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THERAPEUTIC POTENTIAL OF PHYTO CHEMICALS IN DIABETES CARE

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ABSTRACT

The Therapeutic possibilities of plant based treatments the management of diabetetes of mechanism of the action. Diabetes mellitus is a common chronic Illness that serious danger at around the entire world. the properties of following plants are Alstonia scholaris, Annona squamosa, momordica charantia, cinnamon, fenugreek, Allium sativum, Neem, Ocimum sanctum, Ginseng berry, Aloe vera this data process are identify potiential phytoconstituents for treatment of diabetes mellitus.Herbal drugs are controlling diabetes safely effectively and different methods of action experiments on animals and humans. This review important discoveries and medicinal uses herbal treatment for diabetes WHO acknowledges the potiential of herbal drugs in treating different health issues, such as diabetes utilized conventional therapies. It is important to emphasize that herbal treatments are displayed potential diabetes they should be healthcare experts.herbal remedies have been traditionally treat to diabetes.the parts used test models hypoglycaemic [blood-sugar-lowering] active compounds of 20 plant species for 12 families crucial role of plant diabetes. The plants can delay complications from diabetes and metabolic imbalance.This review can attempt to cover for herbal plants like melon, fenugreek, ginseng cinnamon, garlic, gymnema managing blood glucose level due to saponin, terpenoids,flavonoids useful controlling diabetes descrption of gymnema gurmarin possible mechanism the gumarin helps manage taste buds receptors TIR1,TIR3 both β-cells and islets, PPARγ (peroxisome proliferator activated receptor gamma) β-cells is stimulated by gymnema. Plant culture methods gymnemic acid production Diabetes mellitus affecting over 537 million people poses health challenges prevalence and complications like Neuropathy, cardiovascular sylvestre, momordica charantia, trigonella, foenum-graecum cinnamomum veum, Aloe vera and clinical efficacy through results vary due to standardization issues.

Keywords:*Diabetes mellitus; herbal medicine; antidiabetic plants; phytoconstituents; hypoglycemic activity; plant based therapy; Gymnema sylvestre; momordica charantia; Aloe vera; blood glucose regulation; mechanism of action; metabolic disorder*

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INTRODUCTION

Diabetes is caused by body's ability to produce and respond to the pancreatic hormone insulin. One of the important physiological actions of insulin is to be controlling blood glucose levels [1]. Diabetes mellitus can divided into two main types, Type 1, "Juvenile Diabetes Mellitus" (Insulin Dependent Diabetes Mellitus) Type 2, "Adult type" (Non-Insulin Dependent Diabetes Mellitus). [2]. Plants are powerful herbal remedies and natural antioxidants in part because they contain anti-diabetic substances like alkaloids, tannins, phenolic acids, and flavonoids, and enhance the function of pancreatic tissues by either reducing intestinal glucose absorption or increasing insulin secretion [3]. The use of medicinal plants to treat diabetes is now again to being too studied. Prototypic compounds found in medicinal plants have been the source of many traditional drugs [4] diabetes mellitus (DM) is a serious metabolic disorder characterised by high blood glucose levels due to abnormalities in insulin production or insulin resistance [5]. This debilitating disease effects on approximately 29.1 million people of annually in the United States of making it the seventh leading cause of death of according to the Centres for Disease to Controlling and Prevention (CDC) [6]. They are three main types of diabetes: Type 1 Diabetes Mellitus (T1DM), Type 2 Diabetes Mellitus (T2DM), and Gestational Diabetes Mellitus (occurs in pregnant women) [7]. T1DM accounts for 5-10% of all diabetic

cases and it's characterized by body's inability to produce insulin [8]. Diabetic patients often exhibited to symptoms such as excessive thirst, polyuria, blurred vision, and weight loss. If left untreated, diabetes can lead to be severe complications, including keto acidosis, non-ketotic hyperosmolarity, and even mortality. Properly treatment and management of crucial to prevent these complications [9]. In developing countries, pharmaceutical medications and insulin are often scarced and expensive, to making treatment nonaffordable for many [10]. Plants have been used to for centuries to treat various ailments, including diabetes. Bioactive compounds such as tannins, flavonoids, and catechins have to identify as potential anti-diabetic agents[11]. The discovery of effective pharmacological components and therapeutic systems from the natural plants could provide to much-needed solution for diabetes management, particularly in resource-poor settings. .For generations of plants have been used in traditional medicine systems such as a Ayurveda, traditional Chinese medicine, and Native American medicine to help and manage the blood glucose levels. Ginseng, a popular herb in traditional medicine, has found to have antidiabetic effects by improving glucose metabolism and insulin secretionCinnamon has shown to improve insulin sensitivity and reduce fasting blood glucose levels. soluble f iber, can helps regulate blood sugar levels by slowing down the absorption of glucose Garlic is known as to decrease HbA1c level significantly after 13 weeks if used to dose of 750 mg/day, Type 2 diabetes (T2D), comprising 90 95% of cases, is driven to insulin resistance and progressive beta-cell dysfunction, while type 1 diabetes (T1D) results from the autoimmune beta-cell destruction. T2D is characterized by impaired insulin signaling, reducing to glucose uptake via glucose transporting 4 (GLUT4) and muscle and adipose tissues .

PATHOPHYSIOLOGY OF DIABETES MELLITUS

Oxidative stress play on a pivotal and role of the pathophysiology of diabetes mellitus to resulting from the improperly balanced between the production of reactive oxygen species (ROS) the capacity of enzyme tic or non-enzymatic antioxidants.

DIAGNOSIS OF DIABETES MELLITUS

Diagnosis of diabetes mellitus Diabetes are diagnosis is relies heavily on analysing blood sugar levels. Of In healthy individuals, in normal blood sugar levels and ranges from 80 mg/dl when fasting increasing to 160 mg/dl after consuming the meal (postprandial state

3.1 Normal Blood Sugar Levels

1) Fasting: 70mg/dl
2) Postprandial (after meals): up to 150 mg/dl
2) HbA1c: less than 5.7%

3.2 Abnormal Results

1) Fasting: 126 mg/dl or higher (diabetes)
2) Postprandial: 200 mg/dl or higher (diabetes)
3) HbA1c: 6.5% or higher (diabetes)

MEDICINAL PLANT WITH EFFICACIOUS ANTI DIABETIC POTENTIAL

4.1 MOMORDICA CHARANTIA
PLANT NAME: Bitter gourd/bitter melon
BOTANICAL NAME:Momordica charantia L
FAMILY: cucurbitaceous
CLASS: Angiosperms, Dicotyledonae

CHEMICALCONSTITUENTS

Charantia[steroidal saponin]Momordica.
The aqueous solution can be extracts from Tamarindus Indica and Momordica charantia seeds are have demonstrated potent of antidiabetic effects by reducing glucose levels in diabetic adipocytes As expected, adipocytes treated with glucose showed a substantial changing the lipid profiles,

4.2 GINSENG BERRY

PLANT NAME: Ginseng berry
BOTANICAL NAME:panax ginseng C.A Meyer
[Berry of the ginseng plant]
FAMILY: Araliaceae
CLASS: Angiosperms, Dicotyledonae

CHEMICALCONSTITUENTS

Ginsenosides[Rb1,Rg1,Re,Rd-Re is higher in berries]
Polysaccharides
Analysis of the biochemical data can be revealed that red ginseng extract intervention led to significant improvements of total cholesterol (TC), .The ginseng berry (GB) of Ginsenosides treatment led to able to decreasing of blood glucose levels. management of T2DM Ginsenosides Rg5 effectively enhanced hyperglycaemia symptoms, restored intestinal barrier function, alleviated inflammation associated with metabolic endotoxemia, and normalized gut microbiota imbalance in the colon by reducing Firmicutes/Bacteroidetes ratios.

4.3 ALSTONIA SCHOLARIS

PLANT NAME:Devil tree / Blackboard tree / Saptaparni
BOTANICAL NAME: Alstonia scholaris [L.] R.Br.
FAMILY: Apocynaceae
CLASS: Angiosperms, Dicotyledonea

CHEMICAL CONSTITUENTS

- Alkaloids: Echitamine, Alostonine, scholaricine
- Triterpenoids

It contains various Iridoids, alkaloids, coumarins, flavonoids, and leucoanthocyanins, reducing sugars, simple phenolic, steroids, saponins and tannins. .The toxicity of Pulai crude extract was evaluated using the Brine Shrimp Lethality Test (BSLT) method, which revealed an LC50 value of 461 µg/mL, suggesting moderate toxicity.

4.4 ANNONA SQUAMOSA

PLANT NAME: Custard apple / Sugar apple
BOTANICAL NAME; Annona squamosa L.
FAMILY: Annonaceae
CLASS:

- Kingdom: Plantae
- Division: Angiosperms
- Class: Dicotyledonae (Magnoliopsida)
- Order: Magnoliales

CHEMICAL CONSTITUENTS

Annona squamosa contains a wide range of bioactive compounds
Alkaloids – Anonaine, Asimilobine
Annona squamosa is used for diabetes, treating cardiac ailments, thyroid-related disorders, and cancer. Annona squamosa contains phenolics, annonaceous Acetogenins, saponins, flavonoids, alkaloids, T2DM

4.5 ENICOSTEMMA LITTORALE, BLUME [MAMJJIVA]

4.6 CURCUMA LONG LINN

SAFETY: His safety of numerous botanical herbs, including gymnema, has not undergone comprehensive evaluation, raising concerns about their potential risks and side effects. The ten selected herbal plants-Gymnema sylvestre, Momordica charantia, Trigonella foenum-graecum, Cinnamomum verum, Aloe vera,

4.7 TOXICITY

Hepatotoxicity of gymnema; Hepatotoxicity of cisplatin and the role played by gymnema in saving liver from various toxins is induced after cisplatin injection.
Type 2 diabetes mellitus: Clinical trial in a randomized trial, patients with DM 2 can benefit from the combined administration of inositols, α-lactalbumin, G. sylvestre, and zinc, as it has been shown to enhance their lipid metabolic profile.
Tissue culture techniques; certain tissue culture techniques also are useful for enhanced production of gymnemic acid production

4.8 INTERACTION AND LIMITATION

High-dose toxicity is a concern for some plants. Curcuma longa (curcumin >3 g/day) has been associated with rare hepatotoxicity in case reports, particularly in individuals with pre-existing liver conditions Cinnamomum verum contains trace coumarins,

4.9 FUTURE PROSPECTS

The ten selected plants-Gymnema sylvestre, Momordica charantia, Trigonella foenum-graecum, Cinnamomum verum, Aloe vera, Berberis aristata, Ocimum sanctum, Curcuma longa, Panax ginseng, and Salacia reticulate-exhibit diverse phytochemical profileswith Berberis aristata and Trigonella foenum graecum showing efficacy comparable to conventional drugs like metformin, albeit with milder side effects

5.CONCLUSION

A significant number of medications now in use have derived from botanical sources. Due to their growing popularity, it is wise to explore medicinal plant extracts as potential sources for novel antidiabetic hypoglycaemia drugs. Diabetes mellitus continues to pose a substantial worldwide health problem, resulting in millions of fatalities each year.

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7. AUTHOR CONTRIBUTIONS

All authors are contributed equally.

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None

9. DECLARATION COMPETING INTEREST

The authors have no conflicts of interest to declare.

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