Stability of Chemical Components and Antioxidant Activity of Volatile Oils from Some Medicinal Plants in Thailand

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ABSTRACT

The volatile oils from fresh leaves of ten medicinal plant species growing in northern Thailand were isolated by hydrodistillation method. These volatile oils were determined for their chemical components by gas chromatography coupled with mass selective detector (GC-MS) and antioxidant activity was investigated by ABTS assay, FRAP assay, lipid peroxidation assay and amount of total phenolic compounds. In addition, the stability of volatile oils in simulative condition was also studied. The major components of the extracted volatile oils were mainly terpenoid compounds, i.e., caryophyllene, D-germacrene, humulene and linalool. From the results, it can be concluded that the volatile oil of P. fruticosa showed the highest TEAC value of 279.79±0.35 µM trolox equivalents/mg sample while C. bejolghota oil showed the highest EC1 value (387.77±0.36 µM/mg sample). Moreover, the volatile oil of K. lenta possessed the highest lipid peroxidation value (83.43±0.00%) and the highest amount of total phenolic compounds was found in the volatile oil of S. acmella (GAE value = 308.14±0.76 µg/ml sample). In the stability study, it was revealed that the antioxidant activity of the volatile oil from E. odoratum was more stable than S. acmella due to the stability of the chemical components towards oxidation reaction as well as humidity. It was also found that the chemical components of S. acmella oil were comparatively more stable than E. odoratum when they were preserved at -20, 30 and 45°C under the same conditions. The simulated storage condition in this study was effectively aimed to preserve the antioxidant activity and chemical components in the extracted volatile oils. The results of this investigation clearly suggested that the volatile oils of E. odoratum, S. acmella and P. fruticosa possessed the highest antioxidant activity and indicated that they proved to be a good source of antioxidants that might serve to protect health and fight against diseases in the future.

Key words: GC-MS; Volatile oil; Stability; ABTS; FRAP; Lipid peroxidation; Antioxidant