

Anti-HMG-CoA Reductase, Antioxidant, and Anti-Inflammatory Activities of Amaranthus viridis Leaf Extract as a Potential Treatment for Hypercholesterolemia

ABSTRACT

Inflammation and oxidative stress are believed to contribute to the pathology of several chronic diseases including hypercholesterolemia (elevated levels of cholesterol in blood) and atherosclerosis. HMG-CoA reductase inhibitors of plant origin are needed as synthetic drugs, such as statins, which are known to cause adverse effects on the liver and muscles. *Amaranthus viridis* (*A. viridis*) has been used from ancient times for its supposedly medically beneficial properties. In the current study, different parts of *A. viridis* (leaf, stem, and seed) were evaluated for potential anti-HMG-CoA reductase, antioxidant, and anti-inflammatory activities. The putative HMG-CoA reductase inhibitory activity of *A. viridis* extracts at different concentrations was determined spectrophotometrically by NADPH oxidation, using HMG-CoA as substrate. *A. viridis* leaf extract revealed the highest HMGCoA reductase inhibitory effect at about 71%, with noncompetitive inhibition in Lineweaver-Burk plot analysis. The leaf extract showed good inhibition of hydroperoxides, 2,2-diphenyl-1-picrylhydrazyl (DPPH), nitric oxide (NO), and ferric ion radicals in various concentrations. *A. viridis* leaf extract was proven to be an effective inhibitor of hyaluronidase, lipoxygenase, and xanthine oxidase enzymes. The experimental data suggest that *A. viridis* leaf extract is a source of potent antioxidant and anti-inflammatory agent and may modulate cholesterol metabolism by inhibition of HMG-CoA reductase.