Evaluation of antihyperlipidemic activity of leaves *Salacia oblongifolia, Salacia reticulate, Lagerstroemia parviflora* and their polyherbal mixture

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Abstract:
The study reveals the effects of different treatments on serum lipid parameters. The Hyperlipidemic Control group shows significantly elevated levels of total cholesterol, triglycerides, LDL-C, and VLDL-C compared to the Normal Control (Saline) group, indicating the presence of hyperlipidemia. Treatments such as MESO (400 mg/kg), MESR (400 mg/kg), and MELP (400 mg/kg) led to a reduction in lipid levels, with MELP showing notable decreases in triglycerides and VLDL-C. The PHME (400 mg/kg) group exhibited the most significant increase in HDL-C ($p < 0.01$), suggesting its potential to improve lipid profiles. Atorvastatin also effectively reduced triglycerides and VLDL-C, but had a lower impact on HDL-C compared to PHME. Overall, several treatments showed promising results in mitigating hyperlipidemia, with PHME standing out for its ability to raise HDL-C levels.

Introduction:
The evaluation of antihyperlipidemic activity of *Salacia oblongifolia*, *Salacia reticulata*, *Lagerstroemia parviflora*, and their polyherbal mixture aims to assess the potential of these plants in managing hyperlipidemia, a condition characterized by elevated lipid levels that contribute to cardiovascular diseases. These plants have been traditionally used in various medicinal systems for their therapeutic properties, including lipid-lowering effects. This study explores their efficacy in improving lipid profiles, offering a natural alternative for managing hyperlipidemia.

Materials and method
Leaves of *Salacia oblongifolia*, *Salacia reticulate* (*Salacia reticulata), and leaves of Lagerstroemia parviflora Roxb*were obtained from Madhavachetti botanical garden, Thirupathi. The samples authentication done by Dr. K. Madhavachetti, Asst. Professor, Dept of Botany, Sri Venkateswara University, Tirupathi.

Procedure:
The dried leaves of *Salacia oblongifolia Salacia reticulate, Lagerstroemia parviflora* Roxbare made into powder individually and for the Polyherbal mix all the three plants powder in equal quantity then subjected to Maceration using required quantities for 7 days with shaking the sample twice a daily. On 7th day contents filtered and the filtrate evaporated to dryness by heating over water bath (50° C) to obtain methanolic extract (ME)and stored in desiccator. [1]

Experimental Animals:
Wistar Albino rats of either sex weighing between 150-180 g were used for this study. The animals were acclimatized for 7 days under standard husbandry conditions. Room temperature - 26 ± 20 C, Relative humidity - 45 - 55%, Light/ dark cycle - 12: 12 h. All animals were provided with standard diet and water ad libitum. All animal studies were performed as per the guidelines of CPCSEA and Institutional Animal Ethical Committee (IAEC). CPCSEA Approval Number: IAEC/1292/VCP/Y6/Ph D-16/60.[2]

Acute Oral Toxicity Studies:
Acute oral toxicity test was done based on the limit test recommendations of OECD No 425 Guideline. All the extractions at the dose range of 100mg–2000mg/kg were administered orally to different group of rats comprised of ten rats in each group. Mortality was observed after 72 hours.

Anti hyperlipidemic study:
Triton X 100 Induced Hyperlipidemia model [3]: TritonX100 (TR) induced hyperlipidemic model fourty twoWistar rats were randomly divided into 7 groups of 6 each. The first group was given standard pellet diet, water and orally administered with 5% CMC. The II, III, IV, V, VI, VII group animals were injected i.p. with 10% aqueous solution of Triton 400mg /kg body weight. After 72hours of triton injection, the second group received a dailydose of 5% CMC (p.o) for 7 days. The third group was administered daily dose of MESO 400mg/kg, fourth group was administered a daily dose of MESR 400mg/kg and Group V and Group VI was administered dailydose of MELP 400mg/ kg and PHME 400mg/kg suspended in 5% CMC, p.o., for 7 days,after inducing hyperlipidemia.Seventh group was administered with the standard. Atorvastatin 10mg/kg, p.o. for 7 days. Food was withdrawn 10hrs prior to the blood sampling. The control group animals received the vehicle in the same volume orally. On the 8thday, blood was

collected by retro-orbital sinus puncture, under mild ether anaesthesia. The collected samples were centrifuged for 15minutes 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.

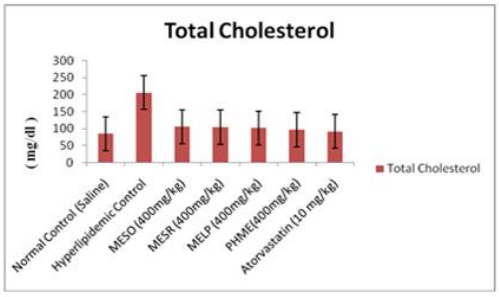
Results and discussion

Antihyperlipidemic activity

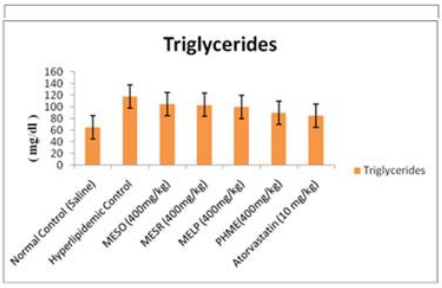
Effect of MESO, MESR, MELP and PHME on serum lipid parameter levels in Triton induced Hyperlipidemic rats

S. No	Groups	Total Cholesterol (mg/dl)	Triglycerides (mg/dl)	HDL-C (mg/dl)	LDL-C (mg/dl)	VLDL-C (mg/dl)
1	Normal Control (Saline)	84.67 ± 1.18	64.73 ± 7.07	47.27 ± 3.62	24.46 ± 1.61	12.95 ± 1.71
2	Hyper lipidemic Control	205.7 ± 13.81	117.9 ± 5.45	34.98 ± 4.40	147.1 ± 16.1	23.58 ± 1.39
3	MESO (400 mg/kg)	105.5 ± 11.22	104.27 ± 11.22	38.23 ± 2.31	43.02 ± 5.12	21.11 ± 1.44
4	MESR (400 mg/kg)	104.1 ± 11.34	103.1 ± 5.1	39.22 ± 3.12	42.11 ± 4.42	20.13 ± 1.22
5	MELP (400 mg/kg)	101.9 ± 11.27	99.12 ± 2.56	41.07 ± 5.61	41.01 ± 3.62	19.81 ± 0.45*
6	PHME (400 mg/kg)	96.36 ± 14.16	89.19 ± 2.30	43.03 ± 3.66**	36.09 ± 12.01	17.83 ± 0.46*
7	Atorvastatin (10 mg/kg)	91.17 ±12.21	84.32 ± 3.13	45.10 ± 2.69	32.44 ± 13.90	16.86 ± 0.70

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



Effect of MESO, MESR, MELP and PHME on Total cholesterol in Triton induced Hyperlipidemic rats.



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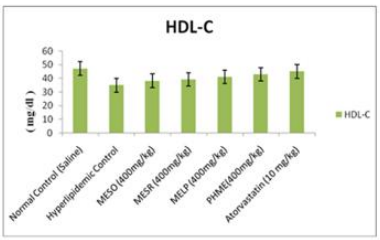

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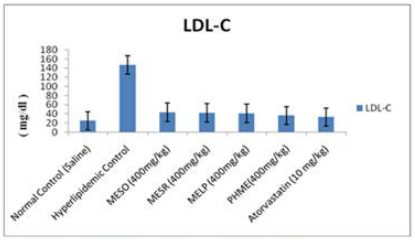
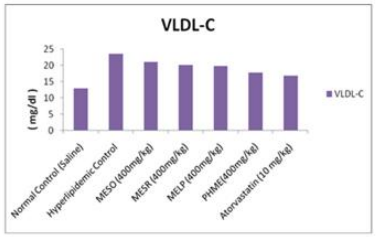


Effect of MESO, MESR, MELP and PHME on LDL-C in Triton induced Hyperlipidemic rats.



Effect of MESO, MESR, MELP and PHME on VLDL-C in Triton induced Hyperlipidemic rats.

The study investigates the effects of Salacia oblongifolia (MESO), Salacia reticulata (MESR), Lagerstroemia parviflora (MELP), and their polyherbal mixture (PHME) on serum lipid parameters in Triton-induced hyperlipidemic rats.

The Hyperlipidemic Control group showed significantly elevated levels of total cholesterol (205.7 ± 13.81 mg/dl), triglycerides (117.9 ± 5.45 mg/dl), LDL-C (147.1 ± 16.1 mg/dl), and VLDL-C (23.58 ± 1.39 mg/dl) compared to the Normal Control (Saline) group, indicating successful induction of hyperlipidemia.

Treatment with MESO (400 mg/kg), MESR (400 mg/kg), MELP (400 mg/kg), and PHME (400 mg/kg) led to significant improvements in lipid profiles. MESO and MESR reduced total cholesterol, triglycerides, and LDL-C, though their effects were less pronounced compared to MELP and PHME.

MELP (400 mg/kg) showed a marked increase in HDL-C (41.07 ± 5.61 mg/dl) and a reduction in total cholesterol (101.9 ± 11.27 mg/dl), triglycerides (99.12 ± 2.56 mg/dl), and LDL-C (41.01 ± 3.62 mg/dl), demonstrating its lipid-lowering potential. These effects indicate that MELP could have a beneficial impact on improving lipid profiles in hyperlipidemic conditions.

PHME (400 mg/kg) exhibited the most significant improvement in HDL-C (43.03 ± 3.66 mg/dl), showing a $p < 0.01$ improvement compared to the hyperlipidemic control. Additionally, PHME significantly reduced triglycerides (89.19 ± 2.30 mg/dl) and VLDL-C (17.83 ± 0.46 mg/dl), demonstrating its potential in regulating lipid metabolism and improving cardiovascular health.

Atorvastatin (10 mg/kg), a standard lipid-lowering agent, also showed a reduction in total cholesterol (91.17 ± 12.21 mg/dl), triglycerides (84.32 ± 3.13 mg/dl), LDL-C (32.44 ± 13.90 mg/dl), and VLDL-C (16.86 ± 0.70 mg/dl), with a marked increase in HDL-C (45.10 ± 2.69 mg/dl), comparable to the effects observed with PHME.

Conclusion:

Overall, PHME and MELP demonstrated significant antihyperlipidemic activity, particularly in improving HDL-C levels and reducing triglycerides and VLDL-C, with PHME showing the most promising results. These findings suggest that these plant-based treatments may offer a natural alternative to manage hyperlipidemia and improve lipid profiles, with PHME standing out for its potent lipid-modulating effects.

References:

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3. Mukesh SS, Patil MB. Antihyperlipidemic activity of Salaciachinensis root extracts in triton-induced and diet-induced hyperlipidemic rats. Indian J Pharmacol 2012;44:88-92.