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Anti-atherosclerosis and anti-inflammatory effects of Madhuca longifolia ethanol extracts on rat model

Sumit Rajput, A Joshi
Department of Physiology, B V Deemed University, India

Objectives: Madhuca longifolia leaves has been used as a traditional medicine for a long history in developing countries and showed significant free radical-scavenging activities, antioxidant activities in diabetic rats and lipid lowering effects.

In the present study, we investigated the effects of Madhuca longifolia ethanol extracts (MLEE) on the serum lipid profiles, oxidant stress status, inflammatory cytokines and atherosclerotic mediators, and endothelial dysfunction as well as changes in abdominal aorta of atherosclerosis rats.

Methods: The major components of MLEE were analyzed by using infrared spectrum and HPLC-ESI-MS. The atherosclerosis rat model was induced by high fat and vitamin D3 feeding for 12 weeks and two MLEE doses (50 and 100 mg/kg b.w.) were orally administered daily for 12 weeks. The rats were then sacrificed and the blood was collected via abdominal aorta and serum used for biochemical analysis. Part of the aorta tissues were excised immediately for histopathological examination and western blotting.

Results: Compared to model group, MLEE treatments significantly decreased the serum lipid profiles including total cholesterol, total triglycerides, low-density lipoprotein cholesterol (LDL-C) and ox-LDL and increased the high-density lipoprotein cholesterol (HDL-C); significant increased serum antioxidant enzymes (SOD and GSH-Px) and decrease of MDA content as a product of lipid peroxidation; lowered serum levels of TNF-α, IL-1β, IL-6, ICAM-1 and VCAM-1 and enhanced IL-10 level; increased the serum release of nitric oxide and expression of iNOS in aortic, whereas decreased the expression of eNOS.

Conclusions: MLEE can improve the progress of atherosclerosis by regulation of lipid metabolism, restoring of the antioxidant capacities, and improving the endothelial dysfunction.