

Reduction of hydroxyl radical induced DNA damage by perilla leaf extracts

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Objective: Perilla [*Perilla frutescens* (L.) Britt] is an annual herbaceous plant native to Asia, and its leaves are often used in food. The leaves are medicinally used for the treatment of food poisoning. Considerable attention has been given to the anti-allergic, anti-inflammatory and anti-tumor promoting substances contained in perilla plants. This investigation focuses on the hydroxyl radical scavenging activities of the perilla leaf extracts. The study also compares the protective effects against oxidative DNA damage of different antioxidants in aqueous solution.

Materials and methods: Dried perilla leaves were extracted with aqueous solution and then filtered. The filtrates were concentrated under reduced pressure and freeze-dried. Bleaching of the DPPH free radical was performed as following, an aliquot of the ethanol solution containing different amounts of the perilla leaf extracts were added to DPPH• solution. Absorbance at 517 nm was measured on a spectrophotometer 30 min after starting the reaction. The ABTS•+ radical generated by mixing an ABTS 20 mM solution with 70 mM K₂S₂O₈ in the dark for 24 h, at room temperature. Before usage, ABTS•+ solution was diluted to get an absorbance of 0.700 ± 0.020 at 734 nm with phosphate buffer at pH 7.4. Oxidative damage of pUC119 DNA by hydroxyl radical was conducted by UV irradiation in a solution containing 0.3 % hydrogen peroxide.

Results: Perilla leaf extracts had effective DPPH bleaching activity ($IC_{50}, 10.61 \pm 0.37 \mu\text{g/mL}$) and ABTS•+ radical scavenging activity ($IC_{50}, 33.93 \pm 2.22 \mu\text{g/mL}$) in a concentration dependent manner. There is a significant decrease in the concentration of DPPH• and ABTS•+ due to the scavenging capacity of perilla leaf extracts. Furthermore, the perilla leaf extracts to inhibit the oxidative DNA damages were assessed by measuring the conversion of supercoiled pUC119 plasmid DNA to the linear forms. It was found that the perilla leaf extracts could effectively scavenge hydroxyl radical and also significantly reduce the oxidative DNA damage with the IC_{50} of $2.02 \pm 0.11 \text{mg/mL}$. ✓

Conclusion: Perilla leaves are medicinally used for the treatment of food poisoning, we found in this study that the leaf extracts shown great *in vitro* free radical scavenging and oxidative DNA protection activities.