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Effect of *Chloroxylon swietenia* Bark Extract On Lipid Profiles Of Diabetic Induced Wistar Rats

Lingaiah M[1], Estari Mamidala[2] and Nagaraja Rao P[3]*

[1,3]*Department of zoology, Osmania University, Hyderabad-500 007, Telangana State, India*
[2]*Department of zoology, Kakatiya University, Warangal-506 009, Telangana State, India*

Email : * lingaiahzoology@gmail.com

ABSTRACT

Diabetes mellitus is a metabolic disorder and not a disease, characterized by hyperglycemia resulting from defects in insulin secretion/synthesis/induction in to the cell and insulin action or both. This investigation was designed to study the anti lipidemic profiles was investigated in diabetic induced Wistar rats treated with plant extract. Diabetes was induced after a single dose of intraperitoneal injection of Alloxan monohydrate drug (120 mg/ kg). The parameters studied were lipidprofile like Total cholesterol (TC), Triglyceride (TG), High-density lipoprotein (HDL), Low-density lipoprotein (LDL).Theresult of test drug was compared with diabetic control. Glibenclamide (600µg/kg/bw) was selected as standard hypoglycaemic drug. Administration of plant extracts also shows decreased in serum TC, TG, HDL,LDL in diabetic induced wistarrats.The results obtained from the present study revealed the potential Antilipidemic activity of selected medicinal plant extract

Key words: Traditional Healers, Medicinal Plants, Ethnobotanical Survey, Diabetes Milletus, Lipid Profile .

INTRODUCTION

Diabetes mellitus is an endocrine disorder that results from abnormality of carbohydrate metabolism and characterized by absolute or relative deficiencies in insulin secretion or receptor insensitivity to endogenous insulin, that finally resulting in hyperglycemia (Hassouna, 2000. Scheepens, 2001.Kamtchouing and Kahpui, 2006.Elhilaly *et al.*, 2007).Since in diabetes mellitus treatment, the main aim is to not only to regulate blood glucose levels, but also to correct the associated metabolic defects (Hattersley, 2002.Crevel, 2007.Allen,2007). Nowhere is the diabetes epidemic more pronounced than in India as the World Health Organization (WHO)reports show that 32 million people had diabetes in the year 2000 (Wild *et al.*, 2004). Now-a-days various researchers are looking for potent chemicals in plants for the management of diabetes. The treatment of diabetes with synthetic drugs is generally not preferred because of its high cost and the range of side effects caused (Ayman*et al.*, 2015). However few plants have shown promising results (Patwardhan , 2005. Dama, 2010. Singh Akhand Pratap, 2012) especially in the rural areas depends on herbal medicine for their healthcare needs (Nivo *et al.*, 2015; Paul *et al.*,2015). Some researchers reported the other benefits of using some herbal plants for their use in treatment ofhyperlipidemia (Metwally*et al*, 2012. Earlier, Bopanna *et al.*, 1997) reported that many medicinal plants play a major role in hypolipidemicactivity and reported that the lipid lowering action of these plants is mediated through the inhibition of hepatic cholesterol biosynthesis and reduction of lipid absorption in the intestine (Bopanna*et al.*, 1997).

Measurement of triglycerides, total cholesterol, HDL and LDL profiling helps to understand the risk of diabetes. Impairment of insulin secretion or it absence leads to an excessive and prolonged increased and decreased concentration of triglycerides, total cholesterol, HDL and LDL.

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MATERIALS AND METHODS

Chloroxylon swietenia Belongs to Family Apocynaceae, Sub family: Periplocoideae, Genus: Chloroxylon and spices: *Chloroxylon swietenia*.

Chemicals

Alloxan monohydrate and Glibenclamide. Wellion LUNA duo Glucometer and Blood gluco-strips, EDTA, Imidazole buffer (100 mM, pH 6.5), Ammonium molybdate (1%, w/v), Sodium citrate (2%,w/v), ice-cold sucrose (250 mM),NaCl (203.3 mmol), Pyruvate (9.76 mmol), $MgCl_2$.

Preparation of Extracts

Selected *chloroxylon swietena* plant was successively extracted with different organic solvents (acetone and chloroform) in increasing polarity order (Pathmanathan*etal.*, 2010) by using Soxhlet extractor.

Extract yield % = W1/W2 X 100.

Where, W1 = Net Weight of powder in grams after extraction,
W2 = total Weight of powder in grams taken for extraction.

Test Animals

Adult Wistar rats (150-160gr), 8-14 weeks aged were obtained from NIN (National institute of Nutrition) Hyderabad and were used for the study of anti lipidemic activity of selected medicinal plant. Rats were acclimatized for a period of 7 days before experimentation, housed in groups of seven polypropylene cages with lined soft wood as bedding (renewed every 24hrs), 12hour day and 12 hour night cycle, relative humidity 50-60 and at temperature 22±3°c, rats were fed with pellet as diet and water.

Animals selected were kept on starvation overnight and then divided into six groups (n=6) as follows:

Group-I: Normal Control rats (without induced) that are administered with standard feed and water.
Group-II: Diabetic control rats (induced with alloxan drug) without treatment.
Group III: Diabetic rats administered with Glybenclamide drug (600µg/kg/bw) as reference standard drug.
Group-VI: Diabetic rats administered with *Chloroxylon swietenia* bark extract (8 mg/bw)

Induction of experimental diabetes

Diabetes was induced by intraperitoneal injection (single dose) of alloxan monohydrate (120 mg/ kg-b.w.) in (0.9% w/v) NaCl solution (normal saline) to overnight starved normal rats.Treatment was continued for a period of 21 days following oral administration to the experimental animals by gastric intubation by using a force-feeding needle (Shaik Abdul Nabi*et al.*, 2013).

Estimation of Total Cholesterol (TC) (CHOD-PAP)-Phosphotungstate followed by Richmond,(1973) and Hendry (1974) method.

The intensity of the color produced is directly proportional to cholesterol concentration. It is determined by measuring the increase in absorbance at 500 – 550 nm.
Calculation: Total cholesterol (mg/dl) = (Abs. of TC / Abs.of S.) × 200

Estimation of Triglycerides:

(CHOD-PAP-Phosphotungstate Richmond, (1973) and Hendry, (1974) method. The absorbance of the sample and of the standard was measured against the reagent blank value at 546 nm.
Calculation: Triglycerides = (Abs.of Test / Abs.of Std.) × 200

Estimation of HDL and LDL cholesterol:

(CHOD-PAP-Phosphotungstate followed by Richmond, (1973) and Hendry (1974) method.
Calculation: HDL cholesterol (mg/dl) = (Abs. of H / Abs. of S.)×50

RESULTS AND DISCUSSION

Effect of *Chloroxylon swetania* Bark extract on Lipid profile of Wistar rats:

Total Cholesterol levels in normal control group was 68.4mg/dl and in diabetic control (Alloxan treated) group 98.2 mg/dl, in standard (Glybenclamide) control group it was 85.2 mg/dl. Diabetic induced Wistar rats, which were treated with medicinal plant extracts. In *Chloroxylon swietenia* plant extract treated group total cholesterol was 81.3 mg/dl. The effect of *Chloroxylon swietenia* bark extract on total cholesterol was decreased to 17.21% when compared to the diabetic control group rats.

Triglycerides in normal control group was 85.2 mg/dl and in diabetic control (Alloxan treated) group 129 mg/dl, in standard (Glybenclamide) control group it was 123.2mg/dl. In *Chloroxylon swietenia* plant extract treated group, triglycerides was 121.1 mg/dl, and these triglycerides was decreased to 6.13% when compared to the diabetic control group rats.

HDL in normal control group was 55.2 mg/dl, and in diabetic control (Alloxan treated) group it was 28.2 mg/dl. In standard control (Glybenclamide) group HDL was 55.1mg/dl. In *Chloroxylon swietenia* plant extract treated

Table-1 Effect of *Chloroxylon swetania* extract on Lipid Profile of wistar rats

	Total cholesterol (mg/dl)	TRG (mg/dl)	HDL (mg/dl)	LDL (mg/dl)
Group I (NC)	68.4±4.02	85.2±6.02	55.2±0.48	40.2±1.01
Group II(DC)	98.2±1.6	129±1.58	28.2±0.78	86.2±2.0
Group III (Sc)	85.2±1.12	123.2±1.52	55.1±1.67	39.4±3.12
Group-IV *Chloroxylon swetania* (8mg/bw)	81.3±1.14	121.1±1.48	36.2±0.41	38.2±0.15

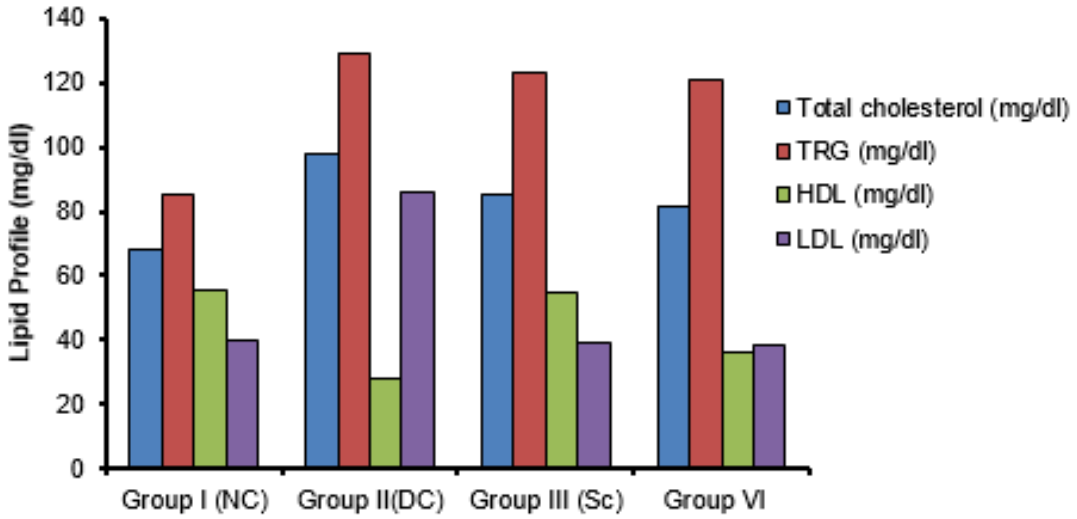

Figure-1. Effect of *Chloroxylon swetania* extract on lipid profiles against wister rats

group HDL was 36.2 mg/dl and HDL increased to 28.36% when compared to the diabetic control group rats.

LDL in normal control group rats was 40.2 mg/dl and in diabetic control (Alloxan treated) group 86.2mg/dl, in standard control (Glybenclamide) group 39.4 mg/dlLDL was decreased to 51.27% when compare to the diabetic Control group rats in *Chloroxylon swietenia* plant extract treated group Wistar rats and it was 38.2 mg/dl.

Measurement of triglycerides, total cholesterol, HDL and LDL profiling helps to understand the risk of diabetes. Impairment of insulin secretion or it absence leads to an excessive and prolonged increased and decreased concentration of triglycerides, total cholesterol, HDL and LDL reduces triglyceride, total cholesterol, and LDL cholesterol levels in people with diabetes (Alam khan, *et al* 2003). After consumption of Jaman fruit extract, there was decrease in serum TGL in some individuals but not significant. Total cholesterol was decreased, but not-significantly. Also LDL was not-significantly decreased. HDL was not affected (Mahpara Safdar *et.al*.,2006).

Cissus sicyoides significant decreases in triglyceride levels (Glauc*etal*., 2004; Mamidala et al, 2020). The treatment with *Chloroxylo swietenia* similar was the situation with *M. vulgare*reduced the hypercholesterolemia. In relation with triglycerides, *C.obtu sifolia* decreased the basal hyper triglyceridemia from 340.5 to 197.48 mg/dl and the extract from *M. vulgare* reduced the basal values of triglycerides by 5.78%. But the differences were not significant (Herrera-Arellano *et al*., 2004). The hypolipidemic action of flavonoid rich extract obtained from seeds of *Eugenia jambolana*was confirmed by significant decrease in the levels of LDL(27%-29%), triglycerides (about 35%- 37%) and increase in HDL (21%-34%) over untreated diabetic rats (Sharma *et al*. 2008). HDL cholesterol, a friendly lipoprotein, was decreased in both the diabetic groups in respect to the control (Sharma *et al*. ,2008).

However, in all these cases, the cholesterol levels were found to be in the normal range. Similar trend was noticed in the levels of triglycerides and LDL-cholesterol (LDL-C) in all the groups. This present research study demonstrated the effects of *Chloroxylon swieteniaon* the

reduction of glucose, triglyceride, LDL cholesterol, and total cholesterol levels in Wistar rats.

Conflicts of Interest

Authors declare that there is no conflict of interests regarding the publication of this paper.

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