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Research Article

HYPOLIPIDEMIC ACTIVITY OF ETHANOLIC EXTRACTS OF CASSIA ANGUSTIFOLIA IN TRITON-X 100 INDUCED HYPERLIPIDEMIA IN RATS

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ABSTRACT

Aim- The present study was aimed to evaluate Hypolipidemic activity of ethanolic extracts of Cassia angustifolia in Triton X 100 induced Hyperlipidemia in Rats.

Materials and Methods- Anti-hyperlipidemic activity was evaluated using Triton X 100-induced hyperlipedemia in rats as an experimental model. Plasma triglycerides, Total cholesterol, HDL, LDL and VLDL were determined to assess the hypolipidemic activity.

Result- It was found that the EECA 400 mg/kg dose showed significant hypolipidemic effect ($P<0.01$) where as 300 mg/kg also significant in the entire parameter used for evaluation of hypolipidemic effect ($P<0.05$).

Conclusion- Ethanolic extracts of Cassia angustifolia showed that hypolipidemic effect and this study provide scientific proof for their traditional claims. However further study is needed in order to understand the precise mechanism.

Keywords: Cassia angustifolia, Hypolipidemia, Atorvastatins.

INTRODUCTION

Cardio vascular diseases are leading cause of death in both industrialized and developing nations. Disorders of lipid metabolism, following oxidative stress are the prime risk factors for initiation and progression of these diseases [1]. Hyperlipidemia is a major cause of atherosclerosis and atherosclerosis-associated conditions, such as coronary heart disease (CHD), ischemic cerebrovascular disease and peripheral vascular disease [2]. The main aim of treatment in patients with hyperlipidemia is to reduce the risk of developing ischemic heart disease or the occurrance of further cardiovascular or cerebrovascular disease [3]. Triditional system of medicine like ayurveda, unani and Chinese prescribe numerous herbal drugs for cardiovascular disorders. Currently available hypolipidemic drugs have been associated with a number of side effects. The consumption of synthetic drugs leads to hyperuricemia, diarrhoea, nausea, myositis, gastric irritation, flushing, dries skin and abnormal liver function [4]. In the present study the hypolipidemic effect of leaf extract of Cassia angustifolia was studied.

MATERIALS AND METHODS

Experimental Animals and Housing of Animals:-

Albino Wister rats of both sex (150-250g) were procured from National Institute of Nutrition (Hyderabad). They are maintained under standard conditions (temperature 25 °C) at least 2 weeks prior to the study, so that animals could acclimatize to the new environment. The animals were housed in sanitized polypropylene cages (32x24x16) with stainless steel grill top, bedded with rice husk containing sterile conditions. They had free access to standard pellet diet and water was provided ad libitum.

Plant Material

The leaves of Cassia angustifolia were purchased from local traditional market, Hyderabad, India and were botanically authenticated by the botanists (Department of Botany, Osmania University). The leaves of Cassia angustifolia were shade dried for 15 days and Powdered.

Preparation of Plant Extract

The dried leaf powder of Cassia angustifolia was extracted using ethanol as a solvent in Maceration method. The percentage yield of plant extract was found to be as 11%. The final concentrated extract obtained was stored at 0-4°C until used. A known volume of the ethanolic residual extract was suspended in distilled water and was orally administered to the animals by gastric intubation using a force-feeding needle during the experimental period.

Preliminary phytochemical screening

A portion residue from extract was screened for the presences of various phytochemical analysis [5].

Chemicals

Triton X 100 was purchased from Finer chemicals limited, Ahmedabad, India. All other chemicals and reagents used were of analytical grade.

Standardisation of Hyperlipidemic dose of Triton - X 100:

To induce the hyperlipidemia rats were kept in fasting for 18 hrs with excess of water and subjected to triton X 100 at the dose of 300, 400, 500, 600 and 700mg/kg p.o. and the different lipoproteins was evaluated at 24, 48 and 72 hrs. It was observed that Triton - X 100 in the dose of 400mg/kg p.o. can induce maximum hyperlipidemia after 48 hrs. Hence 400mg/kg p.o. was considered the ideal dose for induction of hyperlipidemia.

Evaluation of anti-hyperlipidemic activity:-

Animals are divided into seven different groups in each 6 animals. Animals are kept fasting for 18 hrs and injected Triton X100 at a dose of 400 mg/kg p.o. prepared in saline solution. According to treatment protocol, the first dose of the drug treatment was given immediately after triton administration to animals from group 2 to 7. Second and third dose was administered after 24 and 44 hrs respectively. After 4 hrs of third dose the animals are used for the

study of various biochemical parameters. Blood was collected by puncture of retro orbital plexus of the rat under anesthesia and centrifuge at 2000rpm for 30 min to get the serum and analyzed for biochemical parameters [6].

Biochemical estimation

Blood samples were collected after 48 hours of triton injection by retro-orbital puncture. Blood was immediately centrifuged (2500 rpm for 10 min) and serum was analyzed for total cholesterol (TC), Triglycerides (TG), High density lipoprotein (HDL), low density lipoprotein (LDL) and very low density lipoprotein (VLDL) [7].

Statistical Analysis

All results are expressed as mean ± standard error. The data was Analyzed using one ways of analysis of variance (ANOVA). The statistical significance of the different of the means was evaluated by Dennett's test.

RESULTS

The Preliminary phytochemical investigation of the EECA showed the presence of glycosides, flavonoids, triterpenoids, volatile oils, Sugars and resins.

Table 1: HYPOLIPIDEMIC ACTIVITY OF ETHANOLIC EXTRACT OF CASSIA ANGUSTIFOLIA (EECA) IN TRITON X-100 INDUCED HYPERLIPIDEMIA.

Treatment	Serum TG	Serum TC	Serum HDL	Serum LDL	Serum VLDL
Normal	16.90±1.76	81.0±1.56*	34.6±1.05	42.23±4.31*	2.541±0.12
Hyperlipidemic control	89.97±2.88*	123.10±2.44	16.11±0.58*	81.10±3.52	18.9±0.57
Atorvastatins	37.33±1.76*	91.24±1.26**	47.56±1.55*	34.20±1.66*	7.66±0.35
EECA 300 mg/kg	35.27±2.11**	80.68±1.86**	44.13±1.28*	42.01±4.16*	10.21±0.21*
EECA 400 mg/kg	36.56±1.37*	90.45±6.57**	46.56±1.57**	36.33±4.86*	8.12±0.12*

Values are expressed as mean±S.E.M; n=6, *P<0.05, **P<0.01, ***P<0.001 considered for significance, (ANOVA followed by Dunnett's test).

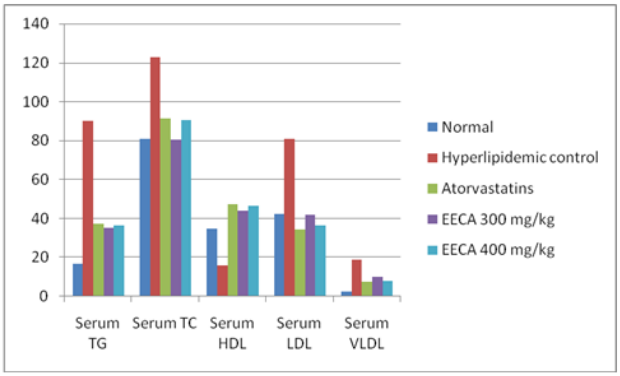

Figure 1: EFFECT OF EECA ON SERUM TG, SERUM TC, HDL, LDL AND VLDL.

As mentioned in the table 1, Estimation of Serum TG levels of the anti hyperlipidemic drug like Atorvastatin, EECA 300 mg/kg and 400 mg/kg were 37.33±1.76, 35.27±2.11, 36.56±1.37 respectively. Estimation of Serum TC levels of Atorvastatin and EECA 300 mg/kg and 400 mg/kg were 91.24±1.26, 80.68±1.86, 90.45±6.57 respectively. Estimation of Serum HDL levels of Atorvastatin, EECA 300 mg/kg and 400 mg/kg were 47.56±1.55, 44.13±1.28, 46.56±1.57 respectively. Estimation of Serum LDL levels of Atorvastatin, EECA 300 mg/kg and 400 mg/kg were 34.20±1.6642.01±4.16*, 36.33±4.86* respectively. Estimation of Serum VLDL of Atorvastatin and EECA 300 mg/kg and 400 mg/kg were 7.66±0.35, 10.21±0.21*, 8.12±0.12*respectively.

In the present study revealed that, ethanolic extract of Cassia angustifolia significantly decreases the levels of serum TG, serum TC, LDL and VLDL and increase HDL levels. The order of activity, increased of hypolipidemic output was 400mg>300mg. The hypolipidemic activity demonstrated by the text extract of 400mg/kg was significantly lesser than standard drug atorvastatin. All the results were stastitically significant (P< 0.05) and compare with normal and control group.

DISCUSSION

Triton acts as a surfactant and suppresses the action of lipases to block the uptake of lipoproteins from circulation by extra hepatic tissues, resulting into increased blood lipid concentration [8]. The biphasic nature of Triton X 100 Induced hyperlipidemia is helpful in understanding the mode of action of hypolipidemia agents. Drugs interfering with lipid biosynthesis or uptake will be active in the synthesis phase and metabolism will be active in the excretory phase. In the present study, the EECA reduced the cholesterol and triglycerides in a manner similar to the reduction facilitated by Atorvastatin. The hypolipidemic activities of Atorvastatin and EECA were evident in both synthesis and excretory phases of triton X 100 - induced hyperlipidemia in rats. Triton induces hyperlipidemia by increasing the hepatic synthesis of cholesterol and triglycerides [9]. So, it can be assumed that Cassia angustofolia inhibits the biosynthesis of cholesterol and triglycerides and therefore can be used for the prevention (prophylactic) of hyperlipidemia.

In the present study, EECA reduces the level of cholesterol, triglycerides and LDL and increase the level of HDL, which may probably be due to the presence of flavonoids, triterpinoids and glycosides.

CONCLUSION

In conclusion, from the present findings, it is well documented that the Cassia angustifolia has the active principle to counteract the hyperlipidemic condition occurring in triton induced hyperlipidemia in rats. Further studies to isolate, identify and characterize the active principle(s) and to elucidate the mechanism of action are in the progress.

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