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Relevance of Phenolic Diterpene Constituents to Antioxidant Activity of Supercritical CO₂ Extract from the Leaves of Rosemary

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Abstract

Isolation of phenolic diterpene constituents from the freeze-dried leaves of *Rosmarinus officinalis* has been obtained by supercritical extraction with carbon dioxide. To determine the ideal conditions for the maximum yield of extract, nine different conditions using three levels of pressures (3000, 4000 and 5000psi) in combination with three temperatures at 40, 60 and 80°C, respectively, in combination with the analyses of the corresponding antioxidant activities and constituents which existed in extracts has been investigated. The antioxidant activity of each obtained extract was determined by using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) radicals test. GC/MS method was used as an alternative to conventional HPLC method for the determination of the principal antioxidant constituents in extract, including phenolic diterpenes carnosic acid (CA) and carnosol (CAL). The confirmation of CA and CAL in extract was forward performed by subjecting HPLC isolates from extract into an ion trap mass spectrometer through an electrospray ionization (ESI) interface for MS/MS analysis. These results indicate that an ideal extraction process was obtained at 5000psi and 80°C with an extraction yield of 4.27% (w/w) and rich in phenolic antioxidants CA and CAL as contents of 35.23 and 0.46mgg⁻¹ in extract, respectively.

Key words : Rosemary; Supercritical fluid extraction (SFE); Antioxidant phenolic diterpenes; HPLC; GC/MS; ESI-MS-MS