Abstract

Dispersive liquid-liquid microextraction (DLLME) coupled with gas chromatography was applied for the extraction and determination of essential oil constituents of the *Borago officinalis L.* In this study, an experimental data based artificial neural network (ANN) model is constructed to describe the performance of DLLME method for various operating conditions. The volume of extraction and dispersive solvents, extraction time and salt effect were the input variables of this process, whereas the extraction efficiency was the output. The ANN method was found to be capable for modeling accurately of this procedure. The overall agreement between the experimental data and ANN predictions was satisfactory showing a determination coefficient of 0.982. The optimum operating condition was then determined by genetic algorithm method. The obtained optimal conditions were 248 µl of volume of extraction solvent, 260 µl of volume of dispersive solvent, 2.5 min of extraction time and 0.16 mol L^{-1} of salt. The limit of detection and linear dynamic range were 0.15 – 24.0 ng mL^{-1} and 1.2 - 1800 ng mL^{-1}, respectively. The main components of the essential oil were: δ-Cadinene (31.02%), Carvacrol (24.91%), α-Pinene (20.89%) and α-Cadinol (16.47%).

Keywords: *Borago officinalis L.*; Dispersive liquid-liquid microextraction; Artificial neural network; Genetic algorithm; Gas chromatography.

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