Electrochemical Interaction Between Free Radicals and Lappaconitines

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We used electrochemical analysis methods to study how the aconitum alkaloids lappaconitine and its salts (HBr-lappaconitine, HCl-lappaconitine) scavenge free radicals (superoxide anion radical, 2,2-diphenyl-1-picrylhydrazyl, hydroxyl radical and lipid peroxy radical) on a multiwall carbon nanotube-modified glassy carbon electrode. The experimental results showed that lappaconitine, HBr-lappaconitine and HCl-lappaconitine scavenge free radicals. Lappaconitine's free-radical scavenging capacity decreased in the order 2,2-diphenyl-1-picrylhydrazyl > hydroxyl radical > superoxide anion radical > lipid peroxy radical. HBr-lappaconitine's free-radical scavenging capacity decreased in the order 2,2-diphenyl-1-picrylhydrazyl > lipid peroxy radical > hydroxyl radical > superoxide anion radical. HCl-lappaconitine's free-radical scavenging capacity decreased in the order hydroxyl radical > 2,2-diphenyl-1-picrylhydrazyl > superoxide anion radical > lipid peroxy radical. Scavenging ability toward 2,2-diphenyl-1-picrylhydrazyl and lipid peroxy radical decreased in the order HBr-lappaconitine > lappaconitine > HCl-lappaconitine. Scavenging ability toward superoxide anion radical and hydroxyl radical decreased in the order lappaconitine > HBr-lappaconitine > HCl-lappaconitine. The results show that the lappaconitine and its salts can be developed as natural antioxidants because of their free-radical scavenging activities.

Keywords: Lappaconitine; Electrochemical characterization; Free radical; Antioxidant capacity

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