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A Review on Herbal Antidiabetic Drug

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Abstract: *Traditional Medicines derived from medicinal plants are used by about 60% of the world's population. This review focuses on Indian Herbal drugs and plants used in the treatment of diabetes, especially in India. Diabetes is an important human ailment afflicting many from various walks of life in different countries. In India it is proving to be a major health problem, especially in the urban areas. Though there are various approaches to reduce the ill effects of diabetes and its secondary complications, herbal formulations are preferred due to lesser side effects and low cost. A list of medicinal plants with proven antidiabetic a related beneficial effects and of herbal drugs used in treatment of diabetes is compiled..*

Diabetes mellitus is the most common endocrine disorder, affecting 16 million individuals in the United States and 200 million worldwide. Despite the use of advanced. Synthetic drugs for the treatment, use of herbal remedies is gaining higher importance because of synthetic drugshave drawbacks

Thus, this review article undertake the attempt for providing updated information on the typeof diabetes and herbal formulations which will enhance the existing knowledge of the researchers

Keywords: Herbal anti Diabetic Medicine ,Natural diabetes remedy, Ayurvedic Daibetes Cure, Herbal Bood Sugar Control

Aim: The aim of this study is to determine the use of herbs among diabetes and which herbs are use

Objectives:
Herbs use in traditional Indian medicine to treat diabetes seems to lower blood sugar level and insulin level.
1) Herbal formulations are cheap as compared to synthetic medicines and also eco
2) Friendly. To study the pharmacognosy of herbal antidiabetic drug.
3) To study the evalution of parameters of herbal antidiabetic drugs.
4) To study the pharmacological properties of herbal antidiabetic drug.

I. INTRODUCTION

Literature Review:

1) Pritt Verma et.al (2018)

The liver is the largest glandular organ in body, and has more function than any other organs. Hepatic disorders which stem from a stressful life style, inappropriate eating habits and lack of exercise have become one of the major causes of morbidity and mortality in human being. The acute hepatic symptoms may be cured by some general prevention such as avoidance of constipation and balance between intake quantity of protein and disaccharides in normal food. An alternative and a progressively increasing adaptation is the use of herbal extracts. Many of the plant based drugs show effective response in managing the hepatotoxicity and secondary symptoms of liver damage

2) Azhagu Madhavan Sivalingam et.al (2012)

How to cite this article: Azhagu Madhavan S. Ganesan S. A. Medicinal Plant P JBRES1231Costus species is a signifi cant restorative and decorative plant used to fixvarious illness commonly known as The plant has been found to The rhizomes of Costus species are harsh, astringent, bitter, cooling, love potion, laxative, anthelminthic, depurative, febrifuge, expectorant, tonic, improve assimilation, and is energizer herb that clears poisons. It additionally has against richness, anabolic properties. This audit plainly demonstrates the need to perform logical investigations with therapeutic

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vegetation featuring potential for Costus species because of its antidiabetic, pharmacological and cell reinforcement properties. The rhizome is credited with purgative and tonic properties. India is a botanical garden of the world

3) Gupta Dennis Chang Basil D. Roufogalis et.al (2015)
The current single target approach has not provided ideal clinical outcomes for the treatment of the disease and its complications. Herbal medicine has been used for the management of various diseases such as diabetes over centuries. Many diabetic patientsare known to use herbal medicines with antidiabetic properties in addition to their mainstream treatments, which may present both a benefit as well as potential risk to Effective management of their disease. In this review we evaluate the clinical and experimental literature on herb-drug interactions in the treatment of diabetes

4) Arun Chaudhury et al (2010)
Diabetes mellitus is a chronic, progressive, incompletely understood metabolic condition chiefly characterized by hyperglycemia. Impaired insulin secretion, resistanceto tissue actions of insulin, or a combination of both are thought to be the commonest reasons contributing to the pathophysiology of T2DM, a spectrum of disease originally arising from tissue insulin resistance and gradually progressing to a state characterized by complete loss of secretory activity of the beta cells of the pancreas. T2DM is a major contributor to the very large rise in the rate of non-communicable diseases affecting developed as well as developing nations. In this mini review, we endeavor to outline the current management principles, including the spectrum of medications that are currently used for pharmacologic management, for lowering the elevated blood glucose in T2DM

5) J Clin Biochem Nutr, 2007 May:
Traditional Medicines derived from medicinal plants are used by about 60% of the world's population. This review focuses on Indian Herbal drugs and plants used in the treatment of diabetes, expecially in India. Diabetes is an important human ailment afflicting many from various walks of life in different countries. In India it is proving to be a major health problem, especially in the urban areas. Though there are various approaches to reduce the ill effects of diabetes and its secondary complications, herbal formulations are preferred due to lesser side effects and low cost. A list of medicinal plants with proven antidiabetic and related beneficial effects and of herbal drugs used in treatment of diabetes is
Compiled.

6) Asian Pac J Trop Biomed, 2012 Apr
Diabetes mellitus is one of the common metabolic disorders acquiring around 2.8% of the world's population and is anticipated to cross 5.4% by the year 2025. Since long back herbal medicines have been the highly esteemed source of medicine therefore, they have become a growing part of modern, high-tech medicine.

Introduction:
Diabetes Mellitus
Diabetes Mellitus is metabolic disorder in endocrine system characterised by chronic hyperglycemia with disturbance in carbohydrate, protein and fat metabolism resulting from defects in insulin secretion, insulin action, or both,

Types of diabetes Mellitus
1) Type 1 diabetes Mellitus
2) Type 2 diabetes Mellitus
3) Gestational diabetes Mellitus

Type 1 diabetes Mellitus is also known as insulin dependent diabetes.
It is autoimmune disorder. Caused due to insulin insufficiency because of lack of functional beta cells.
Patients suffering from this diabetes are therefore totally dependent on exogenous source of insulin.

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Type 2 diabetes Mellitus is also known as insulin independent diabetes are unable to respond to insulin and can be treated with dietary changes, exercise and medication. Type II diabetes is the more common form of diabetes constituting 90% of the diabetic population.

Type 3 Gestational diabetes Mellitus Gestational diabetes Mellitus occurs in about 5 to 10% of pregnant woman, and usually goes away after the birth of baby, women who have gestational diabetes have an increased risk of developing type 2 diabetes later on,

DIABETES SYMPTOMS

Loss of weight indicates that there is a problem in the blood sugar level and functioning of insulin
Blurred vision
Frequent urination is one of the major symptom of diabetes
Severe hunger pain or emptiness stress and irritation also give sign of diabetes
Nausea and vomiting
Extreme weakness and tiredness
Unusual thirst Mood change, etc, 141

DIABETES CAUSES

Hereditary and genetics leads to diabetes.
It also cause due to increase production of glucose level in the blood vessels and less production of glucose in the body.
Also caused due to infections caused by viruses,
Stress, obesity, increased cholesterol level, excess intake of oil and sugar and no physical exercise are some other cause of diabetes.
According to Ayurveda it is caused by vitiation of all the three dosha but vata is to most vitiate out of the three.

DO'S DON'T'S FOR DIABETES

Controlling diet and eating right is very important for diabetic patients and their health.
Low fat diet and vegetables like spinach, cucumber must be taken as they are good for controlling diabetes, Onion, sprouts, beans, garlic in the diet of diabetics low down the sugar level in the blood. Tomatoes, vegetable salad, fruits and milk products like cheese should be taken.
Starchy food products like white bread, rice, potatoes should be avoided as they are not easily digestible. – Diabetic patient should not be scared of eating sugar rich fruits. These are safe and do not increase insulin production. Less amount of oil should be taken and coffee, sugar refined flour, alcohol, heavy metals should be avoided. Meals should be small as the foods are easily digestible and are good for the health of diabetics.

Taking stress should be avoided as it worsens the conditions.
Avoiding mutton, excess salt in the meal will help in controlling the body weight and
diabetes. Avoiding junk food and oily food will control the level of cholesterol. Lowers the blood pressure level and diabetes,
Herbal antidiabetic drugs
1) Herbal antibiotic drugs are the use of plant's to control blood sugar level amongst People with diabetes.
2) There are around 600 herbal drugs manufacturers in India of which almost all manufacturers are developing antibiotic herbal formulations.
3) The medicinal plants and herbs are being used in extract forms for their anti diabetic activity. Various clinical studies confirmed that medicinal plants extract shows anti diabetic activity and restoring the action of pancreatic beta cells.
4) Herbal formulations are made from the natural products while all opathic
medications are produce from the chemical and chemically modified natural products..

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Herbal formulation

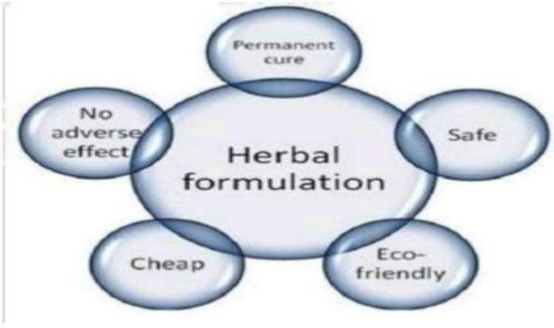

Fig no-1 Advantages of herbal formulation

Examples of herbal antidiabetic drugs (Natural)
1. Allium sativum
2. Eugenia jambolana
3. Momordica charantia
4. Ocimum sanctum
5. Phyllanthus embica

1. Alliumsativum
Family: Lilliaceae
Common name: Garlic
Part used: Petroleum ether extract of bulbs Active constituents: Allyproyl Disulphide oxide, Allicin
Active constituent: Allyproyl disulphide oxide, allicin
Mode of action: Improve plasma lipid metabolism and plasma antioxidant activity.

Fig no -2 Allium Sativum

Allium sativum: (Garlic) Allicin, a sulfur-containing compound is responsible for its pungent odour and it has been shown to have significant hypoglycemic activity. This effect is thought to be due to increased hepatic metabolism, increased insulin release from pancreatic beta cells and/or insulin sparing effect. Aqueous homogenate of garlic (10 ml/kg/day) administered orally to sucrosefed rabbits (10 g/kg/day in water for two months) significantly increased hepatic glycogen and free amino acid content, decreased fasting blood glucose, and triglyceride levels in serum in comparison to sucrose controls S-allyl cystein sulfoxide (SACS), the precursor of allicin and garlicoil, is a sulfur containing amino acid, which controlled lipid peroxidation better than glibenclamideand insulin. It also
improved diabetic conditions. SACS also stimulated in vitro insulin secretion from beta cells isolated from normal rats,
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2.Eugenia jambolana
Family: Myrataceae
Common name: Jamun
Part used: Pulp of fruit
Active constituents: Oleanolic acid, ellagic acid
Mode of action: Inherited insulinase activity from liver and kidney,

Fig no-3 Eugenia jambolana

Eugenia jambolana: (Indian gooseberry, Jamun) In India decoction of kernels of Eugenia jambolana is used as household remedy for diabetes. This also forms a major constituent of many herbal formulations for diabetes. Antihyperglycemic effect of aqueous and alcoholic extract as wellas lyophilized powder shows reduction in blood glucose level. This varies with different level of diabetes. In mild diabetes (plasma sugar 180 mg/dl) it shows 73.51% reduction, whereas in moderate (plasma sugar>280 mg/dl) and severe diabetes (plasma sugar >400 mg/dl) it is reduced to 55.62% and 17.72% respectively. The extract of jamun pulp showed the hypoglycemic activity in streptozotocin induced diabetic mice within 30 min of administration while the seed of the same fruit required 24 h. The oral administration of the extract resulted in increase in serum insulin levels in diabetic rats,

3. Momordica charantia
Family: Curcubitaceae
Common name: Bitter gourd
Part used: Fresh green leaves
Active constituents: Charantin, sterol
Mode of action: Activates PPARS alpha and gama and lower the plasma apo beta 100 in mice fed with high fat diet.

Fig no-4 Momordica charantia

Momordica charantia: (Bitter gourd) It is commonly used as an antidiabetic and antihyperglycemic agent in India as well as other Asian countries. Extracts of fruit pulp, seed, leaves and whole plant was shown to have hypoglycemic effect in various animal models. Polypeptide p, isolated from fruit, seeds and tissues of M. charantia showed significant hypoglycemic effect when administered subcutaneously to langurs and humans. Ethanolic extractsof M. charantia (200 mg/kg) showed an antihyperglycemic and also hypoglycemic effect in normaland STZ diabetic rats, 110

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4. Ocimum sanctum

Family: Labiateae
Common name: Tulsi
Part used: Entire herb
Active constituents: Eugenol
Mode of action: Increased insulin release.
Ocimum sanctum: (Holy basil, Tulsi)

Fig no-5 Ocimum sanctum

Since ancient times, this plant is known for its medicinal properties. The aqueous extract of leaves of Ocimum sanctum showed the significant reduction in blood sugar level in both normaland alloxan induced diabetic rats. Significant reduction in fasting blood glucose, uronic acid, total amino acid, total cholesterol, triglyceride and total lipid indicated the hypoglycemic effectsof tulsi in diabetic rats. Oral administration of plant extract (200 mg/kg) for 30 days led to decrease in the plasma glucose level by approximately 9.06 and 26.4% on 15 and 30 days of theexperiment respectively. Renal glycogen content increased 10 fold while skeletal muscle and hepatic glycogen levels decreased by 68 and 75% respectively in diabetic rats as compared to control.

5. Phyllanthus embica

Family: Euphorbiaceae
Common name: Amala
Part used: Methanolic extract of leaf
Active constituents: phyllanthin.
Mode of action: Reduction of glycemia.

Fig no 6. Phyllanthus embica

P. emblica also known as Amla exhibits many significant pharmacological activities ie, antioxidant, anti-microbial, antifungal, antiallergic, antiviral, anticancer and antidiabetic properties. It acts by inhibiting glycogenolysis, hepatic glucogenesis and glucose absorption from the intestine. It also increases peripheral glucose utilization by stimulating insulin release (Mali, 2012).

P. emblica leaves has been traditionally used against cold, anemia, dysentery, fever, gravel and sores. (Dey, 1896). Decoctions of the leaves are used in the treatment of diabetes

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mellitus (Treadway, 1994). The fruits are indispensable in the various folk systems of medicine in Southeast Asia, and are used to treat ailments including diabetes, cough, asthma, bronchitis (Baligaand D'Souza, 2011). As per a report published by Central Council .

MARKET PRODUCT FOR FORMULATED HERBAL DRUGS WITH ANTI DIABETIC PROPERTIES

Many formulations are in the market and are used regularly by diabetic patients on the advice of the physicians.

Diabecon manufactured by 'Himalaya'is reported to increase peripheral utilization of glucose, increase hepatic and muscle glucagon contents, promote B cells repair and regeneration and increase c peptide level. It exerts an insulin like action by reducing the glycated hemoglobin levels. It minimizes long term diabetic complications.

Epinsulin marketed by Swastik formulations contains epicatechin, a benzopyran, as an active principle. Additionally it has an insulin-mimetic effect on osmotic fragility of human erythrocytes and it inhibits Na/K ATPase activity from patient's erythrocytes. It is reported to be a curative for diabetes, Non Insulin Dependant Diabetes Mellitus (NIDDM) and a good adjuvant for Insulin. Dependant Diabetes Mellitus (IDDM), in order to reduce the amount of needed insulin. It is advised. Along with existing oral hypoglycemic drugs and is known to prevent diabetic complication. Pancreatic Tonic (Ayurvedic herbal supplement): Pancreas Tonic is a botanical mixture of traditional Indian Ayurvedic herbs currently available as a dietary supplement.

Bitter gourd powder marketed by Garry and Sun. It lowers blood and urine sugar levels. The Bitter gourd is specifically used as a folk medicine for diabetes. It contains compounds like bitter glycosides, saponins, alkaloids, reducing sugars, phenolics, oils, free acids, polypeptides, sterols, 17-amino acids including methionine and a crystalline product named p-insulin. It is reported to have hypoglycemic activity.

Dia-Care manufactured by Admark Herbals Ltd. Is claimed to be effective for both Type 1. Type 2 diabetes within 90 days of treatment and cures within 18 months. Persons taking insulin will eventually be liberated from the dependence on it. The whole treatment completes in 6 phases, cach phase being of 90 days. Approx. 5 grams (1 tea spoon) powder is mixed with ½ glass of Water, stirred properly and kept overnight. Only the water and not the sediment must be taken in the morning on empty stomach. To the remaining medicine fresh water is added and kept for thewhole day and is consumed half an hour before dinner.

Gurmar powder manufactured by Garry and Sun is an anti-diabetic drug, which suppresses the intestinal absorption of sacharides, which prevents blood sugar fluctuations. Gurmar stimulates insulin secretion and has blood sugar reducing properties. It blocks sweet taste receptors when applied to tongue in diabetes to remove glycosuria. It deadens taste of sweets and bitter things likequinine (effects lasts for 1 to 2 hours), 1123

DIABETA, a formulation of Ayurvedic Cure, available in the capsule form is an anti- diabetic withcombination of proven anti-diabetic fortified. The formulation of Diabeta is based on ancient Ayurvedic references, further corroborated through modern research and clinical trials. Diabeta acts on different sites in differing ways to effectively control factors and pathways leading to diabetes mellitus. It attacks the various factors, which precipitate the diabetic condition, and corrects the degenerative complications, which result because of diabetes. Diabeta is safe and effective in managing Diabetes Mellitus as a single agent supplement to synthetic anti-diabetic drugs. Diabeta helps overcome resistance to oral hypoglycemic drugs when used as adjuvant to cases of uncontrolled diabetes. Antidiabetic Activity of a Herbal Formulation from Tinospora cordifolia stem and Plumbago rosea root PRTC contains the medicinal herbs, P. rosea and T. cordifolia is widely used in ayurveda to treatdiabetes. Guduchi Satwa, a starchy water extract prepared from it is recommended. As an anti diabetic tonic

II. CONCLUSION

Diabetes mellitus is a most common endocrine disorder, affecting millions of people worldwide. It is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The increase in resistance and populations of patients at some risk, in conjunction with the restricted number of commercially available drugs for diabetes that still present have many side effects and alsoproblems like unwanted hypoglycemic effect are the cause to shift the research towards traditionally available medicine which have low side effect and wide range of bio activity and do not re quire laborious pharmaceutical synthesis seems highly attractive.

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From this review article, it may be useful to the health professionals, scientists and scholarsto develop evidence-based alternative medicine to cure different kinds of diabetes problem using herbal preparation. Substances and extracts isolated from different natural resources play very important role to design medicine and treat Hyperglycemic problem in diabetes mellitus.

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