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EXTRACTION AND EVALUATION OF SELECTED FOLK MEDICINAL PLANT TO CURE ARTHEROSCLEROSIS

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ABSTRACT

A common heart disorder that affects the main blood veins supplying the heart muscle is called coronary artery disease. Coronary artery disease is typically brought on by an accumulation of lipids, cholesterol and other materials in and on the arterial walls. We refer to this accumulation as plaque. crucial structural component of cellular membranes is cholesterol. Furthermore, it is the precursor of numerous substances, including the building blocks for the production of vitamin D, steroid hormones and bile acids. Despite this understanding, a high blood cholesterol level raises the risk of CHD. Acute hepatitis, malnourishment, anemia, hyperthyroidism, and Gaucher's disease are all associated with low cholesterol levels. Diabetes mellitus and coronary heart disease are associated with elevated levels. When compared to the standard, our data showed that oral treatment of methanolic extract of Gymnema sylvestre Whole plants (2.0mg/kg) and Gymnema sylvestre (5.0mg/kg) considerably reduced the high concentration of LDL in hypercholesterolaemic rats. Because GI lowers serum LDL and triglycerides, it may be a suitable option for treating atherosclerosis.

KEYWORDS

Gymnema sylvestre, Atherosclerosis, Serum LDL and Triglycerides.

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INTRODUCTION

Atherosclerosis is a pattern of arteriosclerosis, a condition marked by the formation of anomalies in the artery walls known as lesions. This is a long-term inflammatory condition that affects a variety of cell types and is caused by high blood cholesterol[1-3]. Because of the accumulation of atheromatous plaques, these lesions may cause the artery walls to narrow.

Usually, there are no symptoms at first, but if they do appear, they usually start around middle age. Depending on which body part or parts the afflicted arteries are in, severe cases may lead to peripheral arterial disease, coronary artery disease, stroke, or kidney issues[4,5].

Although the precise origin of atherosclerosis is uncertain, it is thought to be complex.

Abnormal cholesterol, raised inflammatory biomarker levels, high blood pressure, diabetes, smoking (both active and passive), obesity, genetics, family history, lifestyle choices and an unhealthy diet are risk factors. Fat, cholesterol, immune cells, calcium and other blood components make up plaque. The body's ability to get oxygen rich blood is restricted by artery constriction. A physical examination, an ECG, an exercise stress test and other tests are used to make the diagnosis[6-8].

All plaque sites cause the arteries to enlarge, and atherosclerosis typically passes decades without showing any symptoms or affecting blood flow. Until an artery narrows or closes sufficiently due to clots, most plaque ruptures do not result in any symptoms. Signs and symptoms only manifest when significant constriction or closure substantially impedes blood flow to different organs to create symptoms[9-11]. Until they have other heart-related problems like a heart attack or stroke, patients usually do not realize they have the sickness. These symptoms still vary depending on the affected organ or artery, though. The first stages of atherosclerosis most likely begin in childhood. Fibrous and gelatinous lesions have been observed in children's coronary arteries. Fatty streaks have been observed in juvenile coronary arteries. While both sexes are equally vulnerable to stroke and cerebral artery atherosclerosis, males are more likely than women to suffer coronary artery disease[12-14].

Gymnema sylvestre, a perennial woody vine, is native to Asia, Africa, and Australia, including the Arabian Peninsula. It has been used in Ayurvedic medicine. Common names include gymnema, Australian cowplant, Periploca of the woods, and gurmar, which means "sugar destroyer" in Hindi. The primary bioactive ingredients in the leaves and extracts, gymnemic acids, interact with the tongue's taste receptors to temporarily impede the sense of sweetness. Its leaves include gurmarin, flavonols and triterpenoid saponins; the primary physiologically active plant components are gymnemic acids, a type of triterpenoid saponin. They lessen the taste of artificial sweeteners such sucrose, xylitol, stevia and aspartame.

MATERIAL AND METHODS

Materials

Gymnema sylvestre powder, Ethanol, Wistar Albino Rats.

Extraction

Ethonolic Maceration Extract of Gymnema sylvestre has prepared.

Animals

The Animal House provided 150-200g Wistar Albino Rats; Rats were fed a standard pellet diet and ad libitum tap water. They were acclimatized to their surroundings for two weeks prior to the experimental use, and they were kept in clean cages with a 12 hour light/dark cycle and a room temperature of 22–24^{o}C. The guidelines that were approved by the Institutional Animal Ethics Committee were followed during the course of this study.

Extraction and Reconstituted OF Gymnema Sylvestre

Weigh accurately about 3gms of extract in a 150ml conical flask and added 100ml of a mixture of 1 volumes of solvent ether and 4 volume of alcohol and shake frequently during one hour.

Decant and filter the clear solution through cotton into a serator and wash the residue with further 100ml of ether alcohol mixture in 5 lots of 20ml each [add gum tragacanth powder to stimulate stratification]

Combine all the acid extracts, wash the mixture solution first with 10ml then with two successive quantities mixture contained in another separator.

Shake first with 25ml then with successive quantities each of 20ml of chloroform until

complete extraction of the alkaloids is effected. wash each chloroform extract with 10ml water contained in the second separator and filter through cotton in a 150ml conical flask.

EXPERIMENTAL DESIGN

The rats were divided in to 5 groups having 5 animals.

I-Group : Control
II-Group : High Fatty induced food
III-Group : Statine (2mg/kg)
VI –Group : Whole Plant extract (2mg/kg)
V-Group : Whole Plant (5mg/kg)

RESULTS AND DISCUSSION

PRELIMINARY PHYTOCHEMICAL SCREENING

The ethonolic extract of Gymnema sylvestre powder was examined preliminary phytochemical screening of the entire test conducted and the result was showed in Table No.1. Determination of total ash, water soluble ash, acid in soluble ash, alcohol soluble extractive and water-soluble extractive value are conducted as per the standard procedure and the results given in the Table No.2.

Quantitative determination of cholesterol in serum enzymatic methods

Cholesterol esters in serum are hydrolyzed by cholesterol esterase. The free cholesterol is then oxidized by cholesterol oxidase to the corresponding ketone liberating hydrogen peroxide, which is then converted to water and oxygen by the enzyme peroxidase.

The enzyme acts only on free and oxygen by the enzyme peroxidase. The enzyme acts only on free cholesterol and not on the ester form, therefore cholesterol by the action of enzyme cholesterol hydrolase. Paraamino phenazone (4 amino phenozone) takes up the oxygen and together with phenol forms pink coloured quinonemine dye, which can be measured at 515nm. Cholesterol was measured by a direct colorimetric method. The serum was mixed with acetate. When the acetate reagent extract was mixed with sulphuric acid-ferrous sulfate reagent, it produced a purple color within 15 min with a maximum absorbance at 560nm; it was stable for at least 1 hr. The results were given in the Table No.3.

ESTIMATION OF TRIGLYCERIDES

10µL of sample was pipetted out and add 1ml of working reagent. 10µl of standard also was treated with similar manner. Mix and incubate the assay mixture at room temperature 37^{o}C for 5 min. Measure the standard Abs. and test sample against the blank at 505nm. The colour is stable for 30 min when protected from light, so Abs. should be measured within the period. If the serum or heparinized plasma is not tested immediately it may be stored for 3 days at 2-8^{o}C. Triglyceride concentration in serum was expressed as mg/dl. The results were given in the Table No.3.

Table No.1: Preliminary phytochemical screening (preliminary-chemical test)

S.No	Test	Result
1	Test for carbohydraes	(-)
2	Test for starch	(-)
3	Test for alkaloids	(-)
4	Test for flavonoids	(+)
5	Test for tannins	(+)
6	Test for phytosterols	(+)
7	Test for saponons	(+)
8	Test for glycosides	(-)
9	Test for quinones	(+)
10	Test for fatty acids	(+)

Table No.2: Analytical Ash values of leaf of G. sylvestre

S.No	Parameters	Values (%)
1	Water soluble	26.24
2	Water insoluble	58.44
3	Total ash	8.24
4	Acid insoluble ash	0.41
5	Sulphated ash	11.78
6	Loss on drying	13.76
7	Solubility in 100% alcohol	10.4
8	Solubility in 50% alcohol	22.2
9	Solubility in water	13.2

Table No.3: Results of triglycerides and cholestrol (HDL, LDL, VLDL)

S.No		Triglycerides	Cholesterol	HDL	LDL	VLDL
1	Control	130.01±0.28	88.43±0.31	39.90±0.12	27.70±0.14	26.53±0.24
2	D.control	283.41±2.89	235.73±0.57	18.70±0.15	150.90±0.49	26.66±0.38
3	Standard	127.73±0.48	88.50±0.34	38.10±0.24	25.15±0.29	26.10±0.44
4	G. S 1mg/kg	122.00±0.36	90.50±0.14	38.16±0.20	27.06±0.22	25.53±0.28
5	G. S 5mg/kg	138.65±0.18	121.20±0.25	38.53±0.16	27.73±0.16	25.40±0.26

CONCLUSION

It is commonly acknowledged that one of the main risk factors for CHD is elevated plasm LDL levels. Numerous research groups have previously demonstrated a direct association between LDL and atherosclerosis as well as the reversibility of the associated clinical processes by lowering the serum level of LDL. According to our research, oral treatment of G. S. methanolic extract at a dose of 5.0mg/kg considerably reduced the high content of LDL-C in hypercholesterolemic rats more quickly than G. S. 1.0mg/kg. Because GI lowers serum LDL-C levels, it may be an excellent option for treating atherosclerosis.

Lipids that are both endogenously generated from carbohydrates and absorbed from the diet make up triglycerides. For the diagnosis and management of hyperlipidemia, their assessment is crucial. The best and firstline antidabetic medication is Gymnema sylvestre extract, which dramatically lowers triglycerides. This study confirms that Gymnema sylvestre greatly improves the control of hyperlipidemia.

ETHICAL COMMITTEE REGISTRATION NO

1436/PO/a/11/CPCSEA.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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