

Antihypercholesterolemic and antioxidant efficacies of zerumbone on the formation, development, and establishment of atherosclerosis in cholesterol-fed rabbits

ABSTRACT

Owing to the high incidence of cholesterol-induced cardiovascular disease, particularly atherosclerosis, the current study was designed to investigate the preventive and therapeutic efficacies of dietary zerumbone (ZER) supplementation on the formation and development of atherosclerosis in rabbits fed with a high cholesterol diet. A total of 72 New Zealand white rabbits were divided randomly on two experimental studies carried out 8 weeks apart. The first experiment was designed to investigate the prophylactic efficacy of ZER in preventing early developed atheromatous lesion. The second experimental trial was aimed at investigating the therapeutic effect of ZER in reducing the atherosclerotic lesion progression and establishment. Sudanophilia, histopathological, and ultrastructural changes showed pronounced reduction in the plaque size in ZER-medicated aortas. On the other hand, dietary supplementation of ZER for almost 10 weeks as a prophylactic measure indicated substantially decreasing lipid profile values, and similarly, plaque size in comparison with high-cholesterol non-supplemented rabbits. Furthermore, the results of oxidative stress and antioxidant biomarker evaluation indicated that ZER is a potent antioxidant in suppressing the generation of free radicals in terms of atherosclerosis prevention and treatment. ZER significantly reduced the value of malondialdehyde and augmented the value of superoxide dismutase. In conclusion, our data indicated that dietary supplementation of ZER at doses of 8, 16, and 20 mg/kg alone as a prophylactic measure, and as a supplementary treatment with simvastatin, significantly reduced early plaque formation, development, and establishment via significant reduction in serum lipid profile, together with suppression of oxidative damage, and therefore alleviated atherosclerosis lesions.

Keyword: Zerumbone, antihypercholesterolemic; Antioxidant; Atherosclerosis; Rabbit model