# Effect Of Poly Herbal Formulation In Anti Hypolipidemic Activity On Triton Induced WR-1339 Rats



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## Abstract

The anti-hyperlipidemic effect of Polyherbal formulation (PHF) was studies in Triton WR-1339 induced hyperlipidemic in rat models. Here, Acute hyperlipidemia was induced by administration of single dose of Triton WR-1339 (400 mg/kg,i.p). Triton WR-1339 induced animals significantly increased serum Total Cholesterol, Triglycerides, Low Density Lipoprotein Cholesterol (LDL-C), Very Low Density Lipoprotein Cholesterol (VLDL-C) , Treatment with PHF (200 and 400 mg/kg, p.o ) significantly reduced the hyperlipidemia i.e., decreased levels of serum Total Cholesterol, Triglycerides, Low Density Lipoprotein Cholesterol (LDL-C), Very Low Density Lipoprotein Cholesterol (VLDL-C) , an increase of serum High Density Lipoprotein Cholesterol (HDL-C) when compared to vehicle control and standard Atorvastatin (10 mg/kg). Histological study on heart showed amarked regression compare to control. The results demonstrated that PHF possessed significant antihyperlipidemic activity

**Keywords:** Lipoprotein, PHF, Triton WR-1339.

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## Introduction

Hyperlipidemia is one of the greatest risk factors contributing to prevalence and severity of cardiovascular diseases The epidemiologic data shows that the prevalence of dyslipidemia in Chinese adults aged 18 and above is 18.6%, which is to say the number of dyslipidemic patients has reached 160 million.[1] It is also reported that almost 12 million people die of cardiovascular diseases and cerebral apoplexy each year all over the world. Therefore, it is very important to pay attention to early stage prevention and control of hyperlipidemia in a comprehensive way[2].

However, the risk of hyperlipidemia would be reduced by consumption of anti diabetic formulation and their extracts, supported by abundant studies.[3-6] For instance, the flavonoids extracted from gingko, soybean, and some other plants have been reported as the antioxidants and could be beneficial to hyperlipidemia. is a widely distributed plant inChina, whose leaves, root bark and branches have long been used in Chinese medicine to treat fever, protect the liver, improve eyesight, facilitate discharge of urine and lower blood pressure. Mulberry leaves have also been used in leaf stewing, which is considered as a healthy drink on weight reducing. Moreover, the aqueous extract of mulberry leaves, rich in flavonoids, acts as the scavenger of blood lipid radicals in our previous study on sugar metabolism and antioxidation in diabetic rats.[7] Hereby, the aim of this study was to separate thetotal flavonoids from mulberry leaves (MTF) and to detect whether the consumption of MTF could improve the serum lipid status in hyperlipidemic.

In the study to evaluate the effect of PHC on Triton WR-1339 induced anti hyperlipidemic effects in rats.

## Materials and methods

Titon WR1339 procured from Chemenova laboratories USA. normal saline (0.9%), gum acacia 4% b.w., Atorvastatin gifted from Straights pharmaceuticals, Bangalore. PHC formulation which is obtained from charak pharmaceuticals ltd.

**Composition of PHF-** Each 100 gm contains: Gudmar (gymnema sylvestre)-20gm, Jamun guthali (syzygium cumini)-8gm, Gulvel (Tinospora cordifolia)-10gm Karela Beej (Momordia charantia Khadir Chuma (Acacla Catechu), ), Haldi (Curcuma Longa), Amia (Emblica-officinalis), Vijay-sar (Pterocarpus Marsupium), Tejpatra (cinnamomum-Tamala), Shilajit(Asphaltum) – 5gm, Gularphal Chuma (Ficus Glomerata), Kutki (Picrorhiza Kurroa), Chitrak (plumbago Zeylanica) – 4gm, Methi (Trigonella-foenum graecum)– 3gm, Bhavna of Neem Patti (Azadirachta Indica), Bilwa Patra (Aegle Marmelos)- 5gm TrivangBhasma – 2gm, Insert and safe Exciepients, Babool Goand as a Binder-q.s.

## Animal studies

Wistar albino male rats weighing between 150-180gm were procured from central animal house, M.R. medical college, Gulbarga, All the experimental protocols were approved by Institutional Animal Ethics Committee (IAEC) of Pharmacy college, HKES'S/MTRIPS/IAEC/94/2017-2018.

Animals were housed in perspex cages, where the congenial temperature 25+1°c and 12hrs lights and dark cycles were maintained. The animals were allowed to acclimatize to the laboratory environment for 7 days and supplied with a standard pellet diet from Hindustan lever Ltd., Bangalore.

## Induction of Hyperlipidemia:

Hyperlipidemia was induced in Wistar albino rats by single intraperitoneal injection of freshly prepared solution of Triton- WR-1339 (200 mg/kg) in physiological saline solution after overnight fasting for 18 h .The animals were divided into four groups of five rats each. The first group was given standard pellet diet, water and orally administered with 5% CMC. The second group was given a single dose of triton administered at a dose of 100mg/kg, i.p. After 72 hours of triton injection, this group received a daily dose of 5% CMC (p.o) for 7 days. The third group was administered a daily dose of PHF suspended in 5%CMC, p.o., for 7 days, after inducing hyperlipidemia. Fourth group was administered with the standard atorvastatin 10mg/kg, p.o. for 7 days.



## Anti-Hyperlipidemic Activity:

## Triton WR-1339 Induced Hyperlipidemic Model:

Thirty Wister Rats (150-180gm) Were Randomly Divided Into 5 Groups Of 6 Each.

Group 1: Administered vehicle and served as normal control.

Group 2: Administered Triton WR-1339 (TR) and served as hyperlipidemic control.

Group 3: Administered poly herbal formulation (200mg/kg), p.o.,

Group 4: Administered poly herbal formulation (400mg/kg), p.o.,

Group 5: Administered Atorvastatin (10mg/kg), p.o. for 7 days, after inducing hyperlipidemia. Fifth group was administered with the standard Atorvastatin (10mg/kg), p.o. for 7 days. Food was withdrawn 10h prior to the blood sampling. The control group animals received the vehicle in the same volume orally.

On the 8th day, blood was collected by retero orbital sinus puncture, under mild ether anaesthesia. 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.[8-10]

## Histopathological studies

The heart were instantly dissected out, excised and rinsed in ice cold saline solution. The tissues were 10% formalin was used as a fixative and paraffin wax was used for embedding the tissues. Paraffin section were taken (5μm thick) and stained with Haematoxylin and Eosin (H & E) for histopathological examination. After dewaxing, all slides were examined under a light microscope for pathological studies.

## Statistical Analysis:

Results were analyzed by one way ANOVA, followed by Dunnet's test, 'P' value less than 0.05 were taken as significant.

## RESULTS AND DISCUSSION

On the Treatment With Triton WR-1339 rats significantly increased in serum levels such as serum total cholesterol, triglycerides, low density lipoproteins, cholesterol(LDL-C),very low density lipoproteins cholesterol(VLDL-C) are shown in (table 1 and figure 1). Treatment With PHF (200 Mg/kg and 400mg/kg.po,) for 7 days successfully prevented the elevation of serum total cholesterol, triglycerides, low density lipoproteins, cholesterol(LDL-C),very low density lipoproteins cholesterol(VLDL-C) and decrease of serum high density lipoprotein cholesterol(HDL-C) significantly decreased compare to control and triton model rats respectively. Triton induced hyperlipidemia in rats is an acute model for the primary screening of antihyperlipidemic agents.

**Table 1:** Effect of PHF on serum lipid parameter levels in Triton WR 1339 induced Hyperlipidemic rats

| Serum Lipid Parameters (mg/dl ) | | | | | |
|---|---|---|---|---|---|
| Groups | Total Cholesterol | Triglycerides | HDL-C | LDL-C | VLDL-C |
| Control | 85.47±1.78 | 69.23 ± 8.23 | 49.17 ± 4.12 | 25.11 ± 2.61 | 13.05± 1.61 |
| Triton WR-1339 | 211.7±12.81 | 113.1 ± 7.45 | 34.98±4.40 | 147.1±15.1 | 23.58±1.49 |
| Triton WR-1339 + PHF 200mg | 122.9±15.37** | 99.12±2.76* | 39.07±4.61* | 67.01±6.62* | 18.11±0.55* |
| Triton WR-1339+ PHF400 mg | 97.17±14.16** | 88.11±2.80* | 45.03±4.66** | 33.09±15.01* | 16.23±0.56* |
| Triton WR-1339+ Atorvastatin | 93.17±13.21** | 85.32±3.03** | 47.10±4.69* | 31.14±12.90* | 15.16±0.60* |

Values are mean ± SEM (n=6). Values are statistically significant at*P<0.05and more significant at **P<0.01 vs hyperlipidemic control using one way ANOVA followed by Dunnet’s test.

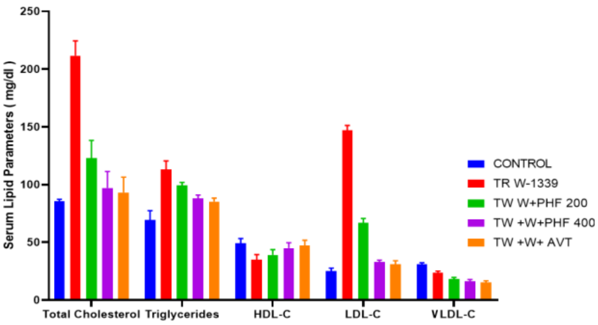



**Figure:** Effect of PHF on serum lipid parameter levels in TritonWR 1339 induced Hyperlipidemic rats

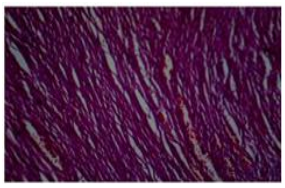
Triton physically alters very low-density lipoprotein cholesterol rendering them refractive to the action of lipolytic enzymes of blood and tissues, preventing or delaying their removal from blood and tissues. hence the antihyperlipidemic effect of poly herbal formulation administration could be due to an increases catabolism of cholesterol inti bile acids.

In our study we chosen fat diet which contain the common ingredients in our daily food. Diet containing saturated fatty acids increases the activity of HMG CoA reductase, the rate determining enzyme in cholesterol biosynthesis; this may be due to higher availability of acetyl CoA, which stimulated the cholesterogenesis rate. Moreover, this could be associated with a down regulation in LDL receptors by the cholesterol and saturated fatty acids in the diet, which could also explain the elevation of serum LDL-C levels either by changing hepatic LDLR (LDL-receptor) activity, the LDL-C production rate or both. LCAT enzyme is involved in the transesterification of cholesterol, the maturation of HDL-C and the flux of cholesterol from cell membranes into HDL. The activity of the enzyme tends to decrease in diet-induced hypercholesterolemia. The possible mechanism of PHF due to present of flavonoids and poly phenols may involve increase of HDL-C, which is attributed to the mobilization of cholesterol from peripheral cells to the liver by the action of Lecithin Cholesterol O-acyltransferase (LCAT). The increased HDL-C facilitates the transport of TG or cholesterol from serum to liver by a pathway termed ‘reverse cholesterol transport’ where it is catabolised and excreted out of the body. Antihyperlipidemic activity was observed with Atorvastatin (10mg/kg p.o.,), and the poly herbal formulation (400mg/kg) showed better activity than poly herbal formulation (200mg /kg).

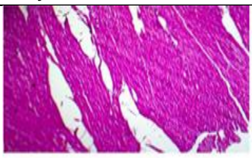
### Histopathology of Heart:

H&E staining of heart tissues showed that myocardial fibers in control group were in order and their structure was normal. There was no broken fiber, the nucleus of myocardial cell was regular. However, the muscle fiber was arranged in disorder, extensively collapsed and degenerated in hyperlipidemia group as shown in (figure 2) treatment with Atorvastatin, PHF 200 and 400mg/kg shows the myocardial fibers in order and their structure was normal

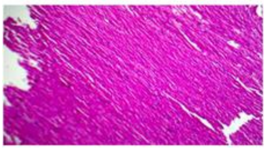
**Control**



**TR W 1339**



**PHF 200**



**PHF 400**

**Atorvastatin**

**Figure:** Effect of PHF on Heart TritonWR 1339 induced Hyperlipidemic rats

## Conclusion

The results obtained from the pharmacological screening of PHF on TritonWR 1339 induced Hyperlipidemic have led to the conclusions that poly herbal formulation has significant antihyperlipidemic activity due the present of secondary metabolites constituents in PHF. 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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## CONFLICT OF INTEREST

We have no conflict of interest to declare.

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