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ANTI-HYPERLIPIDEMIC ACTIVITY OF *ACACIA NILOTICA* PODS EXTRACT AGAINST FRUCTOSE INDUCED HYPERLIPIDEMIA

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ABSTRACT

Hyperlipidemia is one of the major causes of disability in developing countries. It is the one of the major risk factor of coronary heart diseases. The present study was designed to investigate the effect of the pod extract of a medicinal plant Acacia nilotica (AN) on fructose-induced hyperlipidemia in rats. The plant extract and commercial lipid lowering drug atorvastatin were administered in fructose-induced hyperlipidemic rats (FIHRs) at a dose of 100mg/kg and 200mg/kg per day.Biomedical parameters were studied includingSerum Triglyceride, Serum Total Cholesterol, Serum LDL, Serum HDL, VLDL, in control, treated and diabetic rats. The result of the experiment suggest that The AN extract showed a significant decrease in lipid profile, i.e it shows antihyperlipidemic effect in fructose induced hyperlipidemic rats.

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INTRODUCTION

Diabetes Mellitus (DM) is one of the most common metabolic disorders, with a worldwide prevalence estimated to between 1% and 5%. DM leads to abnormalities in carbohydrate, protein and lipid metabolism and increases the risk of developing atherosclerotic arterial disease by two- to six-fold. Natural medicinal plants promote self healing, good health and durability in ayurvedic medicine practices.

Acacia nilotica, locally known as babla, belongs to the family fabaceae. The plant is widely distributed in the Indo-Bangla subcontinent and cultivated throughout the tropical belt. Different parts of this plant are reported to be used for the treatment of human aliments. The whole plant has antiplatelet aggregatory activity. and have acknowledged that Acacia *nilotica (A. nilotica*) can provide the nutrients and therapeutic ingredients to prevent, mitigate or treat many diseases or conditions. Pods and tender leaves are given to treat diarrhea and are also considered very useful in folk medicine to treat diabetes mellitus. So the presence study was carried out to evaluate the antihyperlipidemic effect of *Acacia nilotica* extract on fructose-induced hyperlipidemic rats.

MATERIALS AND METHODS

Chemicals and Drugs:

Ethanol, Pet-ether, fructose, ethyl acetate, Atrovastine. All other chemicals and reagents used for phytochemical screening and HPLC in present investigation were of analytical grade

Equipments:

Soxhlet apparatus Microscope, Glucometer (Onetouch Select Simple), Digital Single Pan Balance, Centrifuge, Refrigerator, Microscope.

Antiheperlipidemic Activity:

Fructose induced hyperlipidemic model.

Animals: Wistar albino rats (180-250 g) of either sex.

Experimental designs:

Animals (Wistar rats) were divided into seven groups (n = 6 for each group).
Control:DMSO
Standard: Atorvastatin (10 mg/kg)

1. Group A (Negative Control) receive vehicle
2. Group B (Positive Control) receive Fructose solution (10%) and vehicle
3. Group C receive standard drug (Atorvastatin 10 mg/kg)
4. Group L Test group (ANP-EA extract, dose 100 mg/kg)
5. Group M Test group (ANP-EA extract, dose 200 mg/kg)
6. Group N Test group (ANP-ET extract, dose 100 mg/kg)
7. Group O Test group (ANP-ET extract, dose 200 mg/kg)

Method Procedure:

Preparation of pod extract

Acacia niloticaPods were pulverized using a milling machine made to obtain coarse powder. Coarse powder (1000 g) of ANP was exhaustively defatted using petroleum ether (60-80 °C) (ANP-PE) and extracted successively with chloroform (ANP-CH), Ethyl Acetate (ANP-EA) and ethanol (ANP-ET) using Soxhlet apparatus. All the extracts were collected, filtered through whatman filter paper, concentrated and stored in tight desiccators and percentage yield was calculated.

Procedure:

Animals were weighed before the experiment, after fourteen days of fructose administration and after the drug treatment. Group A rats received water as an vehicle and Group B to O received 10% fructose solution throughout the 21 days study period. Treatment (Atrovastatin and plant extracts) was started at 15^{th} day for next seven days.
On 21st day, after 1hr of administration of the last dose, blood samples were collected from overnight fasted rats by retro-orbital puncture. Blood parameters were measured by semi-autoanalyser using commercially available assay kits. (Kadnur, 2005)

Evaluation:

Evaluation was carried out over lipid profile parameters as Serum Triglyceride, Serum Total Cholesterol, Serum LDL, Serum HDL, VLDL, etc. by using enzymatic kit procured from Ambika Diagnostics, Parbhani over semi-auto analyzer and morphological parameter viz., body weight.

RESULT AND DISCUSSION

In present study the effect of ANP-EA and ANP-ET was studied for itsantihyperlipidemic activity using fructose induced hyperlipidemia where rats were administered with 10% fructose during the treatment for 21 days and the drug treatment was continued after 14^{th} day of fructose treatment up to 21^{st} day. Rats were evaluated over change in body weight and over lipid profile parameters as Serum Triglyceride, Serum Total Cholesterol, Serum LDL, Serum HDL,VLDL.

Table 1: Effect of ANP-EA and ANP-ET on change in body weight in fructose-induced hyperlipidemic rats.

Groups	Change in Body Weight (gm)	
	Day 14	Day 21
Control	02.54±1.88	03.17±0.73
Positive Control	25.44±3.17	31.33±0.72
Atorvastatin	23.13±3.03	1.11±0.53**
ANP-EA 100	23.94±3.44	20.33±0.57**
ANP-EA 200	24.88±3.57	18.67±0.53**
ANP-ET 100	24.63±3.62	17.11±0.42**
ANP-ET 200	23.62±3.52	12.32±0.32**

Values are expressed as Mean±SEM. (n=6), ANOVA followed by Tukey test. *p<0.05 significant difference, **p<0.001 highly significant difference when compared with Positive-control. #p>0.05 non-significant difference when compared with standard; *ANP-Acacia niloticapods*extract, EA- ethyl acetate, ET- ethanol, ME- Methanol.

Change in body weight was measured on day 14 and 21. Normal control shown body weight change 3.17 gm on day 21 while Positive control shown body weight change 31.33 gm,

Atrovastatin (1.11), ANP-EA 100 (20.33), ANP-EA 200 (18.67), ANP-ET 100 (17.11), ANP-ET 200 (12.32) shown (p<0.001) significant change in body weight on day 21.

Table 2: Effect ofANP-EA and ANP-ET on lipid profile level in Fructose-induced hyperlipidemic rats.

Groups	Serum Triglycerides (mg/dl)	Serum Total Cholesterol (mg/dl)	Serum LDL Cholesterol (mg/dl)	Serum HDL Cholesterol (mg/dl)	Serum VLDL Cholesterol (mg/dl)
Control	62.51±0.49	79.93±0.62	07.51±0.17	59.93±3.65	12.5±0.98
Positive Control	185.83±0.32	184.84±3.73	113.14±3.43	34.53±3.48	37.16±0.88
Atorvastatin	121.31±0.43**	126.23±3.33**	35.44±3.29**	66.54±3.58**	24.26±0.61**
ANP-EA100	182.44±0.33	182.37±3.03	108.32±3.88	37.56±3.42	36.48±0.62
ANP-EA200	175.73±0.53*	173.32±3.41	95.56±3.66*	42.66±3.73	35.14±0.55*
ANP-ET100	166.47±0.91**	168.33±3.51	89.22±3.34**	45.91±3.44	33.28±0.44**
ANP-ET200	160.23±0.37**	161.12±3.33**	78.76±3.57**	50.33±3.31	32.04±0.33**

Values are expressed as Mean±SEM. (n=6), ANOVA followed by Tukey test. *p<0.05 significant difference, **p<0.00 highly significant difference when compared with Positive-control. #p>0.05 non-significant difference when compared with standard;*ANP-Acacia niloticapods*extract, EA- ethyl acetate, ET- ethanol, ME- Methanol.

CONCLUSION

The result obtained from the pharmacological screening havelead to the conclusions that, ethanolic extract of pods of *Acacia nilotica* has significant antihyperlipidemic activity. Hence it can be exploited as an anti-hyperlipidemic therapeutic agent or adjuvant in existing therapy for the treatment of hyperlipidemia.

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