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ANTI-HYPERLIPIDEMIC ACTIVITY OF LEAF EXTRACTS OF ALANGIUM LAMARKII LINN IN TRITON-INDUCED AND ATHEROGENIC DIET INDUCED HYPERLIPIDEMIC WISTAR ALBINO RATS.

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Abstract:

Energy storage, signalling act as structural components of cell membrane are the main biological function of lipids. Elevated serum total cholesterol (TC), low density lipoprotein (LDL), very low density lipoprotein (VLDL), and decrease high density lipoprotein (HDL), are major risk factor for coronary heart disease and atherosclerosis. Medicinal herbs or their phytoconstituents are currently used for their lipid lowering activity and reduce the production of reactive oxygen species and increase the resistance of plasma lipoprotein to oxidation to their effectiveness at preventing cardiovascular disorder. The importance of herbal medicine practices is indicated by the fact that about 80% of the developing World's population depends on traditional medicine for their primary healthcare. Hyperlipidemia is a secondary metabolic dysregulation associated with diabetes. In India Alangium lamarkii Linn. (Alangiaceae) commonly used as a phyto-therapeutic agent. The methanolic extract of Alangium lamarkii was evaluated for anti-hyperlipidemic effect, induced by intraperitonial administration of Triton in Wistar Rats. The Alangium lamarkii extract significantly ($p<0.01$, $P<0.05$) reduced the plasma L.D.L, triglyceride level and raised the plasma H.D.L level. All these observations provided the basis for conclusion that this plant extract inhibits lipid content induced by Triton treatment in rats.

Keywords: *Alangium lamarkii Linn. Alangiaceae, Phytochemical, anti-hyperlipidemic, methanolic extract.*

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INTRODUCTION:

Herbal drugs are use of therapeutic herbs to prevent and treat diseases and ailments or to support health and healing. These are drugs or preparations made from a plant(s) and used for any of such purposes. Herbal drugs are the oldest form of health care known to mankind. However herbal medicines suffer from a range of short-comings. These include insufficient and unacceptable evidences of safety, efficacy, standardization and inconsistent production practices. [1, 2, 3] A large number of Indian medicinal plants have been used in the treatment of hyperlipedimia and they were reported to have no side effects. Hyperlipidemia is a secondary metabolic dysregulation associated with diabetes. Besides the cause effect relationship with diabetes, elevated serum levels of triglycerides, cholesterol and L.D.L. are major risk factors for the premature development of cardiovascular diseases like artherosclerosis, hypertension, coronary heart disease etc. Disorder of lipid metabolism is manifest by increased plasma concentrations of the various lipid and lipoprotein fractions (total and LDL cholesterol, VLDL, triglycerides, chylomicrons). They results, predominantly, in the cardiovascular disease. The extract was given to correct abnormal lipid profiles and diminish vascular disease and its consequences.[4] According to literature survey different parts of *Alangium lamarkii* reported to possess acrid astringent, emollient, anthelmintic, diuretic and purgative properties. It is also used externally in acute case of rheumatism and leprosy. The leaf juice can be applied externally and taken internally in case of rabid dog bite. Root bark is an antidote for several poisons. Fruits are sweet, cooling and purgative and used as a poultive in rheumatism. [5, 6, 7, 8]

MATERIALS AND METHODS:

Plant Material: The leaves of *Alangium lamarkii* are collected form Asansol, West Bengal, India. A herbarium sheet was prepared and it was identified and authenticated (CNH/35/2011/TECH II/446) by the Botanical Survey of India, Howrah, West Bengal, India.

Preparation of extract: The leaves were dried in shade to avoid too many chemical changes occurring and made into coarse powder. Methanol was used as solvent for extraction and extraction was performed in soxhlet apparatus. The extraction vessel was made up of borosil glass which contains round bottom flask. The plant material to be extracted was packed in the soxhlet assembly and a condenser through which refluxing was done .Heat was supplied through a heating mantle .The extract was collected after evaporating the solvent using rota evaporator. The extract was kept in airtight container at room temperature until further use.

Physiochemical Studies [8]

Determination of Ash value:

The total ash obtained was boiled with 25 ml of alcohol for few minute. The insoluble matter was collected on ash less filter paper, washed with hot water and ignited for 15 min at temperature not exceeding 450 ºc. The difference in weight represents the alcohol-soluble ash. The percentage of alcohol - soluble ash was calculated with reference to the air-dried drug.

Determination of extractive value:

About 5gms of air-dried, coarsely powdered roots of *Alangium lamarkii* were weighed accurately and separately macerated with 100 ml of alcohol in stoppered flask for 24 hrs, shaking frequently during the first 6 hrs and was allowed to stand for 18 hrs. Then it was filtered and 25ml of the filtrate was evaporated to dryness in a tarred flat bottom shallow dish, dried at 105 ºc and weighed. The percentage of alcohol-soluble extracts was calculated with reference to the air-dried drug.

Determination of moisture content:

About 5 gm of powdered leaves of *Alangium lamarkii* were weighed accurately and was taken separately in a china dish. It was kept at 105 – 110 ^{0}C for 30min in a hot air oven; the residue was cooled and weighed. The percentage of moisture content was then calculated with reference to the air-dried drug.

Photochemical Studies:

Preliminary phytochemical studies of the leaf extract were conducted as per the standard procedure [9, 10, 11, 12, 13].

Animal Used:

30 Male/Female Wister rats (5-9 weeks old and 150-200 gm weight) bred in Animal House of Gupta College of Technological Sciences, Asansol are procured after the prior approval of the Institutional Animal Ethics Committee. All animals were maintained at 12 hours light- dark cycles and room temperature of 22°**C** (±3) and 30-70% RH. Food (pellet) and water intake were measured and monitored. After 3-5 days of acclimatization in laboratory condition rats are taken for experimental purpose.

LD_{50} Determination (5)

Hindustan Abdul *et al*. has been evaluated, acute oral toxicity for methanolic extract of *Alangium lamarkii*.

They examined the methanolic leaf extract preparation which showed a low toxicity. Basing on the observation of animals, 1.0gm/kg body weight of the extract was found to be safe and is taken as the maximum tolerated dose (MTD)

Experimental Design [14,15,16,17]

The animals were divided in five groups each consisting of five animals. The study was conducted for a period of 4 weeks.

Group-1: Positive Control- Received Triton WR_{1339} dissolved in 0.9% saline (400mg/kg)

Group-II: Standard - Received Atorvastatin suspension prepared with 0.5% CMC (10 mg/kg)

Group-III: Received alcoholic extract of *Alangium lamarkii* 100mg/kg along with 0.9% normal saline.

Group-IV: Received alcoholic extract of *Alangium lamarkii* 200mg/kg along with 0.9% normal saline.

Group-V: Received alcoholic extract of *Alangium lamarkii* 300mg/kg along with 0.9% normal saline.

Statistical Analysis:

The results are expressed as Mean ± SEM for five animals in each group. Difference between groups were assessed by one way analysis of variance (ANOVA) with post test followed by Dunnett compare all vs. control using Graphpad-5 Instat Software for windows. Post hoc testing was performed for inter-group comparison using the least significance difference (LSD) test. Significance at p-values <0.05, $p<0.01$ has been given respective symbol in the table.

Collection of blood:

Blood was collected by retro orbital sinus puncture under mild ether anaesthesia. The collected samples were centrifuged for 10mins.

Biochemical Analysis:

The serum was assayed for triglycerides (TG), high density lipoprotein (HDL) and Low density lipoprotein (LDL) using standard protocol method.

RESULTS:

Physiochemical Studies:

The extract of leaves of *Alangium lamarkii* was subjected to evaluate its alcohol soluble ash, alcohol soluble extractive value and moisture content. Each determination was carried out and the values were taken. The result was reported in table-1.

Table No.1 Percentage yield of values

Name of the Plant	VALUES (%w/w)		
	Alcohol Soluble ash	**Alcohol soluble extractive**	**Moisture Content**
Alangium lamarkii	2.84	6.4	0.8

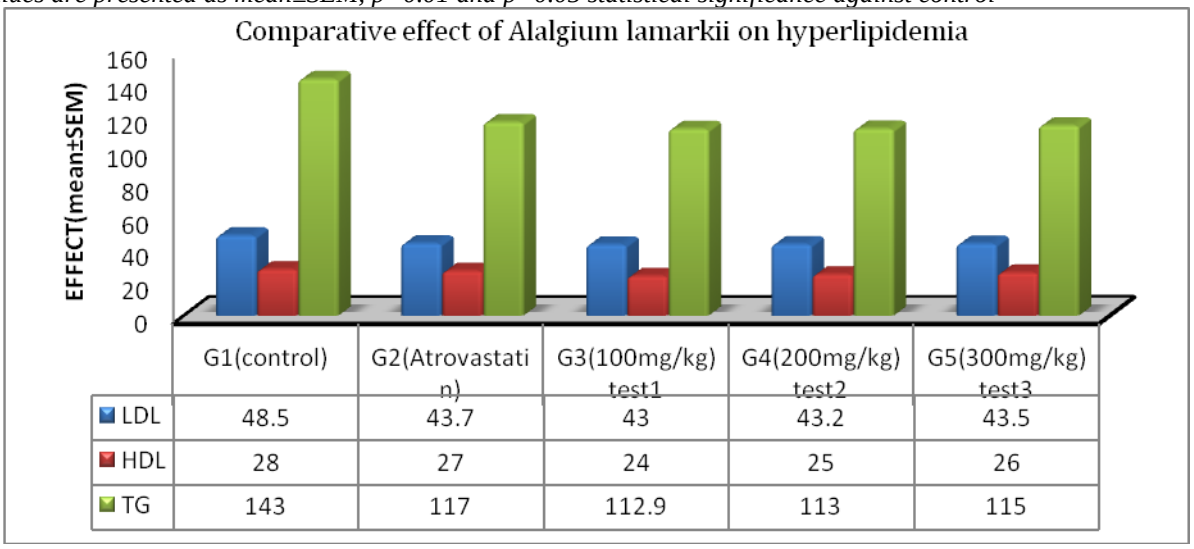
Table No.2 Qualitative Chemical examination of extract of *Alangium lamarkii* leaves

Chemical Constituent	Tests	Ethanolic Extract
Alkaloids	Mayer's test	$+^{ve}$
	Wagner's test	$+^{ve}$
	Dragendorff test	$+^{ve}$
Glycoside	Modified B. T	$+^{ve}$
	Legal's test	$+^{ve}$
	Liebermann-Burchard's Test	$+^{ve}$
Saponin	Froth's Test	$+^{ve}$
Phytosterol	Lieberman Buchard	$+^{ve}$
	Salkowski test	$+^{ve}$
Phenolics and Tannins	$FeCl_3$ test	$+^{ve}$
	Lead acetate sol.	$+^{ve}$
	Shinoda test	$+^{ve}$
	Vanillin HCl Test	$+^{ve}$
Proteins and Amino acids	Millons Test	$-^{ve}$
	Burette Test	$-^{ve}$
Fixed Oil And Fats	Stain Test	$-^{ve}$
	Soap Test	$-^{ve}$
Carbohydrates	Molisch's Test	$-^{ve}$
	Fehling's Test	$-^{ve}$
	Barfoed's Test	$-^{ve}$

Anti-hyperlipidemic activity of methanolic extract:
The rats were treated with intraperitoneal administration of methanolic extract of the plant *Alangium lamarkii* reduce the plasma LDL, triglyceride and rise in plasma HDL level.

Treatment	Dose(mg/kg)	LDL	HDL	TG
Group-1(control)	--	48.56 ±0.1	28 ±1.63	143 ± 0.2
Group-2 (Atrovastatin)	10	43.70±0.5	27± 1.58	117 ± 0.2
Group-3 (Test-1)	100	43.0±0.6	24 ±1.59	112.9 ± 0.5
Group-4 (Test-2)	200	43.20±0.2	25 ± 1.6	113 ± 0.6
Group-5 (Test-3)	300	43.50±0.5	26 ± 1.64	115 ± 0.1

Values are presented as mean±SEM, p<0.01 and p<0.05 statistical significance against control



The methanolic leaf extract at a dose of 300mg/kg showed most promising effect as compared to control. Hence it can be exploited as an anti-hyperlipidemic therapeutic agent or adjuvant in existing therapy.

DISCUSSION:

The present study aimed at evaluation of *Alangium lamarkii* leaves on pharmacognostic, pharmacological and phytochemical parameters. *Alangium lamarkii* leaves were subjected for various standardization parameters. The present study was attempted to evaluate the anti-hyperlipidemic activity of the leaves of *Alangium lamarkii*. The powder of *Alangium lamarkii* leaves was subjected to evaluate their alcohol soluble ash, alcohol soluble extractive value, moisture content and phytochemical evaluation. Ash values are helpful in determining the quality and purity of crude drugs. It gives an idea of the earthy matter or the inorganic composition and other impurities present along with the drug. Extractive values are useful for evaluation of crude drugs and gives idea about the nature of chemical constituents present in them. In some cases the amount of drug soluble in a given solvent is an index of purity. Extractive values are primarily useful for the determination of exhausted or adulterated drug. The moisture content of the drug should be controlled and minimized in order to prevent decomposition of crude drugs either due to chemical change or microbial contamination. Phytochemical screening of methanolic extract of *Alangium lamarkii* leaves reveals the presence of alkaloids, glycosides, phenolic compounds and tannins, phytosterols, fixed oils and fats.

Anti-hyperlipidemic activity:
Triton induced hyperlipidemia in the Wistar Albino rats were treated with various doses extract of the plant *Alangium lamarkii.* It significantly reduced the plasma LDL, triglyceride level and rise in plasma HDL levels. The methanolic extract at a dose of 300mg/kg showed most effective as compared to control. Hence it can be exploited as an anti-hyperlipidemic therapeutic agent or adjuvant in existing therapy for the treatment of hyperlipidemia.

CONCLUSION:

The methanolic leaves extract of *Alangium lamarkii* were subjected for various physiochemical

parameters. The phytochemical screening showed the presence of alkaloids, glycosides, phytosterols, phenolic compounds, tannins and fixed oils. Significantly methanolic extract has shown better anti-hyperlipidemic activity, which might be due to the combination of polar and non polar constituent.

REFERENCES:

1. Bhaskar Ananda Raj V, Janet Beula S, Suresh Kumar S. Ethanobotanical and pharmacognostical study of Givotia moluccana bark. International Journal of Pharmaceutical research and Development, 2012, 4(07), pg 148-154.
2. Raina M.K. quality control of herbal and herbo-mineral formulations. Indian Journal of natural products , 2003,19,pg 11-15
3. Mukesh S Sikarwar, Patil M.B. Anti-hyperlipidemic activity of Salacia chinensis root extract in triton induced and atherogenic diet induced hyperlipidemic rats. Indian Journal of Pharmacology, 2012, 44(1), pg 88-92.
4. Anthony H, Mark G, Margol L. The new royal horticultural society dictionary of gardening.The MacMilan Press. 1992, pg 333-347.
5. Hindustan AA.Yesupadam P, Mallapu Ramie. The Phytochemical and anti inflammatory evaluation of Alangium lamarkii root extract, Der pharmacia sinica, 2011, 2(2), pg 88-92.
6. Umberto Q. CRC world dictionary of plant names. CRC press boca raton. 2000, ISBN 978-0-8493-2672-2(1).
7. Kokate CK. Practical Pharmacognosy. Vallabh Prakashan, Delhi. 1994; 7: p.122-135.
8. Bhaskar Ananda Raj V, Murugamani V, Anusha CH, Indraja N. Preliminary pharmacognostical evaluation of *Givotia Moluccana* leaves. International Journal of Pharmacognosy and Phytochemical Research. 2012; 4(2): p.74-78.
9. Madhava Chetty K, Sivaji K, Tulasi Rao K. Flowering plants of chitoor district, A.P.India, 3rd ed; 2008(1):p.185, 317.
10. Mukherjee P.K. Quality control of herbal drugs. Business Horizons, New Delhi 2002:p.187-191.
11. Raman N. Phytochemical techniques.1st ed; New India Publications, New Delhi, 2006:P.19-25.
12. Kokate CK, Purohit AP, Gokhale S.B .Methods of crude drug evaluation Pharmacognosy, Nirali Prakashan, Pune, 1995:p.88-99.
13. Ghule BV, Ghante MH, Saoji AN, Yeole PG. hypolipidemic and antihyperlipidemic effects of Lagenariasiceraria (Mol.) fruit extracts. Indian J Exp Biol, 2006; 44:905-9 [PubMed].
14. Nomura H, Kimura Y, Okamoto O, Shiraishi G. Effects of antihyperlipidemic drugs and diet plus exercise therapy in the treatment of patients with moderate Hypercholesterolemia. Clin Ther.1996; 18:196.
15. Pande VV, Dubey S. Antihyperlipidemic activity of Sphaeranthus indicus on atherogenic diet induced hyperlipidemia in rats. Int J Green Pharm. 2009; 3:159-61.
16. Saravana K, Mazumder A, Saravanan VS. Antihyperlipidemic activity of Camellia sinesis leaves in Triton WR-1339 induced albino rats. Pharmacogn Mag. 2008; 4:60-4.