

Essential Oils in Several Herbs Inhibit Human LDL oxidation

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Oxidation of low-density lipoprotein (LDL) is believed to play a key role in atherogenesis. Antioxidants from the medicinal plants inhibit the oxidative modification of LDL. Due to the abundance of antioxidative flavonoids and polyphenolics in essential oils isolated from several herbs, we hypothesized that tree different oils extracted from medicinal plants *Melissa officinalis* (MO), *Agastache rugosa* (AR), *Plantago asiatica* (PA) may have beneficial health promoting effects. For this reason, a sufficient protection of LDL by essential oils may provide protection from atherosclerosis. We examined the protective effect of essential oils in several herbs against Cu²⁺-mediated human LDL oxidation. AR and PA essential oils inhibited LDL oxidation in a concentration-dependent manner. MO essential oils at low concentration effectively prevent LDL oxidation. We incubated MO essential oils with human HepG2 cells and examined the expression of key genes in cholesterol metabolism. The transcription levels of the LDL receptor and the 3-hydroxy-3-methylglutaryl coenzyme A (HMG-CoA) reductase were measured by RT-PCR. The expression of the HMG-CoA reductase significantly reduced by exposure of MO essential oils but LDL receptor expression was unchanged. In vitro test, our data suggest MO essential oils may decrease cholesterol biosynthesis and suppressed LDL oxidation may be one of mechanism about protection from atherosclerosis. In addition, we investigated the effect of MO essential oil on the serum lipid levels in apolipoprotein E mice. After 2 week of feeding, serum triglyceride level was reduced by consumption of MO essential oil but total cholesterol level in serum was not affected by consumption of MO essential oil. All results suggest that consumption of essential oils can afford

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desirable health benefits in prevention of atherosclerosis.

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