Amos babu J.*et al.* / *International Journal of Phytopharmacology.* 3(3), 2012, 308-317.

e- ISSN 0975 – 9328
Print ISSN 2229 – 7472

International Journal of Phytopharmacology

Journal homepage: www.onlineijp.com

IJP

ANTI-DIABETIC ACTIVITY OF ACTINIOPTERIS DICHOTOMA (KUHN) LEAVES EXTRACTS IN ALLOXAN INDUCED DIABETIC RATS

J. Amos Babu[*], G. Kiran[1], A.M.S Sudhakar Babu[2], P. Venkateswara Rao[3]

[*1]Department of Pharmacology, A. M. Reddy Memorial College of Pharmacy, Narasaraopet, Guntur, Andhra Pradesh, India.
[2]Department of Pharmaceutics, A. M. Reddy Memorial College of Pharmacy, Narasaraopet, Guntur, Andhra Pradesh, India.
[3]Department of Pharmaceutical Chemistry, A. M. Reddy Memorial College of Pharmacy, Narasaraopet Guntur, Andhra Pradesh, India.

ABSTRACT

Actiniopteris dichotoma (Bedd) (Actiniopteridaceae) widely distributed in the northern parts of India and used ethnically by tribal people in India for controlling blood sugar. This promotes us to undertake a study to examine the possible antidiabetic activity of the leaves extracts in normal and Alloxan induced Diabetic rats.

Key words: Alloxan, Antidiabetic, Hypoglycemia, Glucose tolerance test, *Actiniopteris dichotoma*.

INTRODUCTION

Diabetes mellitus (DM) is in the top 5 of the most significant diseases in the developed world, and is gaining in significance there and elsewhere. Present number of diabetics worldwide is 171 million and this is likely to increase to 340 million or more by the year 2030 (Matti R *et al.,* 2004; Wadkar KA *et al.,* 2008). Synthetic hypoglycemic agents can produce serious side effects and in addition they are not suitable to use during pregnancy (Krishna Kumar CS *et al.,* 2011) Therefore, the search for more effective and safer hypoglycemic agents has continued to be an important area of active research. For a long time, diabetics have been treated with several medicinal plants or their extracts based on the folklore medicine (Subbulakshmi G *et al.,* 2010). Furthermore, after the recommendation made by WHO on diabetes mellitus, investigation on hypoglycemic agent from medicinal plants has been more important.

Actiniopteris dichotoma, commonly known as peacock's tail, it is a small shrub growing in region of Andhra Pradesh particularly in all districts off the state on slopes of hills specially on northern aspect is extensively used in many preparations of Ayurveda and also against anthelmintic, haemostatic, antileprotic action and Hypocholesterolemic effects Peacock's tail (*Actiniopteris dichotoma*) is commonly used for the treatment of antipyretic, antimicrobial, Anti - fertility agent is assumed to possess nutritive and restorative properties and has been used in folk medicine for centuries for a wide range of diseases including diabetes, fever and abdominal colic as a poultice for abscesses, boils. The hypoglycemic property of peacock's tail was observed in diabetic patients. However, no report is available on the effect of peacock's tail leaves in the Alloxan-induced diabetic Wister rats. Hence, in the present study of aqueous and methanolic extract of *Actiniopteris dichotoma* leaves was administered and antidiabetic effect was evaluated in Alloxan-induced diabetic rats.

Corresponding Author

J. Amos babu
Email: amosbabu.jetti@gmail.com

MATERIAL AND METHODS

Animals

Wister rats (Biological E. limited, Gaganpahad, Hyderabad) weighing between 150 and 200 g of male were used. Animals were housed under standard conditions of temperature (24±2°C) and relative humidity

(30-70%) with a 12:12 light: dark cycle. The animals were fed with standard pellet diet (Chakan Oil Mills, Sangli) and water *ad libitum*. Animal handling was performed according to Good Laboratory Practice (GLP). The industrial Animal Ethics Committee (IAEC) of the Biological E.Limited approved the proposal Plant material *Actiniopteris dichotoma* (Kuhn) Leaves were chosen for the present study.

Preparation of the Extract

The plant Actiniopteris dichotoma was collected from Kondapalli, Krishna, and authenticated by an expert taxonomist of Dr. S. M. Khasim, Acharya Nagarjuna University, Guntur. The powdered leaves were extracted in a Soxhlet apparatus with methanol at a temperature of 500C for 12 h. The resultant extract was filtered. The filtered extract was then concentrated to dryness in a rotary evaporator under reduced pressure at a temperature of 40^0C. The dried mass was stored in a desiccators and the yield was 19.2 gm this extract has been termed as "ADM". The aqueous extract was prepared by Soxhlet apparatus as similar to ADA. The yield of the aqueous extract was 14.6 gm. After preparation, the dried extract was stored in desiccators and termed as "ADA".

Preparation of the Drug Solution

An aqueous extract (500 & 250mg/kg b.wt) of leaves extract *Actiniopteris dichotoma* was dissolved in 1&2 ml of distilled water were made to prepare lower doses for administration according to the body weight of Wister rats.

Determination of LD_{50} of Actiniopteris Dichotoma

For acute oral toxicity and LD_{50} determination, the Organization for Economic Co- operation and Development (OECD) guideline 425 was followed.

Experimental rats and Induction Diabetes

Wister male rats 7 to 8 weeks old and weighing 150 to 200gr were used for the present study. The individuals which were obtained from a private animal husbandary, Gaganpahad, brought to the laboratory and were maintained under controlled environment. The rats were randomized into control and experimental groups and housed 4 to 5 cages. Standard pellets obtained from Biological E. limited, Hyderabad. Were used as a basal diet during the experiment. The control and experimental individuals were provided food and drinking water *ad libitum*. Diabetes mellitus was induced by single intraperitoneally injection of Alloxan (40 mg/kg of body weight) dissolved in 0.1 m. citrate buffer (pH 4.5) to overnight fasted albino rats (Sarah Wild *et al.*, 2004). The diabetes was assessed in Alloxan-induced rats by determining the blood glucose level, 48 h after injection of Alloxan. The rats with blood glucose level above 250 mg/dl were selected for the experimental studies

Drug Administration

The methanolic and aqueous extract of Actiniopteris dichotoma (Kuhn) was suspended in phosphate buffer and administered through pediatric cathedral tube at doses of 250mg/kg and 500mg/kg body wt. The volume of administered extract was 1and 2 ml for each animal.

Experimental Design

In the experiment, 65 rats (35 diabetic rats & 30 normal rats) were used: divided into 7 groups of five each.

Group I : Served as untreated control rats.

Group II : Served as diabetic control rats (150mg/kg body weight i.p. Alloxan).

Group III: Diabetic rats orally administrated with methanolic extract of (250mg/kg.b.wt) *Actiniopteris dichotoma*.

Group IV: Diabetic rats orally administrated with methanolic extract of (500mg/kg.b.wt) *Actiniopteris dichotoma*.

Group V : Diabetic rats orally administrated with aqueous extract of (250mg/kg.b.wt) *Actiniopteris dichotoma*.

Group VI:Diabetic rats orally administrated with aqueous extract of (500mg/kg) *Actiniopteris dichotoma*.

Group VII:Diabetic rats orally administrated with Glibenclamide of (5mg/kg.b.wt) after the experimental period, all individuals were sacrificed for biochemical studies.

Biochemical Analysis

At the end of the treatment schedule, blood samples were collected from retro-orbital plexus. Serum was separated and analyzed Autoanalyser for triglyceride (STG), total cholesterol (STC), HDL-cholesterol (HDL-c).

Statistical Analysis

The results are expressed as MEAN±SD. Comparison between the groups was made by analysis of variance (ANOVA), followed by Dunnett's test as per suitability. $P < 0.05$ was considered significant.

Preliminary Phytochemical Investigation

As shown in Table 1, preliminary phytochemical investigation of ADM showed the presence of alkaloids, carbohydrates, phenolics, flavonoids, glycosides and tannins whereas ADA contains carbohydrates, phenolics, flavonoids, glycosides and tannins.

Effect of Extracts in Normoglycemic Rats

Oral Glucose Tolerance Test (OGTT) In Normal Rats

In simple OGT, administration of glucose (2g/kg) produced significant change in SG level of normal rats. As depicted in Fig 1, ADM (500 mg/kg), ADA (500 mg/kg) and GLB (10mg/kg) treatment in Normoglycemic rats showed 2 in SG level respectively over the period of 120 min compared to normal control group. In addition, estimation of integrated AUC glucose indicated that treatment of Normoglycemic rats with ADM (500 mg/kg), ADA (250 & 500 mg/kg b.wt) and GLB significantly improved glucose tolerance over the period of 120 min Evidently, treatment of Normoglycemic rats with higher dose of ADM and ADA showed tolerance to exogenously administered glucose.

Evaluation of ADM and ADA in ALXN-induced diabetic rats

Single-dose one-day study

Acute hypoglycemic effect of different extracts was assessed in ALXN- induced diabetic rats. Administration of single dose of both methanolic and aqueous extract in diabetic rats showed reduction in SG levels at different time intervals compared to basal values i.e. at 0 h of the same group. As shown in Table 5.2, oral administration of higher doses of ADM, ADA and GLB caused a significant (P<0.001) reduction in SG levels at second hour as compared to diabetic control group. In addition, ADM (250 mg/kg) exhibited significant fall in SG level from second hour (P<0.01) to the fourth hour (P<0.001) of post treatment. As depicted in Table 5.4, ADM (500 mg/kg) and ADA (500 mg/kg) treated diabetic rats exhibited significant (P<0.001) fall in SG level over fourth hour post treatment whereas, GLB showed maximum reduction (P<0.001) at fourth hour post treatment compared to their basal values.

Multiple-dose thirty-day study

Chronic administration of lower and higher doses of ADM, ADA and GLB to diabetic rats for 30 days, showed marked fall in SG levels compared to basal values i.e. at 0 day. ADM (500 mg/kg), ADA (500 mg/kg) and GLB showed significant reduction (P<0.001) in SG level (42.31%, 45.79% and 49.63% respectively). These data suggested that potency of higher doses of both extracts is comparable to standard GLB (Table 3). As depicted in Fig 4, treatment with ADA (250 mg/kg) showed significant reduction in SG level from 14 day (P<0.05) which was maintained at 21 day (P<0.01). Multiple-dose thirty-day study revealed that both the higher doses of ADM and ADA showed potent antidiabetic activity compared to GLB.

Oral glucose tolerance test in diabetic rats

On 20th day during the treatment, oral administration of glucose (2g/kg) did not produce significant change in SG level of normal control rats and AUC for the 120 min interval was not altered. As depicted in Fig 4 , the diabetic rats exhibited marked elevation in fasting SG level (at time zero) and showed significant impairment in glucose tolerance to exogenously administered glucose compared to normal control rats. Treatment of diabetic rats with ADM (500 mg/kg), ADA (500 mg/kg) and GLB showed significantly (P<0.001) improved glucose tolerance and marked fall in SG level (49.92%, 47.19% & 60.77% respectively) over the period of 120 min compared to diabetic control group. Fig 4 shows the integrated AUC glucose for the extracts. AUC glucose for ADM (500 mg/kg), ADA (500 mg/kg) and GLB was found to be significant (P<0.001) over the period of 120 min. Collectively, ADA (500 mg/kg) and ADM (500 mg/kg) showed marked improvement in glucose tolerance.

Insulin Tolerance Test

After exogenous administration of glucose (2 g/kg), there was a high release of insulin in normal rats, whereas this glucose load was ineffective in stimulating the release of insulin in diabetic control rats. These results suggested that diabetic rats resembled severe diabetic (type 1) condition in which a maximum pancreatic damage was occurred. Fig 5 indicates ADM and ADA treated diabetic rats accelerated glucose stimulated insulin release from pancreatic β-cells. This response was comparable to GLB treated diabetic rats. As shown in Fig 5 treatment with ADA (500 mg/kg) and GLB exhibited significant (P<0.001) rise in AUC insulin compared to diabetic control.

Estimation of Lipid parameter

Chronic administration of GLB and plant extracts to diabetic rats showed significant restoration in lipid parameters with respect to untreated diabetic rats. As shown in Table 8, treatment of diabetic rats with ADM (500 mg/kg) showed 21.96% and 23.50% reduction in serum triglycerides (STG) and serum total cholesterol (STC) levels respectively whereas, GLB treated diabetic rats exhibited 25.81% and 38% reduction in respect to diabetic control group. ADM (500 mg/kg) and GLB exhibited 21.96% and 25.81% reduction respectively in VLDL-c level in respect to diabetic control group. Whereas, ADA (500 mg/kg) and GLB showed 60.76% and 83.50% reduction respectively in LDL-c level as compared to diabetic control group. HDL-c level in ADM (250 & 500 mg/kg) and GLB treated diabetic rats was significantly increased (39.34%, 42.87% and 39.54% respectively) compared to diabetic control group. Collectively, treatment of ADM (250 & 500 mg/kg) and ADA (500 mg/kg) reduced STG, STC, VLDL-c, LDL-c level and increased HDL-c level near to normal control group

RESULTS

Administration (single dose) of aqueous and methanolic extract of leaves of Actiniopteris dichotoma (250, 500 mg/kg, p.o.) in diabetic Wister rats, showed reduction in serum glucose level in single dose study(0,1,2,3,4hrs) and multiple dose study(1,7,14,21,28 days). Maximum reduction in serum glucose level in single dose study 250 mg/kg in aqueous extract (12%,8%,3%) 500 mg/kg in aqueous extract (30%,20%,15% and10%) multiple dose study was seen at doses of 250, aqueous extract(30%,20%,19%.15%,and 10.7%) 500 mg/kg in aqueous extract (45%,35.70%,32.7%15%,10% decrease respectively) of Actiniopteris dichotoma extract administration. Glibenclamide (0.5 mg/kg, p.o.) showed maximum reduction (27.33% decreases) in aqueous and methanolic [Table 1]. On repeated administration (subacute treatment) of either vehicle or Glibenclamide or aqueous extract of Actiniopteris dichotoma for 28 days, a significant ($P < 0.01$) decrease in serum glucose of the diabetic Wister rats were seen at a dose of 250, 500 mg/kg, p.o., in dose-dependent manner as compared with vehicle-treated group. On the other hand, Glibenclamide showed a significant ($P < 0.01$) decrease in serum glucose at a dose of 0.5 mg/kg, p.o., (27.57% decrease) as compared with vehicle-treated group. Maximum activity of Actiniopteris dichotoma was seen with a significant decrease ($P < 0.01$) in serum glucose levels at the dose of 500mg/kg [Table 2].

Table 1. Preliminary phytochemical analysis of methanolic and aqueous extract of *Actiniopteris dichotoma* (Kuhn) leaves

S.No	TEST	EXTRACT	
		Methanol	Aqueous
1	**Alkaloids**		
	Mayers Test	-	-
	Wagner's Test	+	+
	Dragendroff's Test	+	+
	Hager's Test	+	+
2	**Flavaonoids**		
	Shinoda test	+	+
3	**Glycosides**		
	Borntrager's test	+	+
	Legal's test	-	-
	Killer-killani test	+	+
4	**Carbohydrates**		
	Molish test	+	+
	Benedict's test	+	+
	Fehling's test	+	+
5	**Tosterols**		
	Salkowski's test	+	+
	Liberrman Buchard's test	+	+
6	**Phenolics and Tannins**		
	Ferric chlorides test	+	-
	Gelatin test	+	-
	Lead acetate test	+	-
7	**Saponins**		
	Froth test	+	-
	Liberrman Buchard's test	+	-
8	**Proteins and Amino Acids**		
	Millon's test	-	-
	Biuret test	-	-
	Ninhydrin test	-	-

Table 2. Blood Glucose levels in Normal Rats

Time in minutes	Normal Control	Normal + GLB 5mg/kg	Normal +ADM 250mg/kg	Normal +ADM 500mg/kg	Normal +ADA 250mg/kg	Normal +ADA 500mg/kg
0	72.3±4.6	75.6±2.3	73.6±1.3	80.2±1.6	79.6±5.4	78.7±2.2
30	150.0±10.4	125.7±6.3[a]	142.6±5.9	145.6±4.9	140.2±7.9	139.6±12.3
60	147.6±12.3	104.6±10.2	132.6±8.9[b]	115.2±8.3[b]	127.6±7.6	119.7±8.2
120	139.8±9.8	89.6±7.9[c]	111.2±9.7	102.9±7.6	105.7±6.3[c]	101.8±6.7

Data represent the mean ± S.E.M. for n=5. a. $P < 0.05$; b.$P < 0.01$; c. $P < 0.001$ as compared with normal rats

Table 3. Effect of ADM and ADA on SG levels in ALXN-induced diabetic rats [Single-dose one-day study]

SG levels *[mg/dl]*				
GROUP	**0H**	**1H**	**2H**	**4H**
Normal Control	77.4±3.6	79.8±1.4	79.6±2.2	78.0±1.9
Diabetic control	276.4±10.8	277.2 ±11.9	279.10±11.8	281.10 ±12.2
Diabetic + ADM[250 mg/kg]	285.8±9.9	266.6±10.0	254.6±8.5[b]	243.0±8.3[c]
Diabetic + ADM[500 mg/kg]	303.2±8.3	282.4±11.1	264.8±10.6[c]	246.2±11.0[c]
Diabetic + ADA[250 mg/kg]	286.2±11.7	274.4±12.1	260.2±14.9[a]	251.0±14.6[b]
Diabetic + ADA[500 mg/kg]	275.2±9.4	254.6±12.7	238.2±10.2[c]	216.0±8.5[c]
Diabetic + GLB[5mg/kg]	272±9.6	202±7.8	171±10.6	135±8.7

SG levels were measured at 0 h, 1 h, 2 h and 4 h after single oral administration of ADM, ADA or GLB Data are expressed as means ± S.E.M., for n = 5 rats per group. a. $P<0.05$; b.$P<0.01$; c $P<0.001$, when compared to Basal values of the same group.

Table 5. Effect of ADM and ADA on SG levels in ALXN-induced diabetic rats (Multiple dose, 30 day study)

Group	0 day	7 day	14 day	21 day	28 day
Normal control	77.4±3.62	85.2±3.85	90.8±1.52	86.2±3.76	83±2.62
Diabetic control	281±12.24	297.4±7.44	320.2±10.36	334.8±13.39	339.2±12.70
Diabetic + ADM[250 mg]	285.8±9.86	248.23±9.59**a**	226±4.65**c**	194.24±8.44**c**	180.2±8.02**c**
Diabetic + ADM[500 mg]	303.2±8.32	252.87±5.24**a**	219.0±13.37**c**	187.23±17.17**c**	175.99±15.20**c**
Diabetic + ADA[250 mg]	286.2±11.73	252.43±14.60	231.21±13.86**a**	214.75±11.52$_{b}$	200.56±10.23**c**
Diabetic + ADA[500 mg]	275.79±9.42	220.62±3.37**c**	231.21±13.86**a**	163.29±5.27**c**	148.46±3.88**c**
Diabetic + GLB[5 mg/kg]	271.20±6.20	208.0±5.23**c**	179.60±6.19**c**	155.80±6.26**c**	136.40±3.01**c**

Level each value represents Mean ± S.E.M. for n=5. a $P<0.05$, b $P<0.01$, c $P<0.001$ compared to diabetic control rats of the same time interval.

Table 6. Blood glucose levels in Diabetic rats

Time in minutes	Normal Control	Diabetic + control	Diabetic +ADM 250mg/kg	Diabetic +ADM 500mg/kg	Diabetic +ADA 250mg/kg	Diabetic +ADA 500mg/kg
0	80.2±4.6	220.6±12.6	147.6±12.3	200.7±10.6	190.7±9.3	170.6±9.6
30	150.6±10.3	280.7±15.8	208.7±11.6	240.9±8.3	300.7±16.7	210.7±10.3
60	142.7±9.6	300.6±20.3	198.7±9.4	220.7±8.3	260.8±12.4	200.6±9.7
120	120.4±8.3	280.6±16.7	168.7±8.9	211.8±6.9	240.7±11.9	190.9±8.6

Table 7. Serum Insulin levels in Diabetic Rats

Time in minutes	Normal Control	Diabetic + control	Diabetic + control +ADM 250mg/kg	Diabetic + control +ADM 500mg/kg	Diabetic + control +ADA 250mg/kg	Diabetic + control +ADA 500mg/kg	Diabetic + GLB 5 mg/kg
0	18.6±2.3	9.6±1.3	12.5±2.2	11.6±1.8	9.8±0.9	11.6±1.1	11.2±2.7
30	22.6±3.5	4.2±2.4	17.6±1.8	11.7±1.1	8.7±1.1	12.5±1.6	20.7±1.1
60	19.8±3.2	3.7±0.9	16.2±3.2	12.2±1.2	9.2±2.1	13.6±2.1	17.5±2.6

Table 8. Effect of ADM and ADA on lipid profile in ALXN-induced diabetic rats [Multiple dose thirty-day study]

Parameter	Normal Control	Diabetic control	Diabetic+ADM (250 mg/kg)	Diabetic+ADM (500 mg/kg)	Diabetic+ADA (250 mg/kg)	Diabetic+ADA (500 mg/kg)	Diabetic+GLB (5 mg/kg)
STG(mg/dl)	91.82±2.58	145.89±4.42	119.84±3.10c	113.46±2.63c	132.29±3.76	125.11±3.79a	107.86±3.72c
STC(mg/dl)	60.77±3.60	103.54±4.36	83.83±4.03a	79.04±3.57b	87.77±2.81	76.89±3.69b	63.87±4.30c
HDL-c (mg/dl)	29.09±1.49	20.01±0.96	34.03±2.23b	35.48±1.97c	32.41±2.67b	31.30±1.94a	33.26±1.68
VLDL-c (mg/dl)	18.36±0.51	29.15±0.88	23.96±0.62c	22.69±0.52c	26.45±0.75	25.02±0.75a	21.57±0.74c
LDL-c (mg/dl)	13.31±4.30	54.37±4.03	25.83±4.95b	20.87±4.48b	28.89±2.09a	20.56±5.53c	9.03±5.54c
TC/HDL-c ratio	2.13±0.22	5.20±0.24	2.53±0.24c	2.26±0.16c	2.77±0.19c	2.52±0.24c	1.95±0.19c
LDL-c/ HDL-c ratio	0.49±0.18	2.74±0.22	0.81±0.18c	0.61±0.15c	0.93±0.13c	0.71±0.22c	0.30±0.18c

Each value represents Mean ± S.E.M., for n=5. a $P<0.05$, b $P<0.01$, c $P<0.001$ compared to Diabetic control rats

Fig 1. Blood Glucose levels in Normal Rats (OGTT)

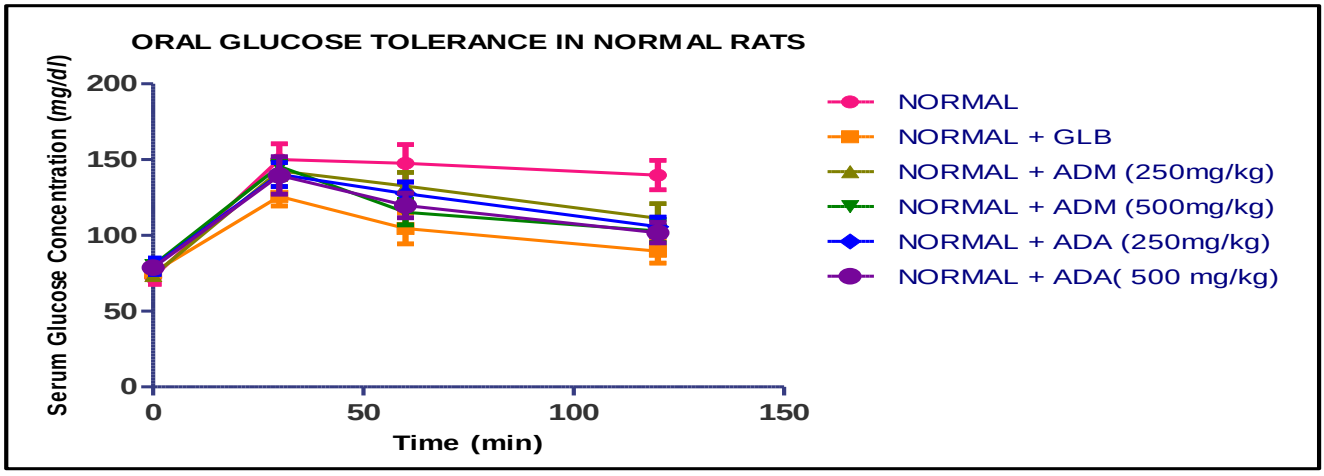


Fig 2. Effect of ADM and ADA on SG levels in ALXN-induced diabetic rats [Single-dose one-day study]

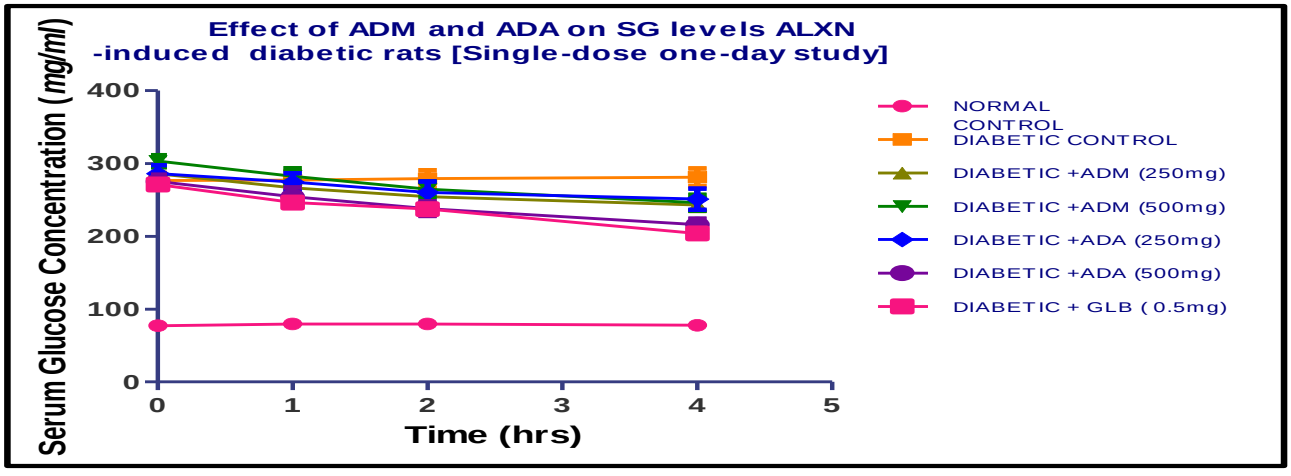


Fig 3. Effect of ADM and ADA on SG levels in ALXN-induced diabetic rats (Multiple dose, 30 day study)

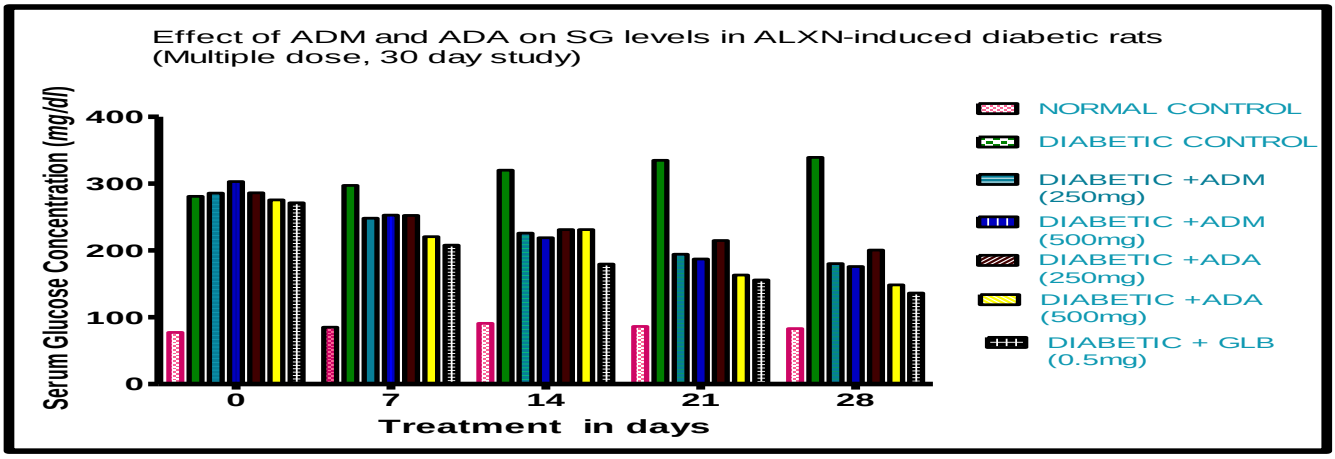


Fig 4. Blood glucose levels in Diabetic rats

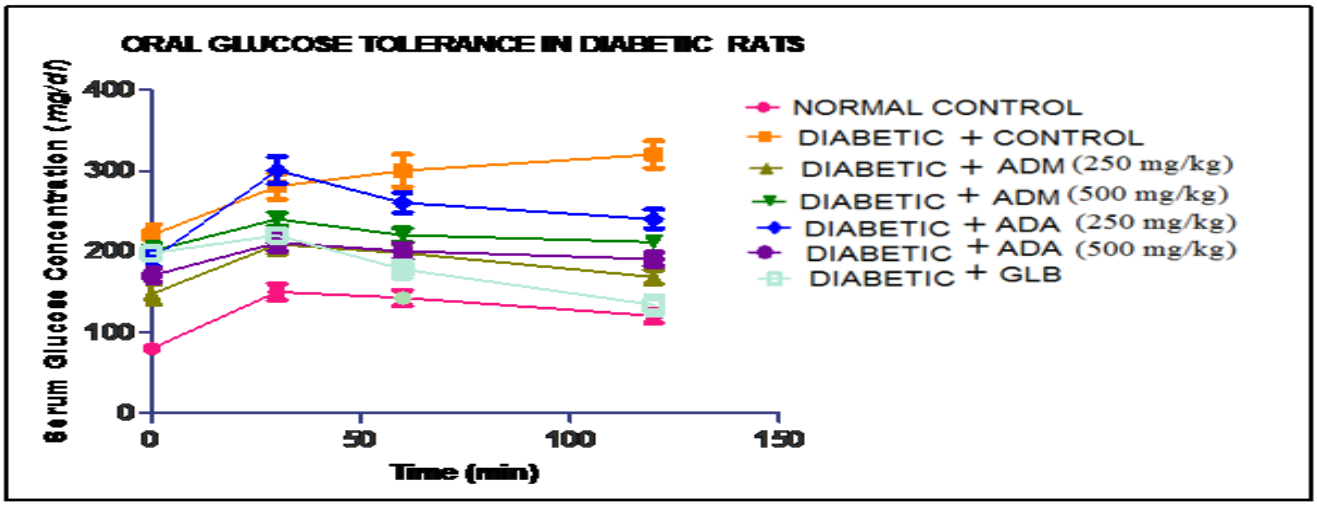


Fig 5. Serum Insulin levels in Diabetic Rats

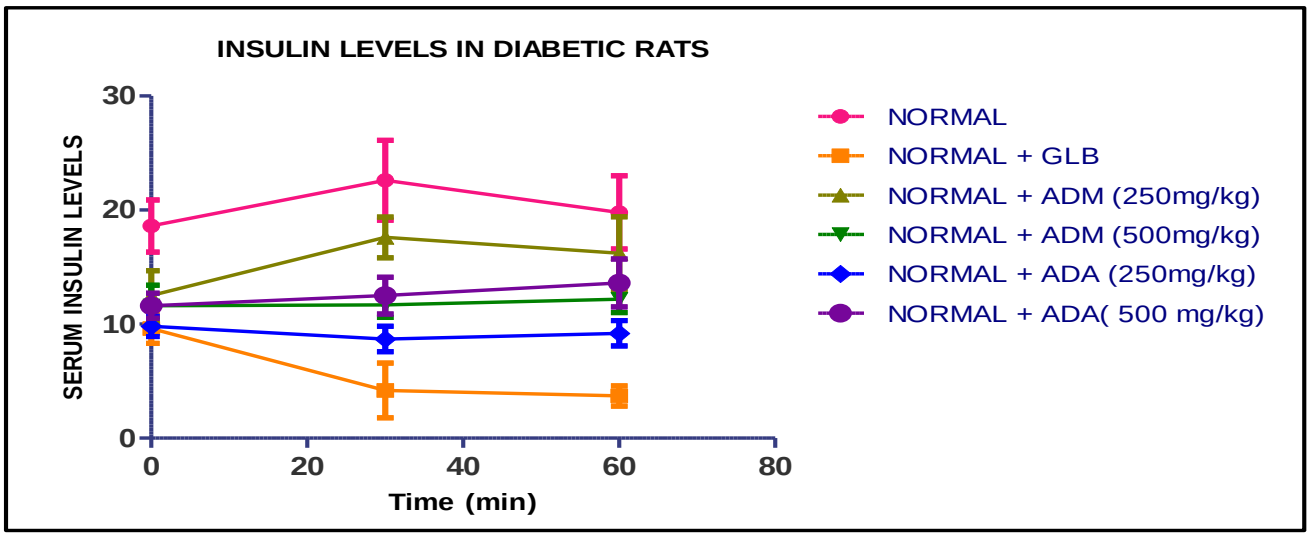
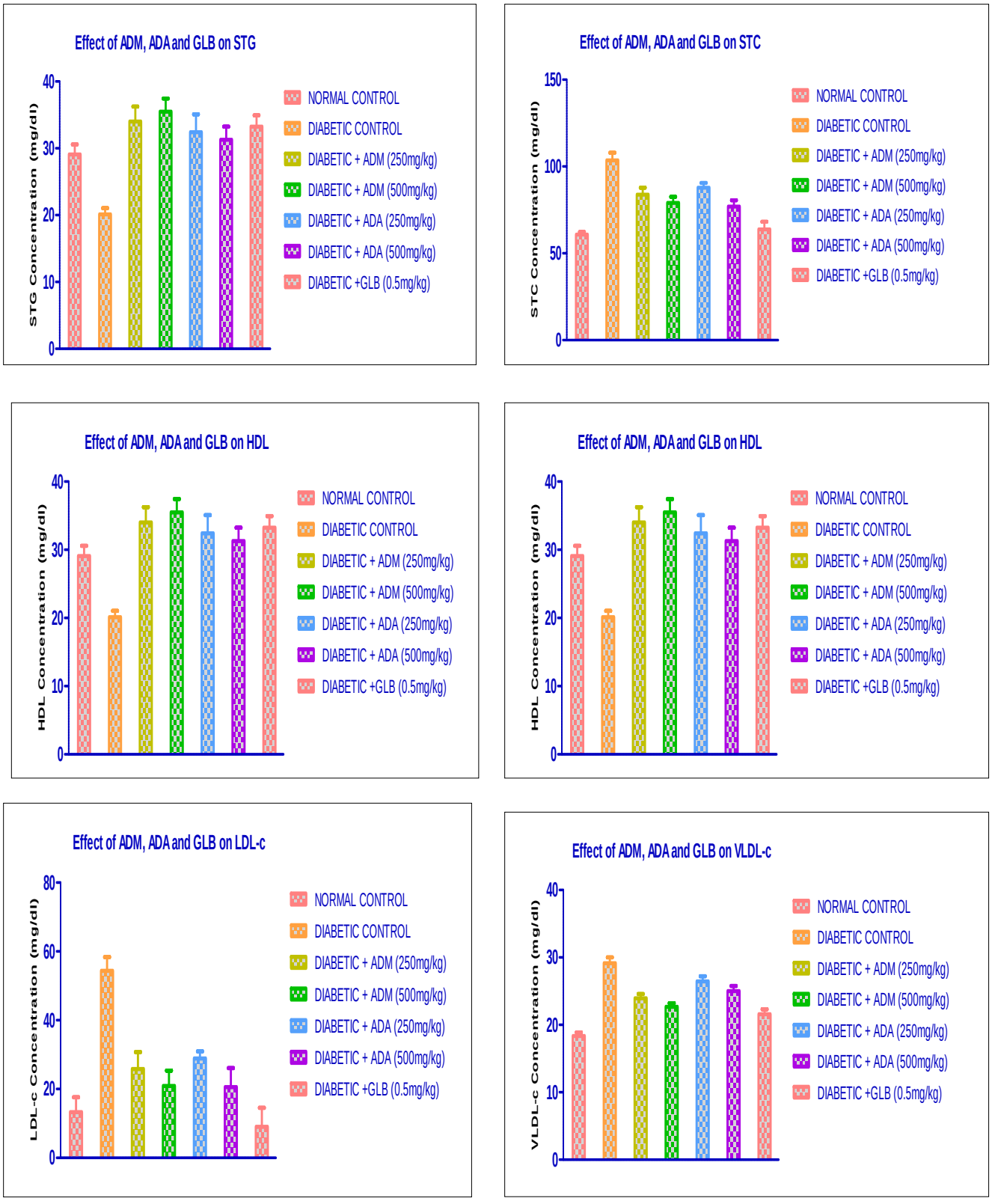
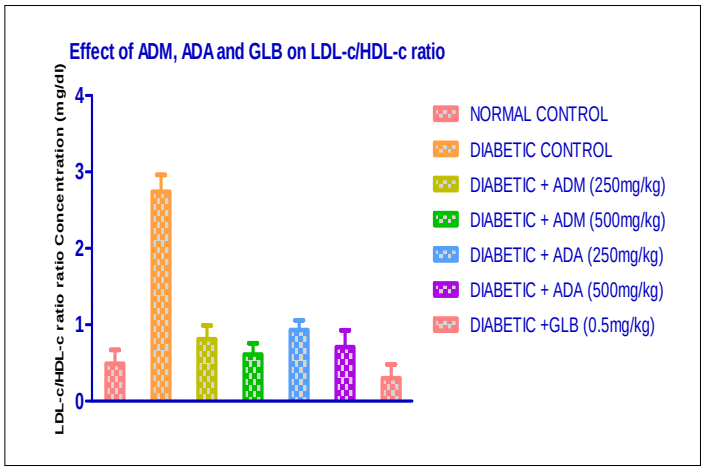


Fig 6. Effect of ADM and ADA on lipid profile in ALXN-induced diabetic rats [Multiple dose thirty-day study]





DISCUSSION

Preliminary phytochemical analysis of the leaves showed presence of alkaloids, carbohydrates, phenolics, flavonoids, glycosides and tannins the flavonoids reported to be present in the plant arequercetin-3-O-rutinoside, cohirsinine. The alkaloids present in the leaves of *Actiniopteris dichotoma leaves* are the leaves also contain isotrilobine,(+)-syringaresinol and protoquericitol. Alloxan, a β-cytotoxic, induces "chemical diabetes" in a wide variety of animal species including Wister rats by damaging the insulin-secreting β-cells of the pancreas.

Alloxan causes time- and concentration-dependent degenerative lesions of the pancreatic β-cells. The dose of Alloxan required to produce diabetes vari es with the species. In the present study,antihyperglyce mic activity of aqueous extract of leaves of *Actiniopteris dichotoma leaves* was evaluated in Alloxan-induced diabetic Wister rats. Single-dose study with 250, 500 mg/kg showed significant ($P < 0.01$) decrease in serum glucose level at 0, 1, 2 and 4 h. Continuous treatment with the aqueous extract of leaves of *Actiniopteris dichotoma leaves* (250, 500, mg/kg) for a period of 28 days showed a significant decrease ($P < 0.01$) in the serum glucose level in diabetic Wister rats. Maximum reduction of serum glucose level occurred at the dose of 500mg/kg, p.o. There was a significant weight loss in the vehicle-treated diabetic Wister rats, whereas treatment with the aqueous & methanolic extract of leaves of *Actiniopteris dichotoma leaves* at the doses of 250 and 500 mg/kg, p.o., Antihyperglycemic activity of aqueous and methanol extract of leaves of *Actiniopteris dichotoma* is reported. Total test drug sample prepared from aqueous & methanol extract showed considerable antihyper-glycemic activity in diabetic rats. Total test drug sample reduced the blood sugar level of diabetic rats significantly. Hence, the flavonoids in the leaves of *Actiniopteris dichotoma* have been reported to be responsible for the antihyperglycemic activity it may be said that the aqueous extract of leaves of *Actiniopteris dichotoma leaves* decreased the serum glucose level and improved glucose tolerance owing to the presence of flavonoids. LD_{50} determination (>5000 mg/kg) indicated safety profile of the drug.

CONCLUSION

The present study indicated that administration of ADA and ADM extract at a dose of 250mg/kg and 500mg/kg produced significant Antihyperglycemic activity in Alloxan induced diabetic rats. Methanolic extract shows less effect then the aqueous extract in reducing the blood glucose levels.

ACKNOWLEDGMENT

Authors are thank the Biological E. Limited, providing Necessary facilities to do this project research work successfully and The authors are thankful to the A.M.Reddy Memorial College of Pharmacy, Narasaraopet, Guntur, Andhra Pradesh, India for providing necessary facilities to carry out my research work successfully.

REFERENCES

Jia W, Gao WY, Xiao PG. Antidiabetic drugs of plants origin used in china: composition, pharmacology and hypoglycemic mechanism. *Zhongguo Zhong Yao Za Zhi*, 28, 2003, 108-113.

Krishna Kumar CS and Krishna Namboodiri K. Ayurvedic Management of Diabete Mellitus. Available from: URL: http//www.ayurvedam.com/pdf/ ayurvdiabetes.pdf (Accessed on 27-02-2011).

Matti R, Jana D, Das UK, Ghosh D. Antidiabetic effect of aqueous extract of seed of tamarindus indica in streptozotocin induced diabetic rats. *J Ethnopharmacol*. 92, 2004, 85-91.

National Diabetes Fact Sheet, General information and national estimates on diabetes in the United States, 2007. Available from URL: http://www.cdc.gov/ diabetes/pubs/ factsheet 07.htm. (Accessed on 04-10-2010).

National Diabetes Fact Sheet, National estimates and general information on diabetes and prediabetes in the United States, Available from URL:http://www.cdc.gov/diabetes/pubs / factsheet11.htm. (Accessed on 29-04-2011).

Plants. *J Herbal Med and Toxicol.* 2, 2008, 45-50.

Sarah Wild, Richard Sicree, Gokaka Roglic, Hilary King, Anders Green. Global prevalence of diabetes, Estimates for the year 2000 and projection for 2030. *Diabetic care*, 27, 2004, 1047-1053.

Subbulakshmi G, Mridula Naik. Indigenous foods in the treatment of diabetes mellitus. Available from: URL: http://www.bhj.org/journal/2001_4304 _oct/review_548. Bombay Hospital Journal. (Accessed on 08-12-2010).

Wadkar KA, Magdum CS, Patil SS, Naikwade NS. Anti-diabetic potential and Indian medicinal plant. *Journal of Herbal Medicine and Toxicology*, 2(1), 2008, 45-50.