ABSTRACT

DETERMINATION OF SOME PHENOLIC COMPOUNDS IN OLIVE OIL WITH LIQUID CHROMATOGRAPHY BY ENRICHMENT WITH REVERSED PHASE LIQUID - LIQUID MICROEXTRACTION

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In this study, a reversed phase dispersive liquid-liquid microextraction method (RP-DLLME) for the enrichment of natural biophenolic compounds of oleuropein, gallic acid, caffeic acid, ferulic acid, p-coumaric acid, hydroxytyrosol and tyrosol compunds in olive oil has been developed prior to their liquid chromatographic determinations. Ordinary (normal phase) DLLME is a miniaturized Liquid-liquid extraction and is based on a ternary component solvent system in which the extraction solvent and disperser solvent are rapidly injected into the aqueous sample by syringe. The RP-DLLME method overturns the solvent polarity in the ordinary DLLME and replaces the chlorinated toxic solvents with water. In this application of the RP-DLLME method to oil samples, the phenolic compounds are directly extracted into an aqueous micro-drop, which can be injected into a chromatograpy column without any further pretreatment. The parameters affecting extraction efficiency of the RP-DLLME method such as pH of water, type of diluter solvent, volume ratio between the olive oil sample and the diluter, volume of sample, type and volume of disperser solvent, volume of extraction solvent (water), salt effect, centrifugation time and centrifugation speed were investigated. Under the optimum extraction conditions (1.0 mL of sample volume, 1.0 mL of hexane as diluter solvent, 50 µL of water as extraction solvent, 100 µL of ethyl acetate as disperser solvent at pH:7) gave enrichment factor in the range of 14.4-17.1. Recoveries for the studied phenolic compounds were 72.3-118.5%. Proposed enrichment method was also applied to virgin olive oil and pure olive oil samples. Biophenolic compounds were detected at ppb levels with adequate chromatographic resolution.

Key words: Olive oil, phenolic compund, natural antioxidant, dispersive liquid-liquid microextraction, enrichment, HPLC.