in normal and diabetic mice.

Management of Fenugreek seeds also improve glucose metabolism and normal activity of creatinine kinase in the heart and skeleton muscle and liver of diabetic mice.

It also reduces liver function and renal glucose-6-phosphatase and fructose-1, 6- biphosphatase activity. This plant also has antioxidants activity



Holy basil :- (Ocimum sanctum)

It is commonly known as Tulsi. Since ancient times, this plant has been known for its medicinal properties.

Aqueous extract of Ocimum sanctum leaves showed a significant decrease in concentration .

Blood sugar levels in diabetes are normal and caused by alloxan. Significantly reduces fasting .

Blood glucose, uronic acid, total amino acids, total cholesterol, triglycerides, and total lipids were indicated Hypoglycemic and hypolipidemic effects of Tulsi in diabetes.

This plant has also been shown to have anti-asthma, anti-stress, antibacterial, antifungal, antiviral, anti-tumor, anti-gastric ulcer, antioxidant, anti-mutagenic and immunostimulating activities.

**Tinospora cordifolia**: (Guduchi)

This is a large, smooth, deciduous climbing shrub belonging to the family Menispermaceae.

It is widely distributed throughout India and is commonly known as Guduchi. Oral administration of Tinospora cordifolia (T. cordifolia) root extract for 6 weeks significantly reduced blood and urine glucose levels as well as serum and tissue lipids in alloxan-administered diabetic rats.

The extract also prevents the loss of body weight. T. cordifolia is widely used in Indian Ayurvedic medicine to treat diabetes.

Oral administration of aqueous extract from T. cordifolia roots to alloxan diabetic rats significantly reduced blood sugar and brain lipids.

Although the aqueous extract at a dose of 400 mg/kg can cause a significant hypoglycemic effect in different animal models, its effect is equivalent to one unit/kg of insulin .

It has been reported that daily administration of alcoholic or aqueous extracts of T. cordifolia reduces blood sugar levels and increases glucose tolerance in rodents .

**Allium sativum** :- (garlic)

usually called lahsun belongs to the family Amaryllidaceae.

According to Ayurveda, it is one Miracle plant is used to combat many different problems, including insect bites, intestinal worms, headaches and tumors.

Garlic is also used in traditional medicine to treat diseases heart disease, cancer, parasites, fungal diseases and diabetes.

The main bioactive ingredients are present Garlic contains allicin, allicin, ajoene and other organic substances Compounds.

Studies have proven that consuming garlic Significantly reduces fasting blood sugar levels.

Diallyl Trisulfide has been shown to improve glycemic control in Mice with STZ-induced diabetes. Garlic can act as an anti-diabetic agent by increasing or pancreatic insulin secretion by β cells or release bound insulin.

In addition, *Allium sativum* also exhibits antibacterial, anticancer and cardioprotective activities. Garlic (*Allium sativum* L.), a famous medicinal plant and functional food that does not have the toxicity and side effects of conventional drugs, has shown positive effects in the treatment of diabetes and its complications. its.



Aloe vera and Aloe barbadensis :-(aloe)

Aloe vera, a popular houseplant, has a long history as a versatile folk remedy.

Trees can separated into two basic products: gel and latex. Aloe vera gel is the pulp or mucus of the aloe vera leaf Latex, commonly called "aloe juice", is a bitter yellow secretion from the tubules around the ring just below the outer layer of the leaf.

Aloe vera extract effectively increases glucose tolerance in normal and diabetic rats.

Chronic treatment but not a single dose of Aloe barbadensis leaf secretions shows hypoglycemic effect.

Single doses as well as chronic doses of the bitter principle of the same plant are also used. showed hypoglycemic effect.

This effect of aloe vera and its bitter principle occurs by stimulating the synthesis and/or release of insulin by pancreatic beta cells.

This plant also has dose-dependent anti-inflammatory activity and improves diabetic wound healing.



Annona squamosa Linn. (Annonaceae) :- (custard apple)

commonly known as custard apple in English and sharifa in English Hindi.

It is grown all over India.

The pharmacologically active ingredients contained in the seeds, leaves and aerial parts of the plant.

Study revealed that this plant also has hypoglycemic properties and anti-diabetic activity.

It works by improving insulin pancreatic islet levels, which increases utilization of glucose in the muscle and inhibits glucose production in the liver. Its safety margin is high.

Extract obtained from the leaves of this plant are useful for maintaining healthy blood sugar and cholesterol levels.



Azadirachta indica: (Neem)

Azadirachta indica is widely distributed throughout India, Pakistan and Bangladesh. That's normal name is neem. Hydroalcoholic extracts of this plant have shown antidiabetic activity.

Rats were treated with streptozotocin. This effect is due to increased glucose and glycogen absorption, deposited in the hemidiaphragm of isolated mice.

Besides having anti-diabetic activity, this plant also has very important activities such as antibacterial, anti-malarial, anti-reproductive, hepatoprotective and anti-oxidant effects



Momordica charantia: (bitter melon)

Momordica charantia is used more frequently as a hypoglycemic agent in India. Whole section of this plant, such as fruit pulp, seeds, leaves and whole plant extracts, have been found to be present. Hypoglycemic effects in different animal models.

Polypeptide has been isolated from fruits and seeds and *M. charantia* tissue showed significant hypoglycemic effects by subcutaneous administration. Management is carried out in langurs and humans. Ethanol extraction your.

charantia (200 mg/kg) showed hypoglycemic and hypoglycemic effects in Normal and STZ diabetic mice.

This may be due to inhibition of glucose-6-phosphatase. In addition to hepatic fructose-1,6-biphosphatase and hepatic glucose-6-phosphate dehydrogenase activity



Bixa orellana L. (Bixaceae) :- (annatto)

It is a shrub or small tree from the tropics Americas.

This annatto extract reduces blood sugar levels in normoglycemic and streptozotocin-induced fasting situations dogs with diabetes.

In normal dogs, it suppresses postprandial reactions increased blood sugar levels after taking glucose and also causes an increase in the insulin/glucose ratio in normal dogs.

The increase in insulin levels is not due to hyperinsulinism synthesized after 1 hour stay and half hour after meals, reduces C-peptide levels.

We conclude that B. orellana (annatto) reduces blood sugar by stimulation

peripheral glucose utilization, and possibly this Hypoglycemic extracts may have pharmacological effects importance.



Conclusion :-

Diabetes is a serious life- hanging complaint and must be constantly covered and effectively subdued with proper drug and by conforming to a healthy life. By following a healthy life, regular checks, and proper drug we can observe a healthy and long life. herbs are natural antioxidants and effective herbal drugs, in part due to their anti-diabetic components, similar as flavonoids, tannins, phenolic, and alkaloids that ameliorate the performance of pancreatic α -cells by adding the insulin stashing or dwindling the intestinal immersion of glucose.

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