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REVIEW ON ANTI DIABETIC HERBALS

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ABSTRACT

Diabetes mellitus is metabolic disorder in which blood glucose level decrease. Due to this disease various complications are arises including retinopathy, nephropathy, cardiovascular disease, and neuropathy. Diabetes mellitus is chronic condition includes type 1 DM, type 2 DM and gestational diabetes, which occurs in pregnancy. For management of DM various system of medicine are used, from that herbal or traditional medicine are used for many cases as a core medicine or supplementary to allopathic medicine. Frequency of occurrence of type 2 DM is high than type 1 DM. Different type plant or herbal extract are used for management of DM includes, *Ocimum sanctum*, *Allium stivum*, *Eugenia jambolana*, *Abelmoschus esculentus*, *Allium cepa*, *Gymnema sylvestre*, *Momordica charantia*, *pterocarpus marsupium* etc. Many plants are use as single herb extract for treatment or used in combination with other anti-diabetic plants as a poly herbal formulation.

KEYWORDS

Diabetes milletus, Anti-diabetics herbals, Blood glucose and Traditional plants.

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INTRODUCTON

Diabetes mellitus is one of the chronic disease that prevent body from appropriate use of energy from the diet which you have eat. Diabetes mellitus is classifies into two types Type 1-DM and Type 2-DM. Type-1 is also called as insulin dependent DM in this condition pancreas unable to produce the insulin which is essential for body functioning.

The presence of type -1 DM is commonly observed in children and adolescents. Type 2 is reported as non-insulin dependent DM. In this type of DM body does not respond the action of insulin which produced by beta cells of langedrans of pancreas due to this pancreas does not secrets required amount of insulin and cause diabetes mellitus. The 90% of patient are suffering from type 2 DM

worldwide. This type of DM frequently observed in adults. In this case oral hypoglycemic agents are used for treatment and management of DM. common symptoms of diabetes mellitus are polyphagia, polydipsia, and polyuria. Due to increase in blood sugar level various complications are arises such as heart, blood vessels, and retina of eye, kidney, and various nerves of body.

According to WHO more than 400 million people living with diabetes worldwide. And it is predicted to increase. According to survey of 2016 DM was seventh leading cause of death. Medicinal plants are helps in maintain health of individuals after administration of particular or specific disease condition. The food and agriculture organization roughly calculate in 2002 that 50,000 medicinal plants are utilized for treatment or prevention of disease over the globe. WHO calculate about 80% population of world is depend largely on tradition medicine.

Eugenia jambolana

Eugenia jambolana is used for management of diabetes mellitus as a single herb or combination with other antidiabetic drugs. Bark, seed, leaves are used in India for treatment or management of diabetes. Many diabetic patients use *Eugenia jambolana* aqueous extract as home remedy along with oral hypoglycemic drugs¹. According to research work *Eugenia jambolana* (tri terpenoids) possess anti diabetic property². *Eugenia jambolana* also have other pharmacological activities like anti-inflammatory effects, antibacterial, neuropsychopharmacological action, anti-human immunodeficiency virus activities, and anti-diarrheal effects¹. Freeze dried powder is used in the animal study it shows reduction in blood glucose level.

Abelmoschus esculentus

Abelmoschus esculentus is commonly as okra or the fruit of *Abelmoschus esculentus* is called as okra. It is widely used as vegetable, functional food and medicine in china for different purpose. Okra is belonging to hibiscus family. It is low in calories content and it contain large amount of dietary fibers. From long time roasted okra seeds are used in turkey for treatment of diabetes. The consumption of okra help in management of blood glucose level in case of Type 1, Type 2 and

gestational diabetes. It is proven that it have good effect on lowering blood glucose level. In one of the research paper extraction of okra was performed by hot water for extracting water soluble polysaccharide. 10 days study was performed on six mice in which the high dose shows increase in hypoglycemic activity³.

***Trigonella foenum- graecum* Linn**

Fenugreek is one of traditional medicinal plant grown in southwest Asia, Africa and Mediterranean region as food source. Now a day many research institute and pharmaceutical companies are study or research on fenugreek seed as raw material from which active constituent are extracted and used to treat diabetes. Fenugreek seed mostly contain polysaccharides, saponin, flavonoides, alkaloids, and proteins as a chemical constituent. In one of article Petroleum ether is used for extraction process. And from work it is concluded that fenugreek flavonoids may increase diabetic symptoms in STZ induced diabetic rats. In another research work fenugreek seed when extracted with water having larger hypoglycemic and anti hypoglycemic activity because of this it may be used as herbal medicine for treatment of diabetes. The 25 gm of fenugreek seed in diet helps in treatment of type 1 diabetics, it acts as supportive therapy very efficiently.

Gymnema Sylvester

Gymnema Sylvester is medicinal plant belonging to family Asclepiadaceae having various pharmacological action like diabetes mellitus, stomachic and diuretic medicine⁴. In various system of medicine *Gymnema sylvestre* is used as medicine ingredient, the system of medicine used are mostly folk, ayurvedic, homeopathic and modern medicine. It is cultivated in mainly Deccan peninsula of Western India, Tropical Africa, Vietnam, Malaysia, Shrilanka and it is mostly present in Japan, Germany and USA as a functional food. *Mahastier and caius* (1930) was 1st time scientifically tested *Gymnema Sylvester* for its hypoglycemic activity. Many formulations are available in capsule, tea etc. *Gymnema* is work by increasing glucose uptake and utilization⁶. It may stimulate beta cell function of pancreas also increase the release of insulin. In one of study of gymnema polyherbal formulation was studied on 32 human subjects in which 10 herbs are used. The formulation is given to the patient daily

on empty stomach for 6 months⁸. From this study the observation was found that polyherbal formulation containing gymnema having potential to maintain glucose level. And it may be efficiently use for treatment of type 2 diabetes mellitus.

Cinnamon

Cinnamon species are helps to treat patient with type-2 diabetes mellitus get better glycemic control. Cinnamon bark oil is used as traditional medicine in western and eastern region from ancient time⁷. US physicians also used cinnamon for variety of disorders in 19th century. In this research paper extraction is done by aqueous or organic solvent, in that powder various constituents are present, volatile oil 1% to 4%, 60% to 80% cinnamaldehyde; upto 10% eugenol; 5% to 10% trans-cinnamic acid, phenolic compound, other compounds are of 10% including condensed tannins, catechins, and proanthocyanides. Resent study suggested that cinnamon oil useful for lowering blood glucose level and to treat many disease. Some research study includes *in-vivo* and *in-vitro* studies that aqueous extract of cinnamon activates the insulin receptor by various mechanisms that include improve autophosphorylation of the insulin receptor, stop pancreatic and intestinal amylase and glycosidase improve glycogen synthesis in liver, improve sensitivity, and glycemic control. In one of the study water extraction of cinnamon bark enhances glucose re uptake and increase insulin sensitivity. As cinnamon is abundance in polyphenolic components and when taken 500 mg/d for 12 days it shows decreased in oxidative stress and rise impaired fasting glucose⁹. Food and drug administration does not give permission for use of dietary supplement to treat disease. According to clinical trial data, adverse reports are evaluated and safety data is collected, from this mostly observed signs are irritation and contact allergies.

Momordica charantia

Momordica charantia is commonly called as bitter gourd or bitter melon. *Momordica charantia* is one of the member of cucurbitaceae family and it is used as as vegetable source. It is commonly used traditional medicine for treatment of diabetes in India, Asia, South America and East Africa. According to various research work different

chemical constituent are present in isolated and purified extract of *M. charantia* such as fatty acid, flavonoids, polysaccharides, alkaloids, saponins and polypeptides¹⁰. The isolated polysaccharide is acidic polysaccharide and having average molecular weight of 1.3 kDa and it is composed of rhamnose (12%), galactose (3.05%), glucose (19.89%), xylose (5.46%) and arabinose (56%)²⁴. Also bitter melon is consist of various beneficial compounds includes bio-active chemical, vitamins, minerals, antioxidants¹². Various solvents are used for extraction are water, ethanol, and hexane. In one of study chromium and *M. charantia* polysaccharide are used, both having good hyperglycemic effect. From this study we can hypothesized that the complex of polysaccharide-chromium increase anti hyperglycemic effect. For this study STZ solution is induced intraperitoneally to the mice. The experiment was performed for 28 days. Another paper contain three study report it reflect that it having central nervous system related adverse effects; headache and dizziness other less observed side effects are skin rash, sore throat and hypotension. *M. charantia* stimulate insulin secretion and increase glucose uptake in liver¹⁵. It is one of the scientifically proven medicinal plants approved by the department of the health¹⁷. Continuous dosing of aqueous of *M. charantia* fruit for 90bdays give significant lowering in blood glucose level of STZ induced diabetic rat¹⁶. *M. charantia* was extracted with ethanol, this extract is having more amount of saponin and according to this research work saponin are responsible for hypoglycemic activity²¹.

Pterocarpus marsupium wood

Pterocarpus is belongs to leguminosae family. Heart wood obtained from *pterocarpus* is also called as Indian Kino²³. According to study of Ayurvedic system of medicine recommend that water stored in heart wood of *pterocarpus* is good remedy for treatment of diabetes²². The water extract of *pterocarpus marsupium* Roxb. It is used for treatment of diabetes mellitus from long ago. The study of chakravarthy *et al.* Give information that flavonoids, (-)-epicatechin, isolated from *pterocarpus* plant have activity that it effectively regenerate the beta cell in alloxen induced diabetic rat and cause reduction in blood glucose level^{18,19}.

This plant is used in other ailment like diarrhoea, toothache, fever, infection of urinary tract and skin²⁰.



Figure No.1: (*Eugenia jambolana*)



Figure No.2: (*Abelmoschus esculentus*)



Figure No.3: (*Trigonella foenum-graecum* Linn)



Figure No.4: (*Gymnema Sylvester*)



Figure No.5: (cinnamon)



Figure No.6: (*Momordica charantia*)



Figure No.7: (*Pterocarpus marsupium*)

CONCLUSION

The use of plant as medicine is one of the traditional method for treatment of the various diseases. Many research work is going on traditional medicinal plant for their pharmacological action, mechanism, and adverse reaction. Thus, the use of herbal medicine is still continue in today's society for prevention and treatment of diabetes. Many of commercially produced drug are obtained from plant origin, they having potential action same as that of modern medicine. Many herbs show anti diabetic action by regulating insulin secretion, improve insulin sensitivity. Some authorities are working for safety and efficacy of herbal medicines.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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