

Hypolipidemic activity of parts of *Luffa aegyptiaca* in poloxamer induced hyperlipidemia

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ABSTRACT

Cholesterol and lipids are the major class of metabolites that are used to store high energy in the form of fats in the body. They are often stored in specific places in the system and some times misplaced in the bloodstream and other areas leading to metabolic disorders. The elevation in their quantities in serum is often termed as Hyperlipidemia. It affects most the worlds population adversely and is the causative factor for many comorbidities. Usually, medicinal plants exhibit the activities which are mainly due to the chemical constituents in them that are mostly phenols and flavonols. The plant *Luffa aegyptiaca* was investigated for its hyperlipidemic activity in high-fat diet-induced diabetes method. The results showed hyperlipidemic activity by lowering the lipid levels in the serum Four parts of the plant *Luffa aegyptiaca* were investigated for the antihyperlipidemic activity by extracting them with ethanol. These were tested for the lipid reducing property in the rat models induced by poloxamer drug. There was a successful induction of the Hyperlipidemia in the animals. The extracts showed a significant activity int his model. Fruits and leaves showed the best activity compared to other parts.



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INTRODUCTION

Cholesterol and lipids are the major class of metabolites that are used to store high energy in the form of fats in the body. They are often stored in specific places in the system and some times misplaced in the bloodstream and other areas leading to metabolic disorders. The elevation in their quantities in serum is often termed as Hyperlipidemia. It affects most the worlds population adversely and is the causative factor for many comorbidities [1, 2].

This condition is the primary cause of the increase in the atherogenic index in the people of the world. This was noted to be caused due to various factors that include unhealthy diet, improper lifestyle habits and genetic factors too. High-fat food intake and less exercise and sedentary life also stand as contributing factors for Hyperlipidemia. This will lead to a rise in unhealthy fats like VLDL and cholesterol [3]. This disease is known to cause several other diseases like atherosclerosis, diabetes, congestive heart failure, vasculitis and other endocrine disorders [4]. This will often lead to a permanent disorder or dysfunction of the endocrine system and pancreatitis too.

This is generally fixed by making some alteration in the lifestyle of the patient and by introducing some changes in the diet and dietary supplementation in the food [5]. As we know, numerous drugs treat Hyperlipidemia and related conditions. They are known for their potency, but usually, the course takes a longer duration of use of synthetic medications which usually lead to many other side effects

that are obvious with all the synthetic chemicals. Thus medicinal plants are used as the best treatment options to use in case to avoid side effects and maintain the potency and activity [6]. Plants have been observed to note for their potential for treating diseases but without any scientific proof and established evidence. So there is a need to establish the proof of the activity of the plant in various method [7].

Usually, medicinal plants exhibit the activities which are mainly due to the chemical constituents in them that are mostly phenols and flavonols [8]. The plant *Luffa Aegyptiaca* was investigated for its hyperlipidemic activity in high-fat diet-induced diabetes method. The results showed hyperlipidemic activity by lowering the lipid levels in the serum [9].

So, this current work was focused on the establishment of the activity in successive parts of the plant and comparing the various parts of the plant in the absence of the fruits.

MATERIAL & METHOD

The plants that belong to *Luffa aegyptiaca* are identified and were duly authenticated, and samples were prepared from each part of the plant. The herbaria were stored in the college library for reference. The parts of the plant like leaves, fruits, stems and roots were collected from a native forest area and were dried under sunlight for about two days at ambient temperature. The dried parts were finely powdered, and the powder was used to extract the chemical constituents. The powder was macerated using ethanol and for five days, and then it was filtered off. The filtrate was collected and evaporated to dryness, and the extract was stored in a desiccator. The extracts were named successively as LLE, LFE, LSE and LRE accordingly.

Hypolipidemic activity

The assessment of the hypolipidemic activity was done in poloxamer induced hyperlipidemia method wherein the poloxamer was suspended in 25ml of the saline which was 0.9% w/v and 3.8gm of the poloxamer was suspended in the solution. This was let to sit in the fridge for 15min and was administered in intraperitoneal route at a dose of 1g/kg to the albino Wistar rats [10, 11].

Wistar albino rats were used to investigate the Hyperlipidemia which weighed about 140-160gms. The animals were divided into seven groups, with four rats in each group. The first group was treated as a control group which did not receive any drug of the inducing agent. From the second group rest, all the groups were induced with Hyperlipidemia with

poloxamer agent. Group 3-group 6 were administered with the extracts at a dose of 250mg/kg body weight of the animals. The last group was received standard drug simvastatin at a dose of 100mg.

The animals were then sacrificed, and the blood was withdrawn to test the lipids in the serum. The blood was drawn and centrifuged for 30 mins to separate the serum. The serum collected was investigated to analyze for the lipid parameters like total cholesterol, triglycerides, high-density lipids, low-density lipids etc. [12].

RESULT ANALYSIS

With the induction of the Hyperlipidemia in the poloxamer model, there was an abnormal gain in the weight of the animals, which resulted overall to about 210-230gms in all the groups except the first group. All the lipids like TG, TC, LDL and VLDL also were elevated except the HDL. The control showed normal values of the fats, but group 2 showed a remarkable increase in all the parameters.

All the plant parts showed a marked decrease in the lipids and elevated HDL. This was compared with the standard drug and showed better activity. TG and TC were lowered significantly with the extracts from all the parts. Out of all the parts, Roots showed the least activity, followed by Stems and followed by leaves and fruits. The order goes as follows in ascending order; LRE<LSE<LLE<LFE. The lipid-lowering property of the extracts was investigated, and the results were comparable to the standard simvastatin. (Figure 1)

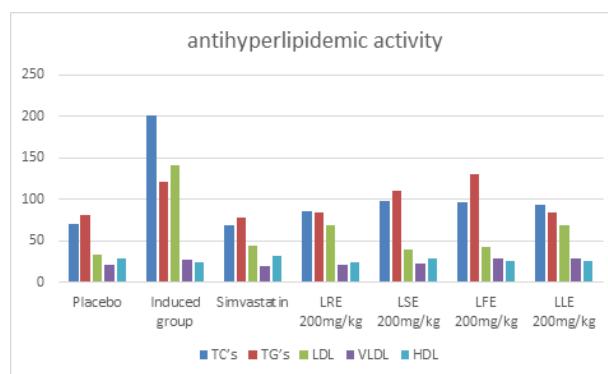


Figure 1: Antihyperlipidemic activity of various extracts

The elevation of the HDL was seen significantly with the leaves, and fruits extracts which were decreased due to the induction was Hyperlipidemia. This was asserted that the chemical constituents that are present in the leaves are rich in antioxidant compounds and those are present in fruits too. Thus, there is a significant activity for all the

Table 1: Antihyperlipidemic activity of various extracts

Groups	TC's	TG's	LDL	VLDL	HDL
Placebo	70.24±7.81	82.83±7.54	33.5±2.98	21.42±2.35	29.7±4.73
Induced group	201.43±14.13	122.6±7.28	145.13±10.72	27.26±3.51	24.91±4.69
Simvastatin	69.57±5.24	78.5±10.81	44.58±5.43	20.62±1.67	32.82±5.30
LRE 200mg/kg	86.12±7.59	84.29±7.62	69.98±5.34	22.38±2.02	25.59±3.47
LSE 200mg/kg	87.75±6.64	94.43±8.76	57.236.05	23.59±1.93	26.64±3.82
LFE 200mg/kg	98.841±11.8*	110.782±3.72*	40.346±2.36**	23.48±4.03*	29.562±2.50
LLE 200mg/kg	94.49±13.14**	131.913±3.13	43.492±2.91**	29.56±3.12**	26.798±3.05

extracts.(Table 1).

Still, roots and stems showed a lesser activity because they have these antioxidants in a smaller quantity, thus supporting the assertion that the antioxidant activity of the plant is responsible for the lipid lower activity.

CONCLUSION

Four parts of the plant *Luffa Aegyptiaca* were investigated for the antihyperlipidemic activity by extracting them with ethanol. These were tested for the lipid reducing property in the rat models induced by poloxamer drug. There was a successful induction of the Hyperlipidemia in the animals. The extracts showed a significant activity in this model. Fruits and leaves showed the best activity compared to other parts.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest for this study.

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