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A Simple and Novel Deep Eutectic Solvent Based Ultrasound-Assisted Emulsification Liquid Phase Microextraction Method for Malachite Green in Farmed and Ornamental Aquarium Fish Water Samples

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ABSTRACT

In this work, the recently suggested concept of Deep Eutectic Solvents (DESs) as green and cheap extraction solvent was used for ultrasound-assisted emulsification liquid phase microextraction (UA-ELPME) of Malachite Green (MG) in farmed and ornamental aquarium fish water samples followed by UV-VIS spectrometry. In the DES-UA-ELPME, Malachite Green in sample solution (pH 3) was extracted into a well dispersed of microvolume of DES phase consisting of choline chloride and phenol and analyzed by UV-VIS spectrometry at 635 nm. A series of analytical factors such as pH and volume of sample solution, the type and volume of DES ultrasonication time and salt effect that would affect the extraction efficiency was systematically examined and optimized. Under optimum conditions, the DES-UA-ELPME method offered a limit of detection (LOD) of 3.6 µg L^{-1} and a relative standard deviation (RSD) of 2.7 %. The procedure was validated with three aquarium and farmed fish water samples and quantitative recoveries (96-99 %) were achieved.