

**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 HMG-CoA 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.