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A REVIEW ON SOME POTENTIAL TRADITIONAL PHYTOMEDICINE WITH ANTIDIABETIC PROPERTIES

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ABSTRACT

Diabetes is a chronic carbohydrate, lipid, and protein metabolic condition characterised by elevated fasting and postprandial blood sugar levels. The global prevalence of diabetes is expected to rise from 4% in 1995 to 5.4% by 2025. According to WHO, the majority of the burden will fall on underdeveloped countries. Plants have been used as a source of medicine since prehistoric times. Plants are mentioned in Ayurveda and other Indian literature as being used in the treatment of many human illnesses. There are over 45000 plant species in India, and thousands of them have been claimed to have therapeutic characteristics. In recent decades, research on plants described in ancient literature or used historically for diabetes has revealed anti-diabetic properties

KEYWORDS: Diabetes, Hypoglycemic medications, Traditional medicine, Prehistoric. Etc.

1. INTRODUCTION

Due to its natural origins and absence of side effects, herbal therapy has increased rapidly in popularity in recent years, and both developed and developing nations are beginning to turn to these remedies. Medicinal plants, minerals, and organic materials are the source of many widely used traditional treatments.

Indian traditional health care systems use herbal remedies that contain a variety of medicinal herbs known as rasayana, which have been used for over a millennium.[2] The majority of medical professionals in Indian systems create and administer their own formulae.[3] 21,000 plants are known to be utilized therapeutically worldwide, according to the World Health Organization (WHO). Of the 2500 species found in India, 150 are employed on a reasonably large commercial scale. The world's largest country is India. India is the world's largest producer of medicinal herbs and is known as the botanical garden.

2. Historical Context

Herbal medication with curative and restorative properties is known as phytomedicine. Since the beginning of human society, it has existed. Phytomedicine is the study of treatments based on plants. Although there are around 420,000 plant species on our globe, little is known about them and their many uses. Herbal preparations and products find widespread application in three primary sectors: food (foodstuffs); medicine (traditional and folk treatments); and research (phytochemical studies). The World Health Organization (WHO) states that herbal medicines are among the most sought-after primary health care services for between 3.5 and 4 billion people worldwide. A large percentage of traditional medicine uses decoctions and medicines made from plant extracts, which are sometimes referred to as "modern herbal medicine."

3. Role of phytomedicine in diabetes

3.1 DIABETES

In India, the number of adults with diabetes is thought to be over 33 million. By 2025, this figure is probably going to rise to 57.2 million. A complex metabolic condition known as diabetes mellitus is caused by either inadequate or dysfunctional insulin. Because there are insufficient beta cells, type I diabetes (insulin dependent) is brought on by inadequate insulin production. As a result, those who have it are fully dependent on exogenous sources of insulin, as opposed to those who have Type II diabetes, which is insulin independent and can be managed with dietary changes, exercise, and medication. 90% of people with diabetes have type II diabetes, which is the more prevalent type.

3.2 Both forms of diabetes can cause the following symptoms

- Blood Sugar Levels That Are Abnormally High
- Unusual Thirst,
- Frequent Urination,
- Severe Hunger And Weight Loss,
- Impaired Vision,

- Nausea, And Vomiting,
- Extreme Weakness And Exhaustion,
- Irritability,
- Mood Swings, Etc.

Experimental evidence points to the role of free radicals in the pathogenesis of diabetes and, more crucially, in the emergence of diabetic complications, even though the pathophysiology of diabetes is still not fully understood. Free radicals can affect the way that cells function by harming proteins, lipids, DNA, and other biological components. Numerous recent research have shown that free radical- neutralizing antioxidants can prevent experimentally generated diabetes in animal models as well as lessen the severity of diabetic sequelae.

4. RISK FACTOR

4.1 Type 1 Diabetes

Type 1 diabetes is thought to be caused by an immune reaction (the body attacks itself by mistake). Risk factors for type 1 diabetes are not as clear as for prediabetes and type 2 diabetes. Known risk factors include:

- Family history: Having a parent, brother, or sister with type 1 diabetes.
- Age: You can get type 1 diabetes at any age, but it usually develops in children, teens, or young adults.
- In the United States, White people are more likely to develop type 1 diabetes than African American and Hispanic or Latino people. Currently, no one knows how to prevent type 1 diabetes.

4.2 Type 2 Diabetes

- Have prediabetes.
- Are overweight.
- Are 45 years or older.
- Have a parent, brother, or sister with type 2 diabetes.
- Are physically active less than 3 times a week.
- Have ever had gestational diabetes (diabetes during pregnancy) or given birth to a baby who weighed over 9 pounds.

Are an African American, Hispanic or Latino, American Indian, or Alaska Native person. Some Pacific Islanders and Asian American people are also at higher risk. If you have non-alcoholic fatty liver disease you may also be at risk for type 2 diabetes. You can prevent or delay type 2 diabetes with proven lifestyle changes. These include losing weight if you're overweight, eating a healthy diet, and getting regular physical activity.

5. Phytoproducts Used In Treatment Of Diabetes

Phytomedicine are being looked up for the treatment of diabetes. Numerous conventional medications have been created using prototype molecules in medicine plants. One effective oral glucose-lowering medication is metformin. The usage of Galega officinalis to treat diabetes served as the foundation for its development. Galega officinalis has a lot of guanidine, a substance that lowers blood sugar. The alkyl biguanides synthalin A and synthalin B were initially offered as oral anti-diabetic medications in Europe in the 1920s but were later withdrawn as insulin became more widely available because guanidine is too toxic for therapeutic usage. However, the development of metformin was influenced by the use of guanidine and biguanides. More than 400 conventional plant remedies for diabetes have been documented to date, but only a tiny portion of these have undergone scientific and medical evaluation to determine their usefulness recent reviews and studies.

Some herbal extracts have been shown to have hypoglycemic effects in type 2 diabetes models in both humans and animals. The World Health Organization's Expert Committee on Diabetes has advised greater research into traditional medicinal herbs. Lack of scientific and clinical evidence demonstrating herbal medicine's efficacy and safety is a major barrier to its incorporation into current medical practises. Clinical studies on herbal medicines are required, as are the creation of straightforward bioassays for biological standardisation, pharmacological and toxicological evaluation, and the creation of numerous animal models for testing toxicity and safety. Establishing the active component(s) from these plant extracts is also crucial.

RESEARCHS

In the past thirty years, numerous evaluations on plants that were tested for hypoglycemic action in India and other countries have been published. In the most recent months, two thorough reviews based on a global literature study of 150 plants and 343 plantsfrom various international locations. In recent years, scientists and laypeople alike have become more interested in certain plants, including –

Allium cepa (onion, piyaj), Allium sativum (garlic, lasun), Momordica charantia (bitter gourd, karela), Gymema sylvestre (Gurmar), Pterocarpus marsupium (Vijay-) sar, etc.

Here, a select few phytomedicines will be briefly yet thoroughly explored. Water extracts or alcoholic extracts of the plants have often been tested in animal research. Several research have looked into the hypoglycemic potential of plant active ingredients. Over the course of several decades.

Systematic screening programme of plants available in India

Only 11 plants had positive hypoglycemic action reported by the Central Drug Research Institute (CDRI), Lucknow (India) in October 1989, and none of them were deemed encouraging enough to be pursued for further research. Glycosides, alkaloids, glycans, triterpenes, mucilages, polysaccharides, oils, vitamins, saponins, glycoproteins, peptides, amino acids, and proteins are a few of the main chemical components of plants that are credited with having hypoglycemic activity. Recently, reports on up to 20 plant mucilages

with hypoglycemic action were reviewed. Among these, mucilages isolated from Malavaceous plants that exhibit hypoglycemic activity have been discovered to have highly interesting chemical structures related to a trisaccharide structural unit, offering fascinating leads on structure-activity relationships. Animal models used for pharmacological screening for hypoglycemia action include normal, fasting rats and rabbits; rabbits treated with alloxan; Adrenaline, corticosterone, somatotropin, streptozotocin, and pancreatectomy all cause hyperglycemia in rats. Diverse groups of Indian researchers have reported conflicting results on plants including Momordica charantia and Pterocarpus mar sup um. In the majority of research, M. Charantia has demonstrated hypoglycemic action. Thus, M. Charantia seeds proved hypoglycemic in streptozotocin-induced diabetes in rabbits in normal rabbits,[41] while the fruit of this plant demonstrated hypoglycemic effect in normal & alloxan-induced diabetic rabbits.

Table 1: Some Important Examples of Potential Anti Diabetic Phytomedicine.

S.N.	Botanical Name	Family	Ethnobotanical uses
1	Acacia arabia	Mimosaceae	Seeds hypoglycemic
2	Azadirachta indica	Meliaceae	Leaves anti diabetic
3	Bombax ceiba L	Bombacaceae	Seed powder with goat's milk is taken
4	Brassica juncea	Bracecaceae	Seed powder with milk
5	Coccinia indica	Cucurbitaceae	Leaf / Fruit decoction is taken topically
6	Erythrina indica	Fabaceae	Leaves consumed to treat diabetics
7	Ficus benghalensis	Moraceae	Fruits taken to treat diabetics.
8	Gymnema sylvestre	Apocyanaceae	Leaf made to juice and taken orally
9	Hibiscus rosa-sinesis	Malvaceae	Tender fresh leaves used to cure diabetes
10	Ipomoea batatas	Convolvulaceae	Leaf juice is taken to trat daibetes
11	Jatropha glandulifera	Euphorbiaceae	Tubers boiled and taken to treat diabetics
12	Lantana camara	Verbenaceae	Leaf and fruit consume raw
13	Mangifera indica	Anacardiaceae	Dry kernel powder in cow milk
14	Nelumbo nucifera	Nymphiaceae	Flowers made to juice and taken orally.
15	Ocimum santum	Lamiaceae	Leaf powder in Honey taken oral
16	Punica granatum	Punicaceae	Fruit is used to treat Diabetics.
17		Myrtaceae	Seed powder reduce Blood sugar/ diabetics

Table 2: The list of potential hypoglycemic plant families, scientific name of the plant, route of administration, animal used, dose, active ingredient and their effects.

Biological family	Route of administration	Animal used	Does	Active ingredients	Effect
Amaranthaceae (Achyranthes aspera)	Oral	Alloxanised diabetic rat	200 mg/kg	Calcium, magnesium, manganese,z inc and copper	Significant dose releted hypoglycemic effect
Chenopodiaceae (Beta vulgaris var.Cicla L.)	Oral	Streptozotocin-diabetic rats.	0.5,2 and	Betavulgarosi des I, II, III, IV, VI, VII, VIII oleanolic acid oligoglycosid es	Inhibited the Increase in the nonenzymatic glycosylation of skin proteins and blood glucose
Apocynaceae (Rhazya stricta	Oral	Adrenaline-induced hyperglycaemic mice	5 g/kg	Alkaloids, flavonoids	Glycaemia was reduced by approximately 6, 8 and 30 %, respectively
Araliaceae (Ginseng Radix)	I.V.	Wiztar rats	100	Ginseng polypeptide	Lowered blood glucose levels in diabetic patients
Anacardiaceae (Mangifera indica)	Oral	Male swiss mice	150mg/kh	Mangiferin, sucrose Xylose, flavonidal tannins	Hypoglycaemic action due to a reduction in the intestinal absorption of glucose

Apiceace (Daucus carota)	Oral	Alloxan-induced diabetic rabbits	150 mg/kg	Pectin,caroti m, volatile oil,albumin	Improve the glucose tolerance
Acanthaceae (Asteracantha longifolia)	Oral	Alloxanised diabetic rat	200 mg/kg	Ginseng polypeptide	Improve glucose Tolerance in healthy human subjects and diabetic patients

CONCLUSION

Diabetes is a long-term condition of the metabolism of carbohydrates, fats, and proteins marked by elevated fasting and postprandial blood sugar levels. According to estimates, the prevalence of diabetes will rise from 4% in 1995 to 5.4% by 2025. According to WHO, developing nations will bear the majority of the burden. Studies carried out in India over the past ten years have shown that not only is the prevalence of diabetes high, but it is also rising quickly among urban residents. An estimated 33 million persons in India have diabetes, according to estimates. By 2025, this figure is probably going to rise to 57.2 million. Once more, Phytomedicine is being researched for the treatment of diabetes. Many traditional medications have been created using chemicals that originated in medicinal plants. We think that both scholars and practitioners will find the list of medicinally significant families and plants offered in this review to be helpful.

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