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ANTIDIABETIC AND PROTECTIVE ACTIVITIES AGAINST DIABETIC COMPLICATIONS OF *TAXILLUS TOMENTOSUS TIEGH* IN ALLOXAN INDUCED DIABETIC WISTER RATS.

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ABSTRACT According to WHO, the prevalence of diabetes is likely to increase by 35%. Currently there are over 150 million diabetics worldwide and this is likely to increase to 300 million or more by the year 2025. International Diabetes Federation (IDF) estimates the total number of diabetic subjects to be around 40.9 million in India and this is further set to rise to 69.9 million by the year 2025. *Taxillus tomentosus Tiegh* belonging to family Loranthaceae (Mistletoe family) commonly known as Hairy Mistletoe or Pulluruvi is a parasitic shrub with dark brown branches is a native to Western Ghats of India, Srilanka and some parts of India.

KEYWORDS : *Taxillus tomentosus Tiegh,* Anti-diabetic, Metformin and Alloxan.

INTRODUCTION

The term ***Diabetes Mellitus*** describes a metabolic disorder of multiple aetiology characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism along with specific long-term complications affecting the retina (retinopathy), heart (cardiomyopathy), kidney (nephropathy) and nervous system (peripheral and autonomic neuropathies) resulting from defects in ***absolute correlative deficiency o a defect in the action of insulin***[1-5].

Diabetes mellitus (DM) is a common disorder associated with markedly increased morbidity and mortality rate and reduced the quality of life. Diabetes is possibly the world's fastest growing metabolic disease; it is the third commonest disease in the world affecting approximately 1.5% of total population. The number of people with diabetes is increasing due to population growth, aging, urbanization, and increasing prevalence of obesity and physical inactivity [6-10]. Persons with diabetes are at increased risk for macrovascular and microvascular disease, Viz. retinopathy, nephropathy, peripheral and autonomic neuropathies, and lower extremity disease. Microvascular complications are the major risk in type 1 diabetes, while macrovascular complications are the major cause of morbidity and mortality in type 2diabetes. The major aim of diabetes management is to prevent secondary complications[11-15].

Aim: The study was undertaken to investigate antidiabetic and protective activities against diabetic complications of *Taxillus tomentosus Tiegh* in alloxan induced diabetic wister rats.

MATERIALS AND METHODS

Materials used in this study are as follows:

1. **Chemicals:** Distilled water, Alloxan monohydrate, (Sigma Aldrich, USA), Metformin (Alembic Pharma) Chloroform (Fisher scientific), Diethy ether (Fisher scientific) Ethanol (Fisher scientific) and all other chemicals were used AR grade and ethanolic extract of Taxillus tomentosus (ETT1 and ETT2).
2. **Experimental Animal:** Albino wister rats.
3. **Equipments:** Borosilicate Soxhlet extractor,Biochemical Analyser-ROBONIK (prietest easylab, Mumbai), ROBONIC diagnostic kit (creatinine, SGOT, SGPT, urea, uric acid, cholesterol, glucose, ALP, Triglycerides, HDL) Centrifuge Biofuse pico (Heraeus), electronic digital weighing (Apex), EDDY's Hot plate analgesometer MK-111, (Sisco, Thane, Maharastra), Glucose check monitoring system (Aspen diagnostics ltd, Delhi, India.) micropippet.

1) CHEMICALS:-

a. **Alloxan monohydrate:** Alloxan monohydrate 5% solution, dissolved in normal saline was used in this study at the dose of 150mg/kg to induce diabetes in rats.[2]

Structure: 2, 4, 5, 6-Tetraoxypyrimidine 5, 6-dioxyuracil.
It is clearly soluble in water, It is stored between 2-80c.[10]

b. **Metformin:** Metforminbelongs to the biguanides class of antidiabetic drugs. It was taken as a standard drug to compare it with the test drug.

c. **Ethanolic extract of Taxillus tomentosus:** It was prepared by using finely powdered whole plant of taxillus tomentosus which was extracted by using ethanol as medium (90% of ethanol).Here our aim is to test its hypoglycemic activity by itself and in combination with metformin. Results obtained are compared with the standard drug metformin.

RESULTS AND DISCUSSIONS

Table No. 13 **Effect of taxillus tomentosus whole plant extract on blood glucose level in alloxan induced diabetic rats**

Groups	Blood glucose level in mg/dl			
	0 day	1st day	7th day	14th day
Normal	55.66±1.54	122.86±1.59	176.35±1.25	179.46±1.31
Control	61±1.86	300.25±1.38 a	251.21±1.09 a	220.53±1.22 a
Standard	61.16±1.16	246.28±0.99 ***	211.16±1.25 ***	145.15±1.17 ***
ETT_1	63.66±2.47	370.7±1.17* **	224.01±1.4* **	210.74±1.32 ***
ETT_2	56.66±1.40	517.31±1.52 ***	245.79±1.25 *	142.08±1.31 ***

Values are mean±SEM; n=6 *p<0.01 **p<0.001 ***p<0.0001 compared with diabetic control

Table No. 14 **Effect of taxillus tomentosus whole plant extract on Neuroparameters in alloxan induced diabetic rats**

Groups	Eddy's hot plate method		
	1st day	7th day	14th day
Normal	4.30±0.34	4.63±0.39	6.15±0.4
Control	7±0.75c	10.47±0.63a	11.07±0.42a
Standard	7.55±0.44	7.23±0.66*	5.94±0.76***
ETT_1	6.5±0.7	7.06±0.54***	7±0.93**
ETT_2	6.58±0.52	6.66±0.46***	6.41±1.06***

Values are mean±SEM; n=6 *p<0.01 **p<0.001 ***p<0.0001 compared with diabetic control

Table No. 15 **Effect of taxillus tomentosus whole plant extract on Neuroparameters in alloxan induced diabetic rats**

Groups	cold water test method		
	1st day	7th day	14th day
Normal	6.01±0.47	5.83±0.72	6.02±1.02
Control	7.06±0.78c	12.2±0.77b	13.83±1.1a
Standard	7.76±0.78	7.29±0.88**	7.03±0.79***
ETT_1	7.1±0.6	6.69±0.91*	7.22±0.88**
ETT_2	7.98±0.8	7.18±0.77*	5.91±0.92**

Values are mean±SEM; n=6 *p<0.01 **p<0.001 ***p<0.0001 compared with diabetic control

Table No. 16 **Effect of taxillus tomentosus whole plant extract on Neuroparameters in alloxan induced diabetic rats**

Groups	Hot water test method		
	1st day	7th day	14th day
Normal	5.55±0.96	7.3±0.37	5.68±0.69
Control	9.5±1.06c	11.28±0.7a	11.56±0.86a
Standard	8.72±0.56	7.85±0.83**	5.94±0.89***
ETT_1	9.43±1.17	7.99±0.8***	7.71±0.69***
ETT_2	10.43±1.02	8.03±0.53**	7.19±0.84***

Values are mean±SEM; n=6 *p<0.01 **p<0.001 ***p<0.0001 compared with diabetic control

Table No. 17 **Effect of taxillus tomentosus whole plant extract on Biochemical parameters in alloxan induced diabetic rats**

Groups	Biochemical parameters		
	SGOT	SGPT	ALP
Normal	25.9±1.31	34.82±.96	25.86±0.81
Control	66.96±0.7a	48.91±1.05a	75.51±0.89a
Standard	42.56±1.13***	42.3±1.17***	30.78±0.99***
ETT_1	45.3±1.09***	46.44±0.85	62.55±0.89***
ETT_2	40.4±1.01***	42.2±0.86***	54.70±0.76***

Values are mean±SEM; n=6 *p<0.01 **p<0.001 ***p<0.0001 compared with diabetic control

The acute toxicity test of ETT in mice produced no death or signs of toxicity even at the dose of 2000 mg/kg which shows that the extract was well tolerated and the test doses safe in the animals. The antidiabetic activity of ETT was evaluated in alloxan-induced diabetic rats by testing its effect on fasting blood glucose level using autoanalyzer (AccuCheckActive®) glucose kit. The fasting blood sugar test is a carbohydrate metabolictest which measures plasma or blood glucose levels after a fast (usually 8–12 h). During fasting the body stimulates the release of the hormone glucagon, which in turn releases glucose into the blood through catabolic processes. Normally, the body produces and processes insulin to counteract the rise in glucose levels but in diabetes, this process does not occur and tested glucose levels normally remain high 1. Alloxan is one of the usual substances used for induction of diabetes mellitus apart from streptozotocin and has a destructive effect on the beta (β) cells of the pancreas as previously reported by Jelodar et al[16]. Pancreas is the primary organ involved in sensing the organism's dietary and energetic states via glucose concentration in the blood and in response to elevated blood glucose, insulin is secreted[37]. However, alloxan causes diabetes through its ability to destroy the insulin-producing-cells of the pancreas[42]. When there are not enough available beta-cells to supply sufficient insulin to meet the needs of the body, insulin-dependent diabetes results

SUMMARY AND CONCLUSION

The present work was carried out evaluate antidiabetic activity of *Taxillus tomentosus* commonly known as hairy mistletoe, Pulluruvi. Evaluation of antidiabetic activity was assessed by using two experimental models namely alloxan induction and streptozotocin models. Acute diabetic was induced by administration of alloxan (150mg/kg i.p, at once) in rats. Administration of ETT (200/400 mg/kg. p.o) for 7/14 days in alloxan model, successfully prevented the elevation of serum glucose levels. Treatment with ETT (200 and 400mg/kg) for 7/14 days successfully prevented the elevated serum TG, TC,and decrease of serum HDL-c in alloxan model rats. Extract showed significant results of histopathology in liver and aorta tissues. The antidiabetic activity was due to its phytochemical constituents like alkaloidal,steroids and presence of glycoside. More investigation is necessary to prove the antidiabetic activity of *Taxillus tomentosus* by other experimental models.

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