

**ELUCIDATION OF ANTIHYPERLIPIDEMIC PROFILE OF BAHUNIA RACEMOSA LIN
USING TRITON-INDUCED ANIMAL MODEL**

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INTRODUCTION

Lipids are water insoluble substances with unique structures and functions. They are soluble in organic solvents such as Chloroform, Ether and acetone. Major groups of lipid include fats, phospholipids, steroids and waxes, etc. The main biological functions of lipids are energy storage, as structural components of cell membranes and signaling. Metabolic syndrome (MS), such as diabetes, obesity, hyperlipidemia and hypertension is associated with abnormal lipid metabolism. The accumulation of nutrients such as lipids and caloric surplus leads to abnormal lipid and ectopic fat accumulation, which is a fundamental component of metabolic disease. Elevated serum total cholesterol (TC), low density lipoproteins (LDL), very low density lipoprotein (VLDL) and decrease high density lipoprotein (HDL) are the major risk factors for coronary heart diseases and chronic degenerative disease such as atherosclerosis. In recent scenario herbal drugs play a vital role in controlling diseases including increased lipid level in the body. The natural sources are less toxic, less expensive, which can provide better safety and efficacy on a long term usage.

Bauhinia racemosa Lam (The Sonpatta Tree) is a small, crooked, bushy, deciduous tree with drooping branches, which can grow in poor and very harsh climatic conditions. The deciduous tree is propagated easily from seed. The plant Bauhinia racemosa (L). belongs to the Caesalpiniaceae family. It is popularly known as Mandarai in 'Tamil', "Apta" in Marathi and "Kanchnal" in Hindi. This particular species racemosa is widely distributed throughout India, in the western Himalayas, and in Ceylon. The bark and leaves of B. racemosa are sweetish and acrid, refrigerant, astringent and is used in the treatment of headache, fever, skin diseases, blood diseases, dysentery and diarrhea.

MATERIALS AND METHODS**Plant Selection and Preparation of Extract**

Bauhinia Purpurea leaves were collected, in and around Coimbatore. The plant was authenticated by Dr. M. Palanisamy, Scientist "D" in-charge, Botanical Survey of India, Southern Regional Centre, Coimbatore, Tamilnadu. Vide Letter No. BSI/SRC/5/23/2016/Tech/585. A voucher specimen is deposited for further reference. Leaves were air dried, powdered to 40 mesh and were cleaned to remove any foreign materials and dust. The dried plant material was pulverized into fine powder using a grinder (mixer). About 50 g of powdered material was extracted in

soxhlet extraction apparatus with 250 ml of alcohol. The extracts obtained with alcohol were filtered through Whatman filter paper No. 1 and the solvents were evaporated (at 40°C) with the help of heating mantle. Sticky greenish-brown substances were obtained and stored in refrigerator for prior to use. Some of the extracts of each solvent were used for the qualitative phyto chemical screening for the identification of the various classes of active chemical constituents, using standard prescribed methods. The extract was concentrated under reduced pressure.

Drugs and Chemicals

Triton WR-1339 was purchased from Fisher Scientific, Belgium. Total cholesterol estimation was done using the Seimen Cholesterol Diagnostic Kit. Serum triglyceride was estimated by Siemens Triglycerides Diagnostic Kit. All solvents were purchased from Rankem ltd.

Animal Selection and Housing

Adult Wistar albino rats (150-180 g) of either sex were procured from the laboratory animal house. The animals were kept under standard environmental conditions of room temperature (220 ± 20C), relative humidity (50% ± 5%) and 12 h light and dark cycle. The animals were housed in the colony cages (either three rats per cage) and provided feed commercial pellets contain a balanced

ration. The animals were fasted overnight just prior to the experiment but allowed free access to drinking water. All the experiments were carried out in accordance with the guidelines of Animal Ethics Committee.

In vivo studies

Adult Wistar albino rats (150-180 g) of either sex were procured from the laboratory animal house. The animals were kept under standard environmental conditions of room temperature ($220 \pm 20^\circ\text{C}$), relative humidity ($50\% \pm 5\%$) and 12 h light and dark cycle. The animals were housed in the colony cages (either three rats per cage) and provided feed commercial pellets contain a balanced ration. The animals were fasted overnight just prior to the experiment but allowed free access to drinking water. All the experiments were carried out in accordance with the guidelines of Animal Ethics Committee.

Induction of Hyperlipidemia

A single dose (350 mg/kg body weight i.p) of Triton WR-1339 dissolved in 0.15 N NaCl solution was used for induction of hyperlipidemia in the rats. Hyperlipidemia was confirmed 48 hrs after triton injection by determining the blood cholesterol. The quantities of individual drug (extract) to be administered were calculated and suspended in vehicle (1 % tween 80) at a dose of 100 mg/kg b.w. The drug was administered continuously for 7 days orally using infant feeding tube. The results were compared with that of the standard drug atorvastatin which was also given continuously for 7 days at a dose of 65 mg/kg b.w.¹⁷.

In-vivo study

In this model, animals were randomly divided into 5 groups of 6 animals each. The first group was given standard pellet diet, water and orally administered with 5% CMC.

- Group I served as normal control and this group did not receive triton except regular standard pellet diet.
- Group II was hyperlipidemic control and this group did not receive any treatment except triton hyperlipidemia.
- Group III was positive control which was treated with Atorvastatin (10mg/kg/day p.o.).

- Group IV received extracts of *Bauhinia racemosa* (300mg/kg/day, p.o.).

Treatment period for all these groups was 48 hr for triton-induced hyperlipidemia.

On the 8th day, blood was collected by retro-orbital sinus puncture, under mild ether anaesthesia.

Food was withdrawn 10hr prior to the blood sampling. The control group animals received the vehicle in the same volume orally.

The collected samples were centrifuged for 15 minutes at 2500rpm. Then serum samples were collected and analyzed for serum Total Cholesterol, Triglycerides, High Density Lipoprotein Cholesterol, Low Density Lipoprotein Cholesterol and Very Density Lipoprotein Cholesterol.

Estimation of Lipids

After the treatment period, all the animals were tested for biochemical lipid markers. Blood was collected by cardiac puncture method under ether anesthesia. Serum total cholesterol (TC), triglycerides (TG) was estimated by method of CHOD-PAP and high-density lipoprotein-cholesterol (HDL-c) by the method of GPO-PAP using span diagnostic kits. Serum LDL-c, VLDL-c level was determined by calculation.

Statistical Analysis

Results were analyzed by one way ANOVA.

RESULTS AND DISCUSSION

The blood cholesterol level and triglycerides levels were measured in normal and Triton WR-1339 induced rats. There was significant increase in cholesterol and triglyceride level in triton induced hyperlipidemic rats. Administration of ethanolic extract of *Bauhinia Racemosa* and standard drug, results in producing a significant reduction in cholesterol and triglyceride level with consequent increase in HDL. Treatment with extract of leaf showed a marked reduction in TC, TG and LDL-c levels. There was a marked reduction in TC: HDL-c ratio and LDL: HDL-c ratio.

Groups	TC	TG	HDL	LDL	VLDL
Normal	118.62±1.1	102.23±2.9	63.52±2.7	53.21±5.0	29.11±3.9
Control	284.42±2.4*	273.71±3.0*	29.22±2.9*	202.71±2.5*	58.34±1.2*
Standard	141.32±2.8**	138.41±2.1**	73.22±1.8**	50.31±2.1**	22.75±4.0**
Leaf Extract	116.66±3.6**	129.21±1.8**	74.35±2.4**	51.89±3.8**	18.56±2.0**

The values are expressed as mean±SEM n=6 in each group. P<0.05 significant as compared to control, **P<0.05, significant as compared to hyperlipidemic control, statistical test employed is ANOVA followed by dunnet's t test.

CONCLUSION

TC: HDL-c ratio, LDL: HDL-c ratio is an effective predictor of coronary risk. The activity may be due to the presence of polyphenolic compounds flavonoids, tannins and in the ethanol extracts, which reduce oxidation of LDL. Ethanol extract of leaves also had a marked effect

on antihyperlipidemic activity. The antihyperlipidemic activity of *Bauhinia racemosa* against Triton WR-1339 showed significant activity when compared to Atorvastatin treated groups. The active ingredients present here may recover the disorders in lipid metabolism noted in hyperlipidemic state. Further work

on this extract may lead to isolation of active principle from the same.

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