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RESEARCH ARTICLE OPEN ACCESS

ANTIDIABETIC ACTIVITY OF METHANOLIC EXTRACTS OF LEAVES OF TYLOPHORA NEGLECTA INDUCED DIABETIES IN RATS

Ch. Mojes*[1], Srinivas Nandyala[1] and P.S.S Prasanna Kumar[1]

Department of Pharmacology, Akrg College of pharmacy, Andhra Pradesh, India; Sura Pharma Labs, Dilsukhnagar, Hyderabad, Telangana-500060, India

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Corresponding author: Ch. Mojes,

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. Toevaluate antidiabetic activity of Tylophora neglecta in Alloxan induced diabetes in albino rats albino rats were randomly divided into six groups (n=6). Diabetes was induced 16hrs intraperitoneal injection. After acute toxicity test, the Swiss albino mice were induced with alloxan to get experimental diabetes animals. The fasting mean blood glucose level before and after treatment for normal, diabetic untreated and diabetic mice treated with aqueous and 70% ethanol extracts were performed. Data were statistically evaluated by using Statistical Package. 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 *Tylophora neglecta* 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 *Tylophora neglecta* 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 *Tylophora neglecta* revealed the presence of Alkaloids, Flavonoids, Steroids, Tannins, Anthraquinones, Terpenoids and Cardiac glycoside as the possible biologically active principles.

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INTRODUCTION

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].

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].

History: The term "Diabetes" was first used around 250 B.C. It is a Greek word meaning "to syphon", reflecting how diabetes seemed to rapidly drain fluid from the affected individual. The Greek physician Aretaeus noted that affected individuals passed increasing amounts of urine as if there was "liquefaction of flesh and bones into urine". The complete term "diabetes mellitus" was coined in 1674 by Thomas Willis. Mellitus is Latin for honey, which is how Willis described the urine of diabetics[5]. Historical accounts reveal that as early as 700-200 BC, diabetes mellitus was a well-recognized disease in India and was even distinguished as two types, a genetically based disorder and other one resulting from dietary indiscretion. Ancient Hindu writings document how black ants and flies were attracted to the urine of diabetics. The Indian physician Sushruta in 400 B.C. described the sweet taste of urine from affected individuals, and for many centuries to come, the sweet taste of urine was a key to the diagnosis. Physicians have observed the effects of diabetes for thousands of years. One of the effects of diabetes is the presence of glucose in the urine (glucosuria). For much of the time, little was known about this fatal disease that caused weight loss of body, extreme thirst, and frequent urination. It was in 1922 that the first patient was successfully treated with insulin. Till the mid-1800s, the treatments offered for diabetes varied tremendously. A breakthrough in the puzzle of diabetes came in 1889. German physicians Joseph von Mering and Oskar Minkowski surgically removed the pancreas from dogs. The dogs immediately developed diabetes. Now that a link was established between the pancreas and diabetes, research focused on isolating the pancreatic extract that could treat diabetes. Dr. Frederick Banting succeeded in his experiments of isolating a pancreatic extract. The diabetic dog was kept alive for eight days by regular injections until supplies of the extract, at that time called "isletin", was exhausted. Experiments on dogs showed that extracts from the pancreas caused a drop in blood sugar, caused glucose in the urine to disappear, and produced a marked improvement in clinical condition. A young boy, Leonard Thompson, was the first patient to receive insulin treatment in the year 1922 and lived for thirteen years. Over the next 70 years, insulin was further refined and purified. A revolution came with the production of recombinant human DNA insulin in 1978. Instead of collecting insulin from animals, new human insulin could be synthesized. In 1923, Banting and Macloed were awarded the Nobel Prize for the discovery of insulin. In his Nobel Lecture, Banting concluded the following about their discovery: "Insulin is not a cure for diabetes; it is a treatment."

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].

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.

Irritability: It is a sign of high blood sugar of the inefficient glucose supply to the brain and other body organs, which make us, feel tired and uneasy.

Infections: The body gives few signals whenever there is fluctuation in blood sugar(due to suppression of immune system) by frequent skin infections like fungal or bacterial or UTI(urinary tract infection).

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.

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.

Table 1. Drugs and Chemicals

S.No	*Materials*	*Company Name*
1.	Alloxan	QualiKems Fine Chem Pvt, Ltd, Vadodara.
2.	Methanol	Merck, India.
3.	Alcohol	Merck, India.
4.	Glibenclamide	Sanofi India Ltd, Ankleshwar.

Experimental animals: Healthy adult albino wistar rats weighing 200-250grams of either sex were selected for the study. Animals were housed in appropriate cages in uniform hygienic conditions and fed with standard pellet diet (Amrul Laboratory Animal Diet) and water ad libitum. They were fasted overnight before the day of experiment, after 72hours of fasting from the day of Alloxan introduction. Animals were housed within the departmental animal house and the room temperature was maintained at 27° C. Animal studies had approval of IAEC.

Plant Material Collection: The leaves of*Tylophora neglecta*was collected from thelocal market in Hyderabad in the month of January and was identified and authenticated from Department of Pharmacognosy.The plant material was cleaned, reduced to small fragments, air dried under shade at room temperature and coarsely powdered in a mixer. The powdered material was stored or taken up for extraction process.

Preparation of plant extracts

Preparation of Aqueous Extract: Dried leaves of *Tylophora neglecta*were taken about 20gms into 250ml beaker containing 200ml of water. The contents were mixed well and then the mixture was boiled up to 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.

Preparation of Alcoholic Extract: Dried leaves of *Tylophora neglecta*were taken about 20gms into 250ml beaker containing 200ml of Alcohol. The contents were mixed well and then the mixture was boiled upto 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.

Pharmacological evaluation

Preparation of extracts: The aqueous and alcoholic extracts of *Tylophora neglecta* 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.

Acute Oral Toxicity: The acute oral toxicity of aqueous and alcoholic extracts of *Tylophora neglecta* 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 upto 2000mg/kg and observed for its mortality during 2days and 7days study period (short term) toxicity and observed upto 7days for their mortality, behavioral and neurological profiles.

Assessment of Anti-diabetic Activity in Normal and Alloxan induced Rats

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).

Oral glucose tolerance test(OGTT) in normal rats: On the next day (1st, 8th, 15th and 22nd day) after the assessment of hypoglycemic activity OGTT was carried out in same normal animals.

Procedure: All the animals in each group were administered 2g/kg of glucose one hour after extract/ Glibenclamide/ vehicle administration. The blood samples were collected by tail vein at 0 hour, 0.5 hour, 1 hour, 1.5 hour and 2 hour after the administration of glucose load. Blood glucose levels were measured by glucometer on 1st, 8th, 15th and 22nd day respectively.

Assessment of Anti-Diabetic Activity in Alloxan Induced Diabetic Rats

Induction of Diabetes: Albino wistar rats of either sex weighing 200-250 g were selected for the study. All the animals were allowed free access to water and pellet diet and maintained at room temperature in rat cages. Alloxan was dissolved in normal saline immediately before use. Diabetes was induced in 16 hour fasted rats by single intraperitoneal injection of 120 mg/kg body weight of freshly prepared alloxan in normal saline. The rats after alloxanization were given 5% w/v glucose solution in feeding bottles for next 24 hours in their cages to prevent hypoglycemia. After 72 hours rats with fasting blood glucose levels greater than 200 mg/dl were selected and used for further studies. All the animals were observed for seven days for consistent hyperglycemia (fasting blood glucose level greater than 200 mg/dl and lesser than 400 mg/dl) and such animals were selected and divided into six groups of four each and used for the study of the following experimental models.

Effect of Aqueous and Alcoholic extracts of *Tylophora neglecta* on blood glucose levels in alloxan induced diabetic rats: All the animals of above groups were administered as per treatment protocol mentioned above. The blood samples were collected by retro orbital puncture at 0,1,2,4 and 8 hour after the administration. The treatment was continued for next 22 days. Again blood samples were also collected on 7th, 14th and 21st day after 1 hour administration for sub acute study. Blood glucose level was measured by glucometer at various time intervals.

Oral glucose tolerance test (OGTT) in alloxan induced diabetic rats: On the 8th, 15th and 22nd day OGTT was carried out on the same alloxan induced diabetic animals used for assessment of anti-diabetic activity studies.

Procedure: All the animals in each group were administered 2g/kg of glucose one hour after extract/ Glibenclamide/ vehicle administration. The blood samples were collected by retro orbital puncture at 0 hour, 0.5 hour, 1 hour, 1.5 hour and 2 hour after the administration of the glucose load. The Blood samples were collected by tail vein and its blood glucose levels were measured by using a glucometer apparatus.

Table 2. Phytochemical screening of *Tylophora neglecta*

S.No.	Phytoconstituents	Aqueous	Alcoholic
1.	Alkaloids	-	-
2.	Flavonoids	+	+
3.	Steroids	+	-
4.	Tannins	+	+
5.	Anthraquinones	-	-
6.	Terpenoids	+	+
7.	Cardiac glycoside	+	+
8	Saponins	+	-

Statistical analysis

The values were expressed as mean ± SEM data was analyzed using one-way ANOVA followed by T-test. Two sets of comparisons had made. i.e.

1. Normal control Vs All treated groups.
2. Diabetic Control Vs All treated groups.

Differences between groups were considered significant at P<0.001 and *P* <0.05 levels.

RESULTS

Phytochemical screening of Tylophora neglecta: The present investigation concluded that the isolated compounds from the plant *Tylophora neglecta* shows the various Pharmacological effects was determined due to the presence of different phytochemical compounds.

Acute toxicity testing: Acute toxicity studies revealed that the alcoholic extracts of*Tylophora neglecta* 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.

Effect of *Tylophora neglecta* 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 Table.

Effect of extracts of *Tylophora neglecta* on fasting blood glucose level (FBGL) in normal rats

Table 3. Effect of extracts of *Tylophora neglecta* on fasting blood glucose level (FBGL) in normal rats

Treatment	Dose (mg/kg)	Blood glucose level(mg/dl)		
		7th day	14th day	21st day
Normal control	-	87.13±1.14	75.32±2.97	64.14±1.26
Glibenclamide	10	81.87±3.78	75.81±3.25	66.06±2.05
AQTN1	20	85.31±1.91	80.61±1.61	71.17±5.20
AQTN2	30	80.76±3.49	72.86±5.84	67.56±2.93
ALTN1	20	76.92±1.19	61.23±1.69	55.15±5.73
ALTN2	30	82.1±1.24	70.46±2.26	65.20±1.56

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.

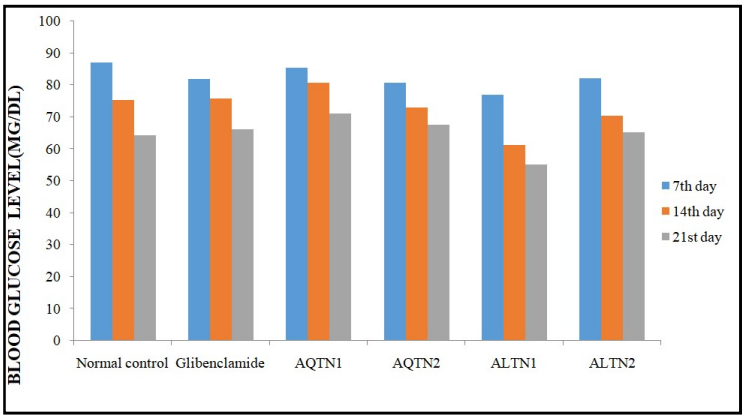

Figure 1. Effect of extracts of *Tylophora neglecta* on fasting blood glucose level (FBGL) in normal rats

Table 4. Effect of extracts of *Tylophora neglecta* on fasting blood glucose level (FBGL) in normal rats on 21st day

Treatment	Dose (mg/kg)	Blood glucose level(mg/dl) (21st day)			
		1sthr	2ndhr	4thhr	8thhr
Normal control	-	38.44±1.21	43.02±1.78	56.13±2.93	64.14±1.26
Glibenclamide	10	41.26±2.02	54.29±2.09	58.09±1.22	66.06±2.05
AQTN1	20	36.13±0.59	43.12±1.01	52.12±3.06	71.17±5.20
AQTN2	30	42.12±3.11	51.03±2.09	64.32±2.35	67.56±2.93
ALTN1	20	34.02±1.22	40.31±2.36	53.41±0.21	55.15±5.73
ALTN2	30	39.16±4.03	44.22±1.10	51.20±3.03	65.20±1.56

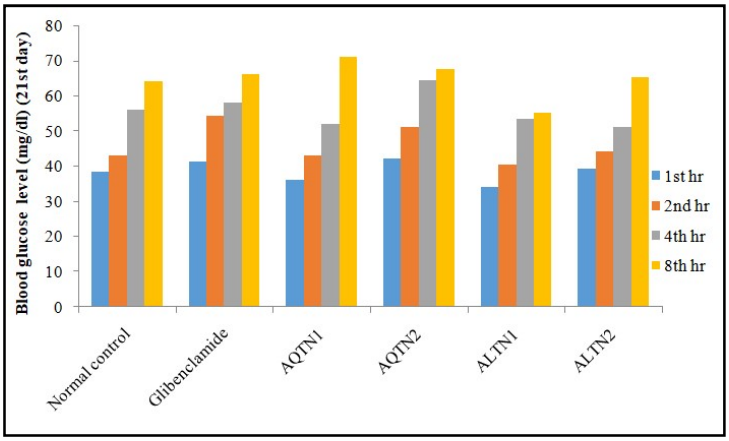

Figure 2. Effect of extracts of *Tylophora neglecta* on fasting blood glucose level (FBGL) in normal rats on 21st day

Oral glucose tolerance test (OGTT)

Table 5. Effect of extracts of *Tylophora neglecta* on 8th, 15th and 22nd day in normal rats

Treatment	Dose (mg/kg)	Blood glucose level(mg/dl)		
		8th day	15th day	22nd day
Normal control	-	85.05±3.72	90.36±1.84	92.31±2.93
Glibenclamide	10	80.11±2.79	75.17±2.74	70.21±1.50
AQTN1	20	86.26±1.21	81.02±0.36	76.17±4.75
AQTN2	30	78.67±0.33	73.99±2.54	71.57±2.26
ALTN1	20	82.57±1.76	78.25±1.91	70.38±3.76
ALTN2	30	71.28±2.58	66.46±1.44	60.61±1.65

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.

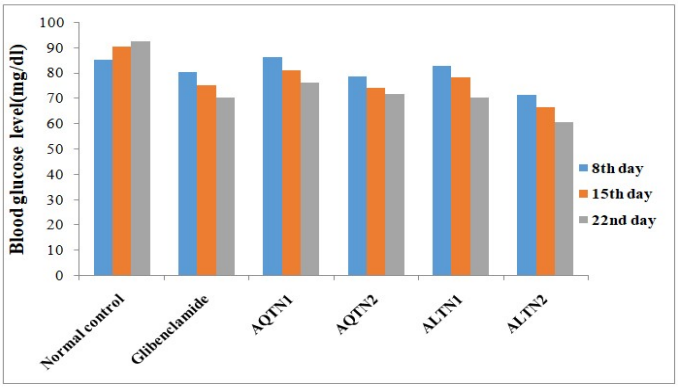

Figure 3. Effect of extracts of *Tylophora neglecta* on 8th, 15th and 22nd day in normal rats

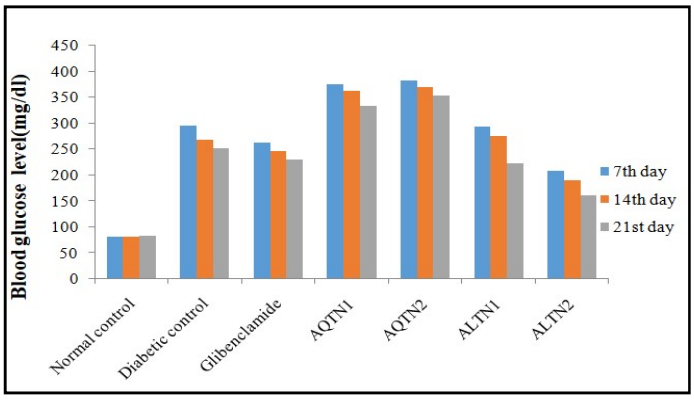

Figure 4. Effect of extracts of *Tylophora neglecta* on fasting blood glucose level (FBGL) in Alloxan induced diabetic rats.

Table 6. Effect of extracts of *Tylophora neglecta* 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	-	81.19±4.69	80.90±7.87	82.74±4.35
Diabetic control	10	295.10±11.05	268.04±10.03	251.13±12.55
Glibenclamide	10	262.21±10.16	245.18±12.01	230.26±11.85
AQTN1	20	373.61±11.21	361.16±19.62	332.57±29.10
AQTN2	30	381.23±12.34	368.82±17.16	351.97±38.33
ALTN1	20	292.08±13.09	275.03±14.28	222.60±05.90
ALTN2	30	208.43±12.19	189.29±16.16	160.30±20.38

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.

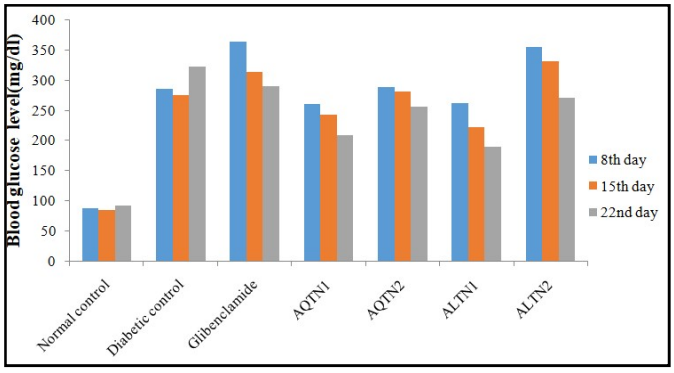

Figure 5. Effect of extracts of *Tylophora neglecta* on 8th, 15th and 22nd day in Diabetic rats

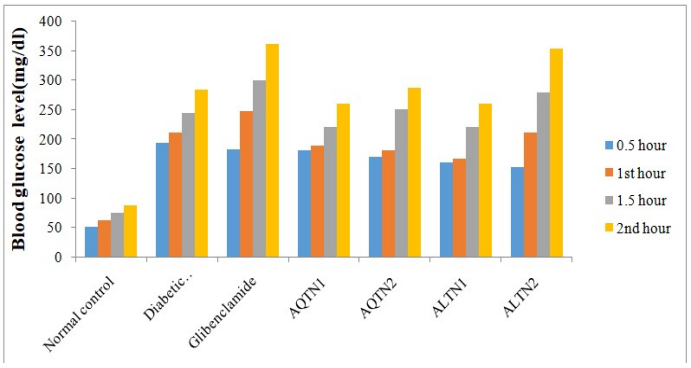

Figure 6. Effect of extracts of *Tylophora neglecta* on 15th day in Diabetic rats

Table 7. Effect of extracts of *Tylophora neglecta* on 8thday in Diabetic rats

Treatment	Dose (mg/kg)	Blood glucose level(mg/dl)8thday			
		0.5 hour	1st hour	1.5 hour	2nd hour
Normal control	-	51.68±2.69	63.25±2.19	75.18±2.90	87.75±3.63
Diabetic control	10	195.25±15.72	212.16±18.57	245.13±10.13	285.01±02.69
Glibenclamide	10	184.01±21.51	248.18±21.05	301.10±15.26	362.38±21.10
AQTN1	20	182.32±31.26	190.26±24.81	221.25±10.63	260.26±10.62
AQTN2	30	170.16±21.51	182.16±54.43	250.87±21.35	287.14±13.30
ALTN1	20	162.03±14.10	167.68±02.05	221.56±05.19	261.22±12.11
ALTN2	30	153.22±21.53	211.72±10.35	280.36±13.73	353.55±14.61

Table 8. Effect of extracts of *Tylophora neglecta* on 15th day in Diabetic rats

Treatment	Dose (mg/kg)	Blood glucose level(mg/dl)15th day			
		0.5 hour	1st hour	1.5 hour	2nd hour
Normal control	-	48.25±3.71	60.36±3.19	76.25±1.54	84.59±2.87
Diabetic control	10	186.36±15.72	201.16±12.79	231.26±12.63	275.00±19.55
Glibenclamide	10	193.46±1.34	272.16±16.12	313.28±11.31	312.88±11.73
AQTN1	20	160.10±61.10	206.52±04.89	235.31±15.73	241.70±16.40
AQTN2	30	183.75±13.62	196.25±63.10	272.02±01.16	280.78±13.78
ALTN1	20	150.13±10.75	186.09±1.13	230.15±1.25	221.56±17.87
ALTN2	30	182.11±51.96	256.75±15.01	290.11±36.12	330.76±15.28

Table 9. Effect of extracts of *Tylophora neglecta* on 22nd day in Diabetic rats

Treatment	Dose (mg/kg)	Blood glucose level(mg/dl) 22nd day			
		0.5 hour	1st hour	1.5 hour	2nd hour
Normal control	-	61.25±0.51	66.3±2.05	83.52±3.96	90.99±1.58
Diabetic control	10	203.15±02.36	232.25±50.18	281.18±33.25	321.57±14.99
Glibenclamide	10	163.89±3.46	212.72±23.03	253.19±13.06	289.41±18.55
AQTN1	20	143.41±53.09	169.22±26.17	183.56±53.36	208.36±11.90
AQTN2	30	159.59±08.18	199.17±39.02	263.11±06.19	255.98±19.75
ALTN1	20	141.11±14.07	162.89±3.52	180.73±2.65	188.63±17.99
ALTN2	30	154.17±08.10	182.14±02.01	225.63±14.25	270.66±10.86

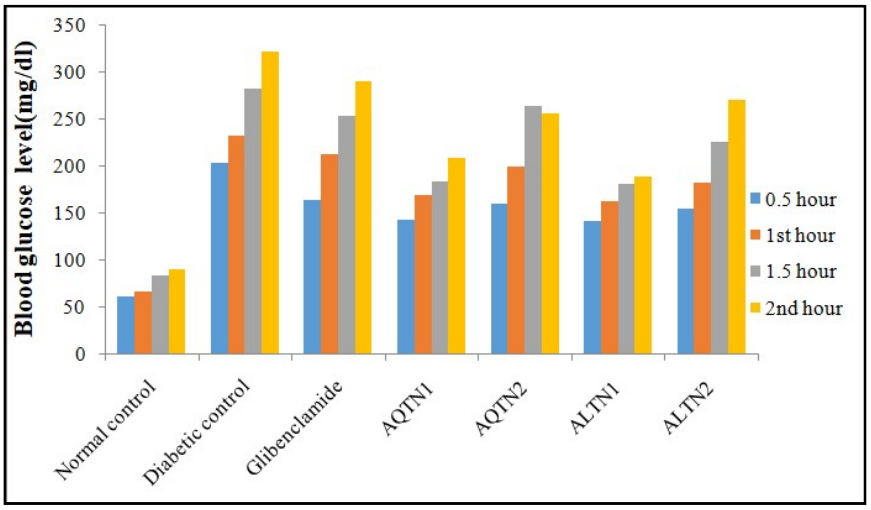

Figure 7. Effect of extracts of *Tylophora neglecta* on 22nd day in Diabetic rats

Oral glucose tolerance test (OGTT) on 8th, 15th and 22nd day: Both the aqueous and alcoholic extracts of *Tylophora neglecta* are significantly (P<0.05) suppress the rise in FBGL after glucose load (2g/kg) in rats, at first half-an-hour and upto 2hr time period as compare with other groups extract Glibenclamideon 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.

CONCLUSION

The study was performed to find out the beneficial effects of two different extracts of leaves of *Tylophora neglecta* 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 *Tylophora neglecta*. The Phytochemical evaluation has revealed the presence of Alkaloids, Flavonoids, Steroids, Tannins, Anthraquinones, Terpenoids, Cardiac glycoside. 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 secreatione.g. by the inhibition of endogenous glucose production or by the inhibition of intestinal glucose absorption. The present study *Tylophora neglecta* 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-hyperglycemic effect at 22nd day which was evident from the 7th day on wards as compared to standard. The aqueous and alcoholic extract of *Tylophora neglecta*has showed better anti-hyperglycemic 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 22nd 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 hypoglycaemicactivity 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.

REFERENCES

Consultation, W. H. O. Definition, diagnosis and classification of diabetes mellitus and its complications. Vol. 1. Part, 1999.

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.

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.

Ahmed, Awad M. "History of diabetes mellitus." Saudi medical journal 23.4 (2002): 373-378.

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.

American Diabetes Association. "Type 2 diabetes in children and adolescents."Pediatrics 105.3 (2000): 671-680.

Saltiel, Alan R., and C. Ronald Kahn. "Insulin signalling and the regulation of glucose and lipid metabolism." Nature 414.6865 (2001): 799-806.

Browning, Jeffrey D., and Jay D. Horton. "Molecular mediators of hepatic steatosis and liver injury." Journal of Clinical Investigation 114.2 (2004): 147-152.

Aronoff, Stephen L., et al. "Glucose metabolism and regulation: beyond insulin and glucagon." Diabetes Spectrum 17.3 (2004): 183-190.

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.

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.

Sherwin, Robert, and Philip Felig. "Pathophysiology of diabetes mellitus." The Medical clinics of North America 62.4 (1978): 695-711.

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.

Ioannidis, Ioannis. "Pathophysiology of Type 1 diabetes." Diabetes in Clinical Practice: Questions and Answers from Case Studies 31 (2007): 23.

Scheen, A. J. "Pathophysiology of type 2 diabetes." Acta ClinicaBelgica 58.6 (2003): 335-341.

Vambergue, A., et al. "[Pathophysiology of gestational diabetes]." Journal de gynecologie, obstetrique et biologie de la reproduction 31.6 Suppl (2002): 4S3-4S10.

Inzucchi, Silvio E. "Diagnosis of diabetes." New England Journal of Medicine367.6 (2012): 542-550.

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