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Development of vortex-assisted ionic liquid-dispersive microextraction methodology for vanillin monitoring in food products using ultraviolet-visible spectrophotometry

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Abstract

The research deals with development of a new methodology for preconcentration and determination of vanillin in food products using vortex-assisted ionic liquid-dispersive microextraction (VAILDME) followed by ultraviolet-visible (UV-vis) spectrophotometry. The hydrophobic vanillin complex was extracted directly from the foods into the fine droplets of ionic liquid (IL) in presence of Cu(II) at pH 8.0. By the experimental studies, the optimum conditions were determined as follows; pH 8.0, 0.5 mmol L^{-1} of Cu(II) solution, 250 µL of the IL, 100 µL of ethanol, 5 min of vortexing time. Under the optimal conditions, the method showed good linearity in the range of 0.5-300 µg L^{-1} with a limit of detection 0.15 µg L^{-1}. The reliability of the method was evaluated in terms of repeatability (as RSD%,, n: 10) and reproducibility (as RSD%, n: 3×5) after spiking with 10, 50 and 100 µg L^{-1}, and the precision levels were 3.7% and 4.1%, respectively. The accuracy of the method was assessed by recovery experiments, and the recoveries for spiked samples were quantitative in range of 92.1-103.0%. After validation studies, the method was successfully applied to the determination of vanillin in food products with satisfactory results.

Keywords: Spectrophotometry, Ionic Liquid, Vanillin, Foods, Microextraction

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