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Research Article

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Antidiabetic activity of Glyconil-H Tablets

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Abstract
Diabetes is a chronic illness characterized by elevated levels of blood glucose, accompanied by disturbed metabolism of fats and proteins. In this research, antidiabteic effect of Glyconil-H Tablets was studied. The Glyconil-H Tablets is composed of *Momordica charantia* and *Acacia arabica*. After taking orally tablet Glyconil-H treated subject for 15 days treatment. Highly significant reduction in blood sugar level was observed in all the subject who administered tablet Glyconil-H.

Keywords: Antidiabetic activity, Glyconil-H**,** *Momordica charantia* and *Acacia arabica*

Introduction

Diabetes is a persistent medical condition marked by high levels of blood glucose, along with disrupted metabolism of fats and proteins. The increase in blood glucose levels occurs when it cannot be broken down in the cells, either because the pancreas does not create enough insulin or because the cells are unable to efficiently utilize the insulin that is being produced. Diabetes can be classified into three primary categories: (1) Type 1 diabetes is characterized by the pancreas's inability to produce insulin. (b) Type 2 diabetes occurs when the body cells become resistant to the insulin being produced, leading to a gradual decrease in insulin production. (c) Gestational diabetes occurs during pregnancy and can result in complications for both the mother and the baby, as well as an increased risk of type 2 diabetes for the mother and obesity in the offspring [1-5].

Incidence of Type 1 diabetes is highest in children, adolescents, and young adults. The etiology of the phenomenon remains unknown. Type 1 diabetes is thought to result from a mix of genetic predisposition and external influences. Despite thorough investigation into potential biological, chemical, dietary, and behavioral factors, no definitive etiology has been established for a substantial number of cases. The risk factors for type 2 diabetes are widely recognized. While genetics plays a significant role, most occurrences of this condition are associated with risk factors such as age, being overweight or obese, and lack of physical activity [6-8].

Unmanaged diabetes results in problems in multiple organs. Damage to both microvascular and macrovascular structures results in visual impairment, renal dysfunction, myocardial infarctions, cerebrovascular accidents, and lower extremity amputations. Diabetes results in impairment and reduces lifespan [9-12].

The entire economic impact of diabetes, including both direct and indirect expenditures, is projected to reach US$ 1.7 trillion. This includes US$ 800 billion for low- and middle-income nations. In addition to the financial strain on the healthcare system and the whole economy, diabetes frequently results in significant personal expenses through out-of-pocket payments and the loss of income owing to disability and premature death [13-16].

Momordica charantia is the scientific name for a plant often known as bitter melon.

Throughout history, plants and herbal medicines have been utilized as medicinal remedies. Research conducted in recent decades has confirmed numerous assertions regarding the utilization of various plants in traditional medicine. The investigator's attention was drawn to the popularity of Momordica charantia (MC) in various traditional medicine systems for treating a wide range of ailments, including diabetes, abortion, parasitic worm infections, contraception, painful menstruation, skin conditions such as eczema and psoriasis, malaria, promoting lactation, gout, jaundice, abdominal pain, kidney stones, constipation, leprosy, abnormal vaginal discharge, hemorrhoids, pneumonia, purging the bowels, rheumatism, fever, and scabies. More than 100 research employing contemporary methodologies have verified its efficacy in treating diabetes and its associated problems such as nephropathy, cataract, and insulin resistance. Additionally, it has been proven to possess antibacterial and antiviral properties, including effectiveness against HIV infection. Furthermore, it has demonstrated anthelmintic properties and can also serve as an abortifacient. Historically, it has also been utilized in the treatment of peptic ulcers. Interestingly, recent experimental studies have demonstrated its potential effectiveness against Helicobacter pylori. Significantly, research has demonstrated the effectiveness of this treatment in treating a range of cancers, including lymphoid leukemia, lymphoma, choriocarcinoma, melanoma, breast cancer, skin tumor, prostatic cancer, squamous carcinoma of tongue and larynx, human bladder carcinomas, and Hodgkin's disease [17].

Momordica charantia L., often known as M. charantia, is a plant that belongs to the Cucurbitaceae family. It is found in many tropical and subtropical climates across the globe. Traditionally, it has been employed in traditional medicine to manage diabetes mellitus, and its fruit has served as a culinary vegetable for countless centuries. This plant contains phytochemicals such as proteins, polysaccharides, flavonoids, triterpenes, saponins, ascorbic acid, and steroids. Momordica charantia, also known as bitter melon, has been found to exhibit a wide range of biological activities. These include antihyperglycemic, antibacterial, antiviral, antitumor, immunomodulation, antioxidant, antidiabetic, anthelmintic, antimutagenic, antiulcer, antilipolytic, antifertility, hepatoprotective, anticancer, and anti-inflammatory activities. Nevertheless, both laboratory research conducted on isolated cells and experiments conducted on living organisms have also shown that M. charantia might have harmful or unfavorable effects under various circumstances. This review examines the chemical components of M. charantia and explores their pharmacological effects and potential negative consequences. The goal is to offer a thorough understanding of the plant's phytochemistry and biological properties. [18]

Bitter melon (Momordica charantia) is an alternate treatment largely utilized for reducing blood glucose levels in individuals with diabetes mellitus [19-21].

Acacia Arabica is the scientific name for a specific species of tree.

Given the increasing environmental awareness regarding carbon emissions, natural fibers are considered the optimal choice and serve as a replacement for synthetic fibers due to their inherent qualities. Cellulosic fibers derived from Acacia arabica bark were discovered. The objective of this study was to analyze the properties of Acacia arabica fibers (AAFs) obtained from the bark of the A. arabica tree. The physicochemical characteristics of the fibers were assessed through thermal stability analyses, X-ray diffraction, chemical composition analysis, and Fourier transform infrared spectroscopy. The parameters of cellulose content (68.1 wt%), density (1028 kg m^{-3}), and crystallinity index (51.72%) were determined.

Normal and alloxan-diabetic rabbits were given doses of 2, 3, and 4 grams per kilogram of body weight of powdered seeds from Acacia arabica and roots from Caralluma edulis. The blood glucose levels were measured prior to and at 2, 4, 6, and 8 hours following the administration of the plant suspension. The powdered seeds of Acacia arabica demonstrated a statistically significant ($p < 0.05$) hypoglycemic impact in normal rabbits. The hypoglycemic effect observed in alloxan diabetic rabbits was not statistically significant ($P > 0.01$). No significant hypoglycemic impact was observed in normal or alloxan diabetic rabbits when the powdered roots of Caralluma edulis were administered ($p > 0.01$). The administered amounts did not exhibit any immediate harmful effects or alterations in behavior. The study suggests that the powdered seeds of Acacia arabica stimulate the secretion of insulin from the pancreatic beta cells in normal rabbits. In addition, Caralluma edulis did not demonstrate any hypoglycemic impact in both healthy and diabetic rabbits.

Acacia arabica has been traditionally employed for the treatment of various disorders, including diabetes. This work clarified the antidiabetic effects of A. arabica bark and identified the bioactive compounds responsible. The measurement of insulin production and signal transduction was conducted using clonal β cells and mouse islets. Glucose uptake was evaluated using 3T3-L1 adipocytes, and additional glucose-lowering activities were tested utilizing in vitro systems. The study utilized obese rats that were fed a high-fat diet (HFF) to evaluate the effects in vivo. Phytoconstituents were then extracted and characterized using RP-HPLC, followed by LC-MS and NMR techniques. The hot-water extract of A. arabica (HWAA) significantly enhanced insulin secretion from clonal β cells and mouse islets, resulting in a 1.3 to 6.8-fold increase and a 1.6 to 3.2-fold increase, respectively. Diazoxide, verapamil, and calcium-depleted circumstances resulted in a reduction in insulin secretion by 30-42%. On the other hand, the insulin-secretory effects were enhanced by isobutylmethylxanthine (IBMX), tolbutamide, and 30 mM KCl. The mechanism of action of HWAA involves membrane depolarization and a rise in intracellular Ca^{2+} levels, as well as an enhancement in glucose absorption by 3T3-L1 adipocytes. Additionally, HWAA inhibits starch digestion, glucose diffusion, dipeptidyl peptidase-IV (DPP-IV) enzyme activity, and protein glycation. Administering a high dose of HWAA (250 mg/5 mL/kg) improved glucose tolerance and increased plasma insulin levels in obese rats with HFF. Treatment with HWAA (250 mg/5 mL/kg) for a duration of 9 days resulted in enhanced regulation of glucose levels and improved functioning of β-cells, leading to better control of blood sugar and increased levels of circulating insulin. Phytoconstituents, such as quercetin and kaempferol, when tested in a controlled environment, were found to enhance insulin production and enhance the body's ability to tolerate glucose. The findings suggest that HWAA could be used as a dietary supplement or as a source of antidiabetic drugs, such as quercetin and kaempferol, for the treatment of type 2 diabetes [22-24].

Composition of Glyconil-H Tablets

Table 1: Composition of Glyconil-H Tablets

Sr. No.	Ingredient	Latin name	Part of plant	Quantity	Proof of Concept
1	Karela	Momordia charantia	Fruit	240 mg	BPN
2	Babool Gond	Acacia Arabica	Niryas	10 mg	API I/I

Clinical Study

This clinical study conducted as per the study inclusion criteria. We also included studies in adult human subjects with type 2 diabetes mellitus, non-inulin-dependent diabetes mellitus, and adult on-set diabetes.

Enrolled Subject Criteria:

Table 2: Subjects enrolled in the study.

S. No.	Age Group (Years)	No. of Subjects	Blood Glucose (mg/dl)
1.	21-30	3	250
2.	31-40	4	225
3.	41-50	5	275
4.	51-60	6	325
7.	Above 61	7	350
8.	Total	25	-

Before enrolling the study the subjects blood glucose level was measured.

1. The study drug Glyconil-H was given orally as per the study regimen. The study drug was given orally as per the per protocol.
2. Study Drug Glyconil-H given 1 tablet Morning and 1 Tablet Evening for 15 days.
3. Study protocol after completion of regimen Blood Glucose was measured from GOD Method.

Estimation of Blood Glucose

Using a commercial kit called Erba, the serum glucose concentration was estimated. The glucose oxidase (GOD) method, which is based on protocol [25], was used to estimate the concentration of glucose in serum. The enzyme glucose oxidase converts glucose to hydrogen peroxide and glutamic acid. The enzyme peroxidase catalyses the 4-Hydroxy benzoic acid (4HBA) and 4-Aminoantipyrine (4AAP) were coupled oxidatively to produce a colour quinonimine complex, and the absorbance was proportionate to the glucose concentration. For an hour, the final hue remains constant when shielded from light and impurities.

The amount of pink colour, which was measured at 505 nm using an ELICO SL 244 double beam UV VIS spectrophotometer, is directly correlated with the content of glucose.

Results & Discussion

The tannin and its derivatives selling the boosts insulin secretion and improves the feature of pancreatic β-cells as found out with the aid of using numerous previous studies. The antidiabetic potential of flavonoids in the end governs with the aid of using the law of carbohydrate digestion, insulin signalling, insulin secretion, glucose uptake, and adipose deposition observed various researchers.

Table 3: Blood Glucose after Treatment

S. No.	Age Group (Years)	No. of Subjects	Blood Glucose (mg/dl)
1.	21-30	3	125
2.	31-40	4	169
3.	41-50	5	170
4.	51-60	6	225
7.	Above 61	7	200
8.	Total	25	-

After taking orally tablet Glyconil-H treated subject for 15 days treatment. Highly significant reduction was observed in all the subject who take Tablet Glyconil-H.

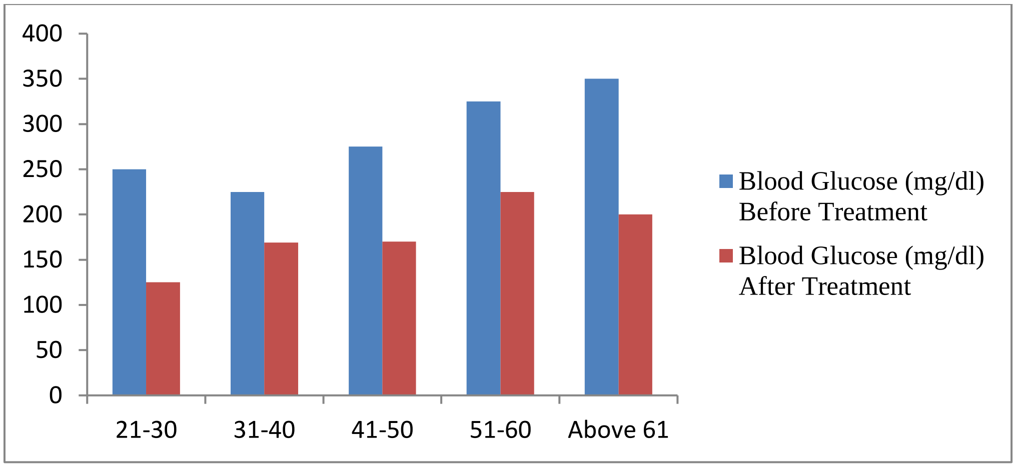

Figure 1: Blood Glucose Levels before and after Treatment

Conclusion

Tablet Glyconil-H twice daily after meals for 15 days, showing good results for down blood sugar levels. There is no major side effects observed in patients who taking this tablet Glyconil-H.ABC

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