ANTI-ATHEROSCLEROTIC ACTIVITY OF THE ETHANOLIC EXTRACT OF BUTEA MONOSPERMA LEAVES ALONE AND IN COMBINATION WITH ATORVASTATIN

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Abstract

Atherosclerosis is a chronic inflammatory disorder characterized by lipid accumulation, oxidative stress, and vascular dysfunction. *Butea monosperma* is a medicinal plant containing flavonoids, phenolic compounds, and other bioactive constituents that may exert antioxidant and lipid-lowering effects. The aim of this study is to evaluate the anti-atherosclerotic potential of ethanolic leaf extract of *Butea monosperma* alone and in combination with atorvastatin. Available experimental evidence suggests that the plant may improve lipid profile, reduce oxidative stress, and support vascular protection. Combination with atorvastatin may provide complementary effects through both pharmacological lipid lowering and plant-derived antioxidant mechanisms. However, further controlled studies are required to confirm the safety, efficacy, and interaction profile of this combination.

Keywords: *Butea monosperma*, atherosclerosis, atorvastatin, ethanolic extract, lipid profile, antioxidant activity.

Introduction

Atherosclerosis develops through a complex interaction of dyslipidemia, oxidative modification of lipoproteins, endothelial dysfunction, and inflammation. Elevated low-density lipoprotein cholesterol is one of the major risk factors for the formation of atherosclerotic plaques.

Atorvastatin is widely used to lower cholesterol by inhibiting HMG-CoA reductase. In addition to its lipid-lowering effect, it may also reduce vascular inflammation and improve endothelial function.

Medicinal plants are increasingly investigated as complementary sources of cardioprotective compounds. *Butea monosperma*, commonly known as flame of the forest, contains flavonoids and phenolic constituents that have demonstrated antioxidant and pharmacological activity [1,2].

The purpose of this article is to examine the potential anti-atherosclerotic effect of ethanolic *Butea monosperma* leaf extract and its possible interaction with atorvastatin.

Materials and Methods

This article is based on a literature-supported experimental framework commonly used in anti-atherosclerotic research.

Experimental animals may be divided into control, atherogenic diet, plant extract, atorvastatin, and combination-treatment groups.

The principal parameters for evaluation include total cholesterol, triglycerides, LDL cholesterol, HDL cholesterol, lipid peroxidation, antioxidant enzyme activity, and histopathological examination of blood vessels.

The ethanolic extract may be prepared from authenticated leaves by drying, pulverization, solvent extraction, filtration, and concentration.

Results

Available pharmacological studies indicate that *Butea monosperma* possesses antioxidant and hypolipidemic potential [1,2].

In an atherogenic condition, beneficial treatment would be expected to reduce total cholesterol, LDL cholesterol, and triglycerides while improving HDL cholesterol.

The plant extract may also reduce lipid peroxidation and improve endogenous antioxidant defense.

Atorvastatin acts primarily through inhibition of cholesterol synthesis, whereas the plant extract may contribute additional antioxidant and anti-inflammatory effects.

For this reason, combined administration may theoretically provide broader protection against atherosclerotic changes than either intervention alone.

However, the combination should be evaluated carefully because plant–drug interactions may alter pharmacokinetics or toxicity.

Discussion

The anti-atherosclerotic potential of *Butea monosperma* is biologically plausible because oxidative stress plays an important role in the modification of LDL and progression of vascular injury.

Flavonoids and phenolic compounds may reduce free-radical-mediated oxidation and help preserve endothelial function.

Atorvastatin provides a well-established lipid-lowering mechanism. A combination strategy may therefore act through complementary pathways: reduction

of cholesterol synthesis by atorvastatin and reduction of oxidative stress by plant-derived compounds.

Nevertheless, the combined effect cannot be assumed to be automatically superior. Direct experimental comparison is necessary.

Liver enzymes, muscle-related adverse effects, and possible changes in drug metabolism should also be assessed when plant extract is administered with atorvastatin.

Conclusion

Ethanolic extract of *Butea monosperma* leaves represents a promising source of compounds with potential anti-atherosclerotic activity.

Its possible mechanisms include improvement of lipid profile, antioxidant activity, and protection against vascular oxidative injury.

Combination with atorvastatin may provide complementary lipid-lowering and antioxidant effects, but this requires controlled experimental confirmation.

Further research should evaluate dose response, vascular histology, oxidative biomarkers, and the safety of plant–atorvastatin co-administration.

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