

Optimization of preconcentration of an organic dye by dispersive liquid-liquid microextraction

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In this research, dispersive liquid-liquid microextraction followed by UV-Vis spectrophotometry was used as a rapid, simple and efficient method for preconcentration of Alizarin red. Octanol and acetone were used as extraction and dispersing solvents, respectively. Effects of some important experimental factors such as volumes of extraction solvent (in the range of 100 to 200 μL) and dispersing solvent in the range of (0.2 to 0.4 mL), extraction time (2 to 6 min) and centrifuge time (2 to 4 min), on the efficiency of extraction were investigated. To determine the optimal experimental conditions, Taguchi experimental design was conducted. According to the design, optimal values of the studied factors to achieve maximum efficiency of preconcentration for Alizarin red were predicted: volume of octanol as extractant: 150 μL , volume of acetone as disperser: 0.4 mL, centrifuge time: 4 min and extraction time: 4 min. Under the optimum conditions, enrichment factor was obtained as 303. The linear concentration range for alizarin red in water was in the range of 2×10^{-4} - 8×10^{-6} M and in octanol was in the range of 10^{-5} - 10^{-4} M. The limit of detection was obtained as 2×10^{-8} M.

Keywords : Keywords: Dispersive liquid-liquid microextraction; Spectrophotometry; Alizarin red; Taguchi experimental design.

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