List of publications


List of Conference attended:

1. Poster presentation on- Isolation, quantification of niazirine from Moringa oleifera and invitro evaluation for Lipase inhibition assay- In IPC 2013.
Cholesterol esterase inhibitory activity of bioactives from leaves of Mangifera indica L

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ABSTRACT

Background: In the earlier studies, methanolic extract of Mangifera indica L leaf was exhibited hypocholesterolemic activity. However, the bioactive compounds responsible for the same are not reported so far. Objective: To isolate the bioactive compounds with hypocholesterolemic activity from the leaf extract using cholesterol esterase inhibition assay which can be used for the standardization of extract. Materials and Methods: The leaf methanolic extract of M. indica (Sindoora variety) was partitioned with ethyl acetate and chromatographed on silica gel to yield twelve fractions and the activity was monitored by using cholesterol esterase inhibition assay. Active fractions were re-chromatographed to yield individual compounds. Results and Discussion: A major compound mangiferin present in the extract was screened along with other varieties of mango leaves for cholesterol esterase inhibition assay. However, the result indicates that compounds other than mangiferin may be active in the extract. In vitro pancreatic cholesterol esterase inhibition assay was used for bioactivity guided fractionation (BA6F) to yield bioactive compound for standardization of extract. Bioactivity guided fractionation afford the active fraction containing 3β-taraxerol with an IC50 value of 0.86 μg/ml. Conclusion: This study demonstrates that M. indica methanol extract of leaf have significant hypocholesterolemic activity which is standardized with 3β-taraxerol, a standardized extract for hypocholesterolemic activity resulted in development of dietary supplement from leaves of Mangifera indica.

Key words: Bioactivity, Hypocholesterolemic, Mangifera indica, 3β-taraxerol

INTRODUCTION

Hypercholesterolemia, is a prerequisite for atherogenesis which leads to myocardial ischemia and other cardiac complications. People with elevated low-density-lipoprotein (LDL) cholesterol are prone to the development of coronary heart disease through multiple stages of the process. Lowering of serum LDL cholesterol is the primary target of anti-hyperlipidemic therapy. A large number of clinical trials on cholesterol-lowering therapy resulted in using 3-hydroxy-3-methylglutaryl coenzyme-A reductase inhibitors (statins (STs)).1,2 Bile acid sequestrants acted on by interrupting enterohepatic recycling of bile acids, they have shown adverse effects like constipation and bloating hemorrhoidal bleeding. Phytic acid derivatives are another class of drugs reduce cholesterol by increased lipolysis of triglyceride via lipoprotein lipase. Ezetimibe reduces cholesterol by blocking the uptake of cholesterol into jejunal enterocytes.3,4 STs are drugs of first choice for the patients with hypercholesterolemia, especially in those at high cardiovascular risk, however some of these patients are intolerant to STs.5 Dietary ingredients include vitamins, minerals, amino acids, and herbs or botanicals, as well as other substances that can be used to supplement the diet. Several plant based nutraceuticals have been suggested to improve plasma lipid profile.6 Red yeast rice, sugar cane-derived policosanols, arishoke leaf extracts are currently used as dietary supplements for their potential LDL-cholesterol-lowering effects.7 Extensive literature survey supports Mangifera indica L. as one of the ingredients which could be utilized for controlling cholesterol level.

Mangifera indica commonly known as mango is a large avenue tree which seen throughout India. It belongs to the family Anacardiaceae. M. indica is one of the most popular of all tropical trees. There are more than 1000 varieties of mango trees all over the world. Most parts of the tree (fruit, seeds, pulp, stem bark, roots and leaves) have medicinal properties.8-9 It is native to tropical Asia

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Pharmacognosy Research | AOP
Evaluation of Cholesterol-lowering Activity of Standardized Extract of Mangifera indica in Albino Wistar Rats

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ABSTRACT

Introduction: Cholesterol lowering activity of Mangifera indica L. has been determined by earlier researchers and kernels, leaf and bark have shown significant activity. However, the specific cholesterol lowering activity of leaf methanol extract has not been determined. Materials and Methods: The present study involved evaluation of cholesterol lowering potential of methanol extract of M. indica leaves using high cholesterol diet model in albino Wistar rats. The acute oral toxicity at a dose of 5000 mg/kg body weight was also determined in female albino Wistar rats. Phytoconstituents, linophenone 3-C-β-D-glucoside and mangiferin were quantified in methanol extracts of different varieties of mango leaves using high performance liquid chromatography. Results and Discussion: Significant cholesterol lowering activity was observed with methanol extract of M. indica leaves, at dose of 90 mg/kg body weight in rats and it was also found to be safe at dose of 5000 mg/kg rat body weight. Linophenone 3-C-β-D-glucoside and mangiferin were found to be in the range of 1.2 to 2.5% w/w and 3.0 to 4.6% w/w, respectively which along with C3-β-taraceral and other sterols could be contributing to the cholesterol lowering activity of mango leaves extract. Conclusions: The phytoconstituents rich extract of Mangifera indica leaves is a good source of nutraceutical ingredients that have the potential to lower serum cholesterol levels.

Key words: Hypercholesterolemia, Mangifera indica, mangiferin, mango leaves

SUMMARY

The Mangifera indica leaves methanolic extract showed significant cholesterol lowering activity in high cholesterol diet induced hypercholesterolemia model in rats when evaluated at a dose of 90 mg/kg rat body weight. The extract was found to contain linophenone 3-C-β-D-glucoside and mangiferin which along with 3 β-taraceral and other sterols could be contributing to the cholesterol lowering activity.

INTRODUCTION

High cholesterol is the 6th risk factor for death in the world.1) Diets high in saturated fat, physical inactivity and genetics can increase cholesterol levels. Cholesterol increases the risks of heart disease, stroke, and other vascular disease. Globally, one-third of ischemic heart disease is attributable to high blood cholesterol. Hypercholesterolemia is the root cause of atherosclerosis and other cardiac complications. Individuals with elevated low-density lipoprotein (LDL) cholesterol are prone to the development of coronary heart disease through multiple stages of the process. Lowering of serum LDL cholesterol is the primary target of therapy. A number of clinical trials on cholesterol-lowering therapy using 3-hydroxy-3-methylglutaryl-CoA (HMG-CoA) reductase inhibitors (statins [STIs])2) are published. STIs are drugs of first choice in hypercholesterolemic patients, especially in those at high cardiovascular risk, some of them are intolerant to STIs.3) Nutraceuticals are borderline devices between nutrients and drugs providing a supplementation of particular nutrients with beneficial effects on health. Nutraceuticals derived from plants have been suggested to improve plasma lipid profile.4) Extracts of gum ghatti of Anogeissus latifolia, Sida rhomboides, soy protein, grape seeds, garlic, ginger, and citrus peel have been assessed for hypcholesterolemic activity.5-6) In particular, many herbal extracts are studied for controlling the cholesterol level. One such plant is Mangifera indica L. (Family, Anacardiaceae) commonly known as Mango, a large evergreen tree of tropical and subtropical region of India and other Asian countries.7) M. indica is one of the most famous of all tropical fruiting trees.8) There are more than thousand varieties of mango trees all over the world. Most parts of the tree (fruit, seed, pulp, stem bark, root, and leaves) have shown medicinal properties.9) In ayurvedic literature, different parts of this plant have been recommended as a remedy for various ailments. It is reported as antiobiotic,10) anti-oxidant,11) antiviral,12) cardiotoxic,13) hypotensive,14) anti-inflammatory,15) antibacterial,16) anti-fungal,17) antihelmintic,18) antiparasitic,19) antitumor,20) anti-HIV,21) anti-bone resorption,22) and anti-spasmodic,23)

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Original Article

CHOLESTEROL LOWERING POTENTIALS OF A BLEND OF STANDARDIZED METHANOL EXTRACTS OF MORINGA OLEIFERA LEAVES AND FRUITS IN ALBINO WISTAR RATS

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ABSTRACT

Objective: *Moringa oleifera* Lam. (*Moringaceae*), a small rapidly growing, evergreen, deciduous tree is an important medicinal plant. Leaves and fruits of this plant are used for various ailments, as a nutritional supplement and also as vegetables. The current study involves in the determination of best combination of the cholesterol-lowering potential of a blend of methanol extracts of *M. oleifera* leaf and fruits, developed based on *in vitro* FIC index studies and evaluate the combination of this extracts in hypercholesterolemic animal models.

Methods: Leaf and fruit methanol extracts and their combinations were tested in *in vitro* lipase inhibition assay to determine the best combination using fractional inhibitory concentration (FIC) index. Hypercholesterolemia was induced with Triton WR-1339 (a non-ionic detergent) and with high cholesterol diet for acute and chronic model respectively and the cholesterol-lowering effect of 1:1 blend of *M. oleifera* leaf and fruits methanol extracts was evaluated.

Results: The FIC index values indicated that *M. oleifera* leaf and fruits extracts blended in 1:1 proportion was the best combination in *in vitro* lipase inhibition assay. This blend, when evaluated *in vivo*, showed a significant decrease in serum total cholesterol level from 24 h through 48 h in triton model. In high cholesterol diet model, the extract blend showed a significant reduction in serum triglycerides levels at 3 and 6 w of treatment.

Conclusion: The results indicate that the blend of *M. oleifera* at the tested dose could be lowering cholesterol and triglyceride levels by inhibiting the absorption of cholesterol and can be developed as a standardized blend for dietary supplement market.

Keywords: *Moringa oleifera*, Cholesterol, Lipase, FIC, Triton, high-fat diet, Niazin

INTRODUCTION

Hypercholesterolemia is the root cause for major health issues like coronary heart disease and atherosclerosis. Control of plasma cholesterol, a biogenic product in the human body, has become one of the main therapeutic strategies to effectively control these diseases [1]. Atherosclerosis is a disease of blood vessels and is known colloquially as "hardening of the arteries". It is characterized by the accumulation of a fatty substance, cholesterol, cellular waste products, calcium and other metabolites in the inner lining of an artery [2]. Elevated cholesterol in the blood can cause coronary artery diseases (CAD) [3]. Statins, a class of drugs widely used for cholesterol management are potent HMG CoA reductase inhibitors that block the de novo synthesis of cholesterol. Statins are drugs of the first choice for the patients with hypercholesterolemia, especially in those who are at high cardiovascular risk [4]. However, some of these patients are intolerant to Statins [5]. Several plant-based nutraceuticals have been suggested to improve plasma lipid profile [6]. *Moringa oleifera* Lamark (*Moringaceae*), commonly known as drumstick tree or horseradish tree is used as a vegetable and also used in Indian folk medicines for the treatment of various illnesses. Traditionally, the plant is used as antiinflammatory, stimulant, expectorant and diuretic. Apart from its traditional and nutritional uses, there are several reports or different biological activities such antimicrobial, anti-inflammatory, antioxidant [7], anticancer, antiinflammatory, hepatoprotective, cardiovascular, antihyperglycemic, wound healing, anticonvulsant, anti-allergy and antihemorrhagic activities [8]. Internally it is used as a stimulant, diuretic and antihypertensive [9]. Many chemical constituents have been isolated and characterized from this plant. The reported chemical constituents from *M. oleifera* leaves are niazin and niazinim and three glycosides, 4-methyl umbelliferone, luteolin, and quercetin, were obtained from Sigma, USA. Sodium chloride, calcium chloride, oxalate, sodium chloride AR, cholecalciferol and cholesterol AR were procured from HiMedia Laboratories Pvt. Ltd., India. Atorvastatin and HPLC grade