International Journal of Pharmacology and Clinical Research (IJPCR)

ISSN: 2349-5448

IJPCR |Vol.9 | Issue 4 | Oct - Dec -2025

www.ijpcr.net

DOI : https://doi.org/10.61096/ijpcr.v9.iss3.2025.719-728

Research

PHARMACOLOGICAL SCREENING AND PHYTOCHEMICAL EVALUATION OF ANTI-DIABETIC ACTIVITY OF ALOVERA IN ALLOXAN INDUCED DIABETIC RATS

Syed Ameer Basha[1*], B. Sandeep[2], Dr. l. Harikiran[2]

[1,2] *Department Of Pharmacology, Princeton College Of Pharmacy In Narapally, Ghatkesar, Telangana.*

*Corresponding Author: Syed Ameer Basha
Email: princeton.pharmacy@gmail.com

Published on: 17.11.2025

Published by:
Futuristic Publications

Abstract

Diabetes mellitus is a most common endocrine disorder, affecting more than 300 million people worldwide. For these therapies developed along the principles of allopathic are often limited in efficacy, Carry the risk of adverse effects, and are often too costly, especially for the developing world. In order to identify complementary or alternative approaches to existing medications, we studied the anti-diabetic potential of leaves of *Alovera*. The acute oral toxicity studies of the extracts revealed no toxic effects up to the levels of 2000mg/kg b.wt. The aqueous and alcoholic extracts of 20 and 30mg/kg body weight of *Alovera* was screened for the presence of hypoglycemic and antidiabetic activity. In this study diabetes was induced by a single IP dose Alloxan monohydrate in 72hrs fasted rats. The FBGL was carried on 7th, 14th and 21st day and OGTT was measured on 8th, 15th and 22nd day. Glibeclamide was taken as the standard and the results are quite comparable with it. The studies were indicated that the leaves of *Alovera* are effective in regeneration of insulin secreting β-cells and thus possess antidiabetic activity. The aqueous and alcoholic extracts showed significant effect in decreasing the Fasting blood Glucose level and oral glucose tolerance test of rats and it's also showed good hypoglycemic activity in normal glycemic rats. The preliminary phytochemical analysis of the extracts of *Alovera* revealed the presence of Alkaloids, Tannins, Anthraquinones, Flavonoids, Saponins, Triterpenes, Sterols, Coumarin as the possible biologically active principles.

Keywords: *Alovera*, Alloxan monohydrate, Glibenclamide, FBGL and OGTT.

INTRODUCTION

1.1-Diabetes Mellitus (DM):

Diabetes is one of the most common non-communicable diseases and a serious life-long condition appearing worldwide. The etiology of diabetes is a complex interaction of genetic and environmental factors. It is a heterogeneous group of metabolic disorders characterized physiologically by dysfunction of pancreatic beta cells and deficiency in insulin secretion or insulin activity and clinically by hyperglycemia or impaired glucose tolerance and other manifestable disorders. It is an endocrinological syndrome abnormally having high levels of sugar in the blood. This may be either due to insulin not being produced at all, is not made at sufficient levels, or is not as effective as it should be.

Diabetes is still a serious health problem all over the world since it is associated with increased morbidity and mortality rate. When compared with the general population, mortality and morbidity increase in diabetes is mainly due to the associated chronic complications both specific (microvascular) and nonspecific (macrovascular). Since the disease prevails in both genders and in all age groups, the general public has a concern about its control and treatment[1].

1.2-Classification of DM

Diabetes is classified by underlying cause. The most common forms of diabetes are categorized as

Type 1, or insulin-dependent diabetes mellitus (IDDM) - an autoimmune disease in which the body's own immune system attacks the pancreatic beta cells, rendering it unable to produce insulin and

Type 2, or non-insulin-dependent diabetes mellitus (NIDDM) - in which there is resistance to the effects of insulin or a defect in insulin secretion.

Type 2 diabetes commonly occurs in adults associated with obesity. There are many underlying factors that contribute to the high blood glucose levels in these individuals. An important factor is the resistance to insulin in the body essentially ignoring its insulin secretions. A second factor is the decreased production of insulin by the cells of the pancreas. Therefore, an individual with Type 2 diabetes may have a combination of deficient secretion and deficient action of insulin. In contrast to Type 2 diabetes, Type 1 diabetes most commonly occurs in children and is a result of the body's immune system attacking and destroying the beta cells. The trigger for this autoimmune attack is not clear, but the result is the end of insulin production[2].

Multiple risk factors for the development of Type 2 diabetes mellitus[3]:

- Family history (parents with diabetes).
- Obesity (i.e., ≥20% over ideal body weight or body mass index ≥25kg/m^2).
- Habitual physical inactivity.
- Impaired glucose tolerance.
- Hypertension (≥140/90mm Hg in adults).
- High density lipoprotein (HDL) cholesterol ≤ 35mg/dl and/or triglyceride level ≥ 250mg/dl.

1.4-Epidemiology[6]

Present status projects that incidence of diabetes is on rise. Present number of diabetics worldwide is 150 million and according to new estimates from researchers at the World Health Organization (WHO), there will be an increase of about 300 million or more by the year 2030 (Warner, 2004). Only in year 2001, about 441,004 deaths were registered and 49,855 of them provoked by diabetes, representing 11.2% of the total population. In United States, diabetes is the sixth leading cause of death. The prevalence of diabetes mellitus is rapidly increasing worldwide and India is estimated to have 31 million diabetics from the total population of the world. Diabetes is predicted to become one of the most common diseases in the world within a couple of decades, affecting at least half a billion people.

The driving force behind the high prevalence of diabetes is the rise of obesity, sedentary lifestyle, consumption of energy rich diet, etc. The diabetes epidemic is accelerating in the developing world, with an increasing proportion of affected people in younger age groups.

The prevalence of Type 2 diabetes is now at epidemic proportions. Type 2 diabetes has a significant impact on the health, quality of life, and life expectancy of patients, as well as on the health care system. Type 2 diabetes accounts for about 90-95 % of population while Type 1 diabetes accounts for about 5 -10% of the total population. In the past, Type 2 was rarely seen in the young, but recent reports describe Type 2 diabetes being diagnosed even in children and adolescent[7].

1.6-SIGNS AND SYMPTOMS[11]:

In both the types of diabetes, signs and symptoms are more likely to be similar as the blood sugar is high, either due to less or no production of insulin, or insulin resistance. In any case, if there is inadequate glucose in the cells, it is identifiable through certain signs and symptoms. These are quickly relieved once the diabetes is treated and also reduce the chances of developing serious health problems.

Type 1 Diabetes:

In type 1 the pancreas stops producing insulin due to autoimmune response or possibly viral attack on pancreas. In absence of insulin body cells don't get the required glucose for producing ATP (Adenosine Triphosphate) units which results into primary symptom in the form of nausea and vomiting. In later stage, which leads to ketoacidosis, the body starts breaking down the muscle tissue and fat for producing energy hence, causing fast weight loss. Dehydration is also usually observed due to electrolyte disturbance. In advance stages, coma and death is witnessed.

Type 2 Diabetes:

Increased fatigue: due to inefficiency of the cell to metabolize glucose, reserve fat of body is metabolized to gain energy. When fat is broken down in the body, it uses more energy as compared to glucose; hence body goes in negative calorie effect, which results in fatigue.

Polydypsia: As the concentration of glucose increases in the blood, brain receives signal for diluting it and, in its counteraction we feel thirsty.

Polyuria: Increase in urine production is due to excess glucose present in body. Body gets rid of the extra sugar in the blood by excreting it through urine. This leads to dehydration because along with the sugar, a large amount of water is excreted out of the body.

Polyphagia: The hormone insulin is also responsible for stimulating hunger. In order to cope up with high sugar levels in blood, body produces insulin which leads to increased hunger.

Weight fluctuation: Factors like loss of water (polyuria), glucosuria, metabolism of body fat and protein may lead to weight loss. Few cases may show weight gain due to increased appetite.

Blurry vision: Hyperosmolar, hyperglycaemia, nonketotic syndrome is the condition when body fluid is pulled out of tissues including lenses of the eye; this affects it's to focus, resulting blurry vision.

MATERIALS AND METHODS

The designing of methodology involves a series of steps taken in a systematic way in order to achieve the set goal(s) under the prescribed guidelines and recommendations. It includes in it all the steps from field trip to the observation including selection and collection of the medicinal plant, selection of dose value, standardization of protocol, usage of instruments, preparation of reagents, selection of specific solvents for extraction, formation of protocols and final execution of the standardized protocol. All this requires good build of mind and a good and soft technical hand to handle the materials and procedure in a true scientific manner.

6.1 Drugs and Chemicals

Drugs and Chemicals used in this study were of analytical grade and of highest purity procured from standard commercial sources in India.

Alloxan	Quali Kems Fine Chem Pvt, Ltd, Vadodara
Methanol	ChangshuYangyuan Chemicals, China.
Alcohol	ChangshuYangyuan Chemicals, China.
Glibenclamide	Orchid Pharma Ltd, Chennai.

6.2. Instruments

Following instruments were required for the study:

Centrifuge	Dolphin
Digital weighing balance	Horizon
Glucometer	Horizon
Heating mantle	ASGI®
Refrigerator	Videocon
Soxhlet extractor	ASGI®
Condenser	ASGI®
Burette stand	Dolphin

Round bottom flask ASGI® , Amar
Mixer Videocon

6.5. Preparation of plant extracts:
6.5.1 Preparation of Aqueous Extract:

Dried leaves of *Alovera* were taken about 20gms into 250ml beaker containing 200ml of water. The contents were mixed well and then the mixture was boiled upto 80-90^{0}C for 4-5hrs. Further the extract was filtered with whatmann filter paper. The filtrate was boiled until the concentrated residue is formed. The concentrated product was sealed in sample covers and stored under room temperature and used for further experiment to check the activities.

6.5.2 Preparation of Alcoholic Extract:

Dried leaves of *Alovera* were taken about 20gms into 250ml beaker containing 200ml of Alcohol. The contents were mixed well and then the mixture was boiled up to 50-60^{0}C for 4-5hrs. Further the extract was filtered with whatmann filter paper. The filtrate was boiled until the concentrated residue is formed. The concentrated product was sealed in sample covers and stored under room temperature and used for further experiment to check the activities.

6.8. Pharmacological evaluation
Preparation of extracts:

The aqueous and alcoholic extracts of *Alovera* suspended in water in presence of 3%v/v Tween-80 solution.

All the drugs were administered orally for experimental purpose. Each time preparations of the extracts were prepared when required. The drugs were administered at a constant volume of 10ml/kg for each animal.

6.9. Acute Oral Toxicity:

The acute oral toxicity of aqueous and alcoholic extracts of *Alovera* was determined by using Albino wistar rats (200-250g) which were maintained under standard conditions. The animals were fasted 12 hour prior to the experiment, up and down procedure OECD guideline no. 425 were adopted for toxicity studies. Animals were administered with single dose of individual extract up to 2000mg/kg and observed for its mortality during 2days and 7days study period (short term) toxicity and observed up to 7days for their mortality, behavioral and neurological profiles.

Group Classification:

Group	Treatment	Dose(mg/kg)
Group 1	Normal control received distilled water	10ml/kg
Group 2	Standard group received Glibenclamide	10ml/kg
Group 3	Aqueous extract of *Alovera*	20 mg/kg
Group 4	Aqueous extract of *Alovera*	30 mg/kg
Group 5	Alcoholic extract of *Alovera*	20 mg/kg
Group 6	Alcoholic extract of *Alovera*	30 mg/kg

Procedure:

Animals were divided randomly into six groups of four and each was fasted to overnight. The blood samples were withdrawn by tail vein at 0hour i.e. before I.P administration of extracts/standard/vehicle. Then blood was collected at an interval of 1, 2, 4, and 8 hour after the administration on 0th, 7th, 14th and 21st day respectively according to procedure blood glucose levels were measured by glucometer (ONE TOUCH glucometer).

RESULTS

7.1 Phytochemical screening of *Alovera*.

The present investigation concluded that the isolated compounds from the plant *Alovera* shows the various Pharmacological effects was determined due to the presence of different phytochemical compunds. Further study is needed for the isolation of the constituents present in the plant and its individual pharmacological activity should need to consider and ultimately it should be implemented for the benefit to human beings.

Table 1. Phytochemical screening of *Alovera*.

S.No.	Phytoconstituents	Aqueous	Alcoholic
1.	Alkaloids	-	+
2.	Tannins	+	-
3.	Anthraquinones	+	+
4.	Flavonoids	-	+
5.	Saponins	-	-
6.	Triterpenes	+	-
7.	Sterols	+	+
8	Coumarin	-	+

7.2 Acute toxicity testing

Acute toxicity studies revealed that the alcoholic extracts of *Alovera* were safe up to 2000 mg/kg of body weight and approximate LD 50 is more than 2000 mg/kg. No lethality or any toxic reactions was observed up to the end of the study period.

7.3 HYPOGLYCEMIC ACTIVITY IN NORMAL RATS

Fasting Blood Glucose Levels (FBGL) were within the range of 90-105 mg/dl in all the groups at 0day. Repeated treatment with the doses of aqueous and alcoholic extract (100 and 200 mg/kg) significantly decrease the blood glucose level on 7^{th}, 14^{th} and 21^{st} day, indicating that the extract produce significant hypoglycemic activity after repeated administration. Glibenclamide (10mg/kg) also significantly reduced Fasting Blood Glucose Level (FBGL) after repeated administration as compare to normal control group. Changes in FBGL in different groups after repeated dose administration are summarized in Table No: 10

Repeated administration of both aqueous and alcoholic extracts had significantly ($p<0.005$) reduced the FBGL on 7^{th}, 15^{th} and 21^{st} day, indicating these extracts can produce hypoglycemia on repeated administration. However hypoglycemic activity was more significant on 7^{th}, 14^{th} and 21^{st} day for Glibenclamide treated as compare with other groups. The results suggest that the both aqueous and alcoholic extracts possess significant hypoglycemic activity after repeated dose administration. The detailed results are summarized in TableNo: 10

- **Effect of extracts of *Alovera* on fasting blood glucose level (FBGL) in normal rats**

Table 2: Effect of extracts of *Alovera* on fasting blood glucose level (FBGL) in normal rats.

Treatment	Dose (mg/kg)	Blood glucose level(mg/dl)		
		7^{th} day	**14^{th} day**	**21^{st} day**
Normal control	**-**	87.18±2.63	76.59±1.89	71.18±2.63
Glibenclamide	10	82.75±4.28	74.35±1.96	70.12±1.53
AQAV1	20	89.17±1.60	82.58±2.15	78.86±5.46
AQAV2	30	83.52±4.98	76.17±2.95	71.15±3.75
ALAV1	20	76.7±2.91	65.85±1.38	60.17±6.78
ALAV2	30	86.2±9.70	76.14±6.18	70.18±5.35

Values are expressed as mean± S.E.M. n=6. Significant values were compared with $p<0.005$, normal control Vs all groups. Parent thesis indicates % reduction in BGL.

- **Oral glucose tolerance test (OGTT) -**

Both the aqueous and alcoholic extracts of *Alovera* significantly ($P<0.005$) suppress the rise in FBGL after glucose load (2g/kg) in rats, at first half-an-hour and up to 2hr time period as compare with other groups extract Glibenclamide on 8^{th}, 15^{th} and 22^{nd} day. While aqueous and alcoholic extracts produced significant reduction in FBGL. Glibenclamide (10mg/kg) showed ($P<0.005$) significant suppression in FBGL rise at first half-an-hour, 1hr and normalized FBGL within 2hr. The detailed results are summarized in Table No: 11

Table 3: Effect of extracts of *Alovera* on 8th, 15th and 22nd day in normal rats.

Treatment	Dose (mg/kg)	Blood glucose level(mg/dl)		
		8th day	15th day	22st day
Normal control	-	89.12±5.15	82.75±1.14	75.36±2.79
Glibenclamide	10	85.17±3.58	75.14±2.93	70.96±4.35
AQAV1	20	86.35±5.18	78.15±1.72	68.52±4.14
AQAV2	30	83.12±3.79	77.37±2.83	65.12±3.65
ALAV1	20	90.35±2.56	82.12±3.96	72.43±2.34
ALAV2	30	75.86±2.42	65.28±2.75	58.99±2.10

Values are expressed as mean ± S.E.M. n=6. Significant values were compared with P<0.005. Normal control Vs all groups. Paranthesis indicates % reduction in BGL.

7.4 ANTI-DIABETIC ACTIVITY IN ALLOXAN INDUCED DIABETIC RATS

Fasting blood glucose levels (FBGL) in normal rats were in range of 90-100 mg/dl. Treatment with alloxan (120 mg/kg, I.P.) had increased the FBGL to range of 252-266 mg/dl after 72 hours. These values on subsequent days got stabilized by day seven on an average between 255 mg/dl.

Changes in the fasting blood glucose levels in different groups are tabulated in Table No: 11. This data shown that blood glucose level of normal control animals has maintained throughout the study period.

The diabetic control group has shown significant increase in fasting blood glucose levels during this 21st day study period. Glibenclamide (10mg/kg) treated group has shown (p<0.05) significant decrease in fasting blood glucose level during 7th, 14th and 21st day of study period.

- **Effect of *Alovera* extracts on antidiabetic activity in alloxan induced diabetic rats**

The animals treated with 100 and 200mg/kg of aqueous and alcoholic of different extracts shown significant decrease (P<0.05) in FBGL on 7th, 14th and 21st day of treatment when compare to other groups of animals. The aqueous extracts have reduced more (%) in FBGL when compared to alcoholic extracts except standard group. The detailed results are summarized in TableNo: 12

Table 4: Effect of extracts of *Alovera* on fasting blood glucose level (FBGL) in Alloxan induced diabetic rats.

Treatment	Dose (mg/kg)	Blood glucose level(mg/dl)		
		7th day	14th day	21st day
Normal control	-	85.70±6.90	75.82±5.15	68.36±2.98
Diabetic control	**10**	296.15±21.53	272.52±12.15	265.58±24.39
Glibenclamide	**10**	263.10±25.19	246.14±85.28	228.14±52.76
AQTP1	**20**	375.29±68.17	360.35±15.85	332.74±12.63
AQTP2	**30**	381.26±15.89	368.24±19.85	351.23±21.96
ALTP1	**20**	292.15±86.75	271.15±59.13	221.85±36.15
ALTP2	**30**	223.52±16.85	185.15±02.61	153.75±55.89

Values are expressed as mean ± S.E.M. n=6. Significant values were compared with P<0.05. Normal control Vs all groups. Paranthesis indicates % reduction in BGL.

- **Oral glucose tolerance test (OGTT) on 8th, 15th and 22nd day-**

Both the aqueous and alcoholic extracts of *Alovera* are significantly (P<0.05) suppress the rise in FBGL after glucose load (2g/kg) in rats, at first half-an-hour and up to 2hr time period as compare with other groups extract Glibenclamide on 8th,15th and 22nd day. While aqueous and alcoholic extracts produced significant reduction in FBGL. Glibenclamide (10mg/kg) showed (P<0.05) significant suppression in FBGL rise at first half-an-hour, 1hr and normalized FBGL within 2hr. The detailed results are summarized in Table No: 13.

Table 5: Effect of extracts of *Alovera* on 8th,15th and 22nd day in Diabetic rats.

Treatment	Dose (mg/kg)	Blood glucose level(mg/dl)		
		8th day	15th day	22st day
Normal control	**-**	85.12±2.85	75.28±1.91	63.14±2.89
Diabetic control	**10**	283.25±11.71	251.14±20.95	221.39±19.86
Glibenclamide	**10**	365.89±75.50	286.15±39.52	275.93±15.78
AQAV1	**20**	262.13±72.89	232.71±25.53	198.17±13.99
AQAV2	**30**	283.82±10.27	262.13±10.78	242.89±15.32
ALAV1	**20**	264.18±93.56	221.80±96.15	186.55±11.89
ALAV2	**30**	363.12±10.28	321.18±25.98	282.15±19.12

Values are expressed as mean ± S.E.M. n=6. Significant values were compared with P<0.05. Normal control Vs all groups. Paranthesis indicates % reduction in BGL.

8. DISCUSSION

Despite the fact that diabetes has high prevalence, morbidity and mortality globally, it is regarded as non curable but controllable disease. Different synthetic drugs, plant remedies and dietary modification play an effective role in the reduction of the suffering that it causes. The potential role of medicinal plants as antidiabetic agents has been reviewed by several authors. In order to identify the plants with antidiabetic properties various plants have been tested *in-vivo* using animal models, for example rats, against the complications caused by inducers of diabetes, and it has been established that many plants possesses the potential to lower the fasting blood glucose levels and besides help in improving other diabetic complications. The sustained reduction in hyperglycemia automatically decreases the risk of other major complications of diabetes. Effective glucose control is the key for preventing or reversing the diabetic complications and improving the quality of life of the diabetics.

Many natural active compounds have been isolated from plants of different species. These active principles are complex Alkaloids, Tannins, Anthraquinones, Flavonoids, Saponins, Triterpenes, Sterols, Coumarin and others. These compounds have been shown to produce potent hypoglycemic, anti-hyperglycemic and glucose suppressive activities. These effects might be achieved by facilitating insulin release from pancreatic ß-cells, inhibiting glucose absorption in gut, stimulating glycogenesis in liver and/ or increasing glucose utilization by the body. These compounds may also exhibit Anti-Inflammatory, Antibacterial, Antifungal and Cardioprotective activities, and restore enzymatic functions, repair and regeneration of pancreatic islets and the alleviation of liver and renal damage.

Crude aqueous and alcoholic extracts of leaves of *Alovera*at a dose of 20 and 30mg/kg showed significant effect on the glucose tolerance of rats and it also showed reduction in the fasting blood glucose levels of the normoglycaemic rats, thus revealing the hypoglycaemic nature of the extracts. The effect was more pronounced for both extracts. These findings indicate that the extracts might be producing hypoglycaemic effect by a mechanism independent from the insulin secretion e.g. by the inhibition of endogenous glucose production or by the inhibition of intestinal glucose absorption.

Alloxan monohydrate is one of the chemical agents used to induce diabetes mellitus in animals. It induces diabetes by dose dependent destruction of β -cells of islets of langerhans. It is a generator of free radicals of oxygen which cause extensive DNA damage. It was observed that single intravenous dose of alloxan exhibited significant hyperglycemia. Excessive hepatic glycogenolysis and gluconeogenesis associated with decreased utilization of glucose by tissues is the fundamental mechanism underlying hyperglycemia in the diabetic state. As the hyperglycemia induced by alloxan falls under category of mild diabetes and may reverse after a few weeks, the hypoglycemic effect of the plant in hyperglycemic rats was studied during 22 days treatment. The difference observed between the initial and final fasting serum glucose levels of extract treated hyperglycemic rat's revealed antihyperglycemic effect of leaves of *Alovera* throughout the period of study. The effect of the extracts was compared to that of reference standard, Glibenclamide and was found to be significant.

Phytochemical analysis of extracts of leaves of *Alovera* revealed the presence of secondary metabolites that have been shown to possess antidiabetic effect in other plants. Flavonoids, alkaloids and Steroids which were responsible for the antidiabetic effect in other plants were also detected in the extracts of this plant. The presence of phenols in the plant could also be responsible for the antidiabetic effect have been shown to prevent the destruction of β-cells by inhibiting the peroxidation chain reaction and thus they may provide protection against the development of diabetes. Extracts of leaves of *Alovera* appear to be attractive materials for further studies leading to possible drug development for diabetes. Development of phytomedicines is relatively inexpensive and

less time consuming; it is more suited to our economic conditions than allopathic drug development which is more expensive and spread over several years.

SUMMARY

1. The dried leaves of *Alovera* for this project work were procured locally.
2. The dried leaves of *Alovera* were successively extracted with water and alcohol.
3. Therapeutic dose of the extracts were calculated after carrying acute oral toxicity studies in rats.
4. Extracts were tested for their anti-diabetic activity in normal and alloxan induced diabetic rats.
5. The following parameters were assessed:
   - fasting blood glucose levels
     At 7^{th}, 14^{th} and 21^{st} day in normal and alloxan induced rats.
   - Oral Glucose Tolerance Test
     At 8^{th},15^{th} and 22^{nd} day in normal and alloxan induced rats.
6. Aqueous and Alcoholic extracts of *Alovera* (20 and 30 mg/kg) showed significant effect in blood glucose lowering activity and improved oral glucose tolerance test (OGTT) in short term (7^{th} day) and long term (14^{th} and 21^{st} day) repeated administration in normal and alloxan induced diabetic rats.
7. The above studies showed that Aqueous and Alcoholic extracts of *Alovera* had potent anti-diabetic activity on repeated administration.

CONCLUSION

The study was performed to find out the beneficial effects of two different extracts of leaves of *Alovera* in normoglycaemic rats and alloxan induced diabetic rats and the results reveal that the plant has beneficial effects on blood glucose levels.

In current scenario, herbs are the potent sources of medicines used in the treatment of various disease and disorders. Since, plants are used as medicine there is prompt need of evaluation of plant species, therefore, the present work was conceived to evaluate the phytochemical and pharmacological screening of leaves of *Alovera*. Alkaloids, Tannins, Anthraquinones, Flavonoids, Saponins, Triterpenes, Sterols, Coumarin.

The aqueous and alcoholic extracts had hypoglycemic activity because the presence of flavonoids which are rich in treatment of hypoglycaemia with less side effects. Flavonoids might be producing hypoglycaemic effect by a mechanism independent from insulin secreation e.g. by the inhibition of endogenous glucose production or by the inhibition of intestinal glucose absorption. The present study *Alovera* of both aqueous and alcoholic extracts was showed significant effect on glucose tolerance and also showed reduction in fasting blood glucose levels in normal diabetic rats.

The data of the blood glucose level of rats treated with Alloxan (150mg/kg body weight) produced diabetes within 72 hours. After 72 hours of Alloxan administered the blood glucose levels of rats were observed. It was observed that significant lowering of sugar in aqueous and alcoholic extract. The administration of different extracts at a dose of 20 and 30 mg/kg showed significant anti-hyperglycaemic effect at 22^{nd} day which was evident from the 7^{th} day on wards as compared to standard. The aqueous and alcoholic extract of *Alovera* has showed better anti-hyperglycaemic effect of the extract on the fasting blood sugar levels on diabetic rats are shown in table. The decreasing blood glucose levels are comparable with that of 10 mg/kg of Glibenclamide. The Glibenclamide (10 mg/kg body weight) shows significant effect on compare to the initial and more significant effect on the 22^{nd} Day compare to the initial. The aqueous and alcoholic extracts of 20 and 30mg/kg body weight shows significant ($P^{*}<0.05$), effect.

Results of anti-diabetic activity in normal and alloxan induced rats the extracts established the scientific basis for the utility of these plants in the treatment of diabetes. The extracts have shown significant reduction in blood glucose levels in normal and alloxan induced diabetic rats and produced maximum anti-diabetic activity and are higher than the hypoglycaemic activity of Glibenclamide in the diabetic rats. In glucose loaded animals, the drug has reduced the blood glucose to the normal levels. It is possible that the drug may be acting by potentiating the pancreatic secretion or increasing the glucose uptake. In conclusion, these extract showed significant anti-diabetic effect in normal and diabetic rats after administration. Thus the claim made by the traditional Indian systems of medicine regarding the use of these plants in the treatment of diabetes stands confirms.

ACKNOWLEDGEMENT

The Authors are thankful to the Management and Principal, Princeton College of Pharmacy, Narapally, Ghatkesar, Telangana, for extending support to carry out the research work. Finally, the authors express their gratitude to the Sura Pharma Labs, Dilsukhnagar, Hyderabad, for providing research equipment and facilities.

REFERENCES

1. Consultation, W. H. O. Definition, diagnosis and classification of diabetes mellitus and its complications. Vol. 1. Part, 1999.
2. Alberti, Kurt George Matthew Mayer, and PZ ft Zimmet. "Definition, diagnosis and classification of diabetes mellitus and its complications. Part 1: diagnosis and classification of diabetes mellitus. Provisional report of a WHO consultation." Diabetic medicine 15.7 (1998): 539-553.
3. Gress, Todd W., et al. "Hypertension and antihypertensive therapy as risk factors for type 2 diabetes mellitus." New England Journal of Medicine 342.13 (2000): 905-912.
4. Ahmed, Awad M. "History of diabetes mellitus." Saudi medical journal 23.4 (2002): 373-378.
5. Zimmet, Paul Z., Daniel J. McCarty, and Maximilian P. de Courten. "The global epidemiology of non-insulin-dependent diabetes mellitus and the metabolic syndrome." Journal of Diabetes and its Complications 11.2 (1997): 60-68.
6. American Diabetes Association. "Type 2 diabetes in children and adolescents."Pediatrics 105.3 (2000): 671-680.
7. Saltiel, Alan R., and C. Ronald Kahn. "Insulin signalling and the regulation of glucose and lipid metabolism." Nature 414.6865 (2001): 799-806.
8. Browning, Jeffrey D., and Jay D. Horton. "Molecular mediators of hepatic steatosis and liver injury." Journal of Clinical Investigation 114.2 (2004): 147-152.
9. Aronoff, Stephen L., et al. "Glucose metabolism and regulation: beyond insulin and glucagon." Diabetes Spectrum 17.3 (2004): 183-190.
10. Ross, E. J., and D. C. Linch. "Cushing's syndrome—killing disease: discriminatory value of signs and symptoms aiding early diagnosis." The Lancet320.8299 (1982): 646-649.
11. Levin, Marvin E., Vincenza C. Boisseau, and Louis V. Avioli. "Effects of diabetes mellitus on bone mass in juvenile and adult-onset diabetes." New England Journal of Medicine 294.5 (1976): 241-245.
12. Sherwin, Robert, and Philip Felig. "Pathophysiology of diabetes mellitus." The Medical clinics of North America 62.4 (1978): 695-711.
13. Faber, O. K., and C. Binder. "C-peptide response to glucagon: a test for the residual β-cell function in diabetes mellitus." Diabetes 26.7 (1977): 605-610.
14. Ioannidis, Ioannis. "Pathophysiology of Type 1 diabetes." Diabetes in Clinical Practice: Questions and Answers from Case Studies 31 (2007): 23.
15. Scheen, A. J. "Pathophysiology of type 2 diabetes." Acta Clinica Belgica 58.6 (2003): 335-341.
16. Vambergue, A., et al. "[Pathophysiology of gestational diabetes]." Journal de gynecologie, obstetrique et biologie de la reproduction 31.6 Suppl (2002): 4S3-4S10.
17. Inzucchi, Silvio E. "Diagnosis of diabetes." New England Journal of Medicine367.6 (2012): 542-550.
18. Turner, R. C., et al. "Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes (UKPDS 33)." lancet 352.9131 (1998): 837-853.
19. Brownlee, M., and A. Cerami. "The biochemistry of the complications of diabetes mellitus." Annual review of biochemistry 50.1 (1981): 385-432.
20. Pari, L., and G. Saravanan. "Antidiabetic effect of Cogent db, a herbal drug in alloxan-induced diabetes mellitus." Comparative Biochemistry and Physiology Part C: Toxicology & Pharmacology 131.1 (2002): 19-25.
21. Day, Caroline. "Traditional plant treatments for diabetes mellitus: pharmaceutical foods." British Journal of Nutrition 80.01 (1998): 5-6.
22. Smith, George Davey, et al. "Genetic epidemiology and public health: hope, hype, and future prospects." The Lancet 366.9495 (2005): 1484-1498.
23. Oluyemisi Omotayo Omonije, Abubakar Ndaman Saidu and Hadiza Lami Muhammad. Anti-diabetic activities of Chromolaena odorata methanol root extract and its attenuation effect on diabetic induced hepatorenal impairments in rats. Clinical Phytoscience (2019) 5:23.

24. Lia Ardiana, Rani Sauriasari, Berna Elya. Antidiabetic Activity Studies of White Tea (Camellia sinensis (L.) O. Kuntze) Ethanolic Extracts in Streptozotocin-nicotinamide Induced Diabetic Rats. Pharmacogn J. 2018; 10(1):186-189.
25. Hanae Naceiri Mrabti, Nidal Jaradat, Ismail Fichtali, Wessal Ouedrhiri, Shehdeh Jodeh, Samar Ayesh, Yahia Cherrah and My El Abbes Faouzi. Separation, Identification, and Antidiabetic Activity of Catechin Isolated from Arbutus unedo L. Plant Roots. 12 April 2018.