Dispersive Liquid–liquid Microextraction and Partial Least Square Method (PLS) for the Simultaneous Preconcentration and Determination of Zn(II), Cu(II) and Cd(II) in Water Samples

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A dispersive liquid–liquid microextraction [1] and partial least square method [2-3] (PLS) was developed for the simultaneous preconcentration and determination of zinc, copper and cadmium in water samples. The simultaneous determination of Zinc, copper and cadmium mixtures by using spectrophotometric method is a difficult problem, due to spectral interferences. By multivariate calibration methods such as partial least squares (PLS), it is possible to obtain a model adjusted to the concentration values of the mixtures used in the calibration range. In this work, an appropriate mixture of ethanol (as the disperser solvent) and tetrachloride carbon (as the extracting solvent) was injected rapidly into the water sample containing zinc (II), copper (II) and cadmium (II) and appropriate amount of 1-(2-pyridyiazol)-2-naphthol (PAN) (as the complexing agent). At this step, the Zinc, copper and cadmium interacted with the PAN and extracted into the CCİ4. After the phase separation, the absorbance of the extracted metal complexes was measured in the wavelength region of 400–700 nm. The calibration model is based on absorption spectra in the 400–700 nm range for 35 different mixtures of Zinc, Copper and Cadmium. Under optimum conditions, the calibration graphs were linear in the range of 2–100 ng mL−1, 2–100 ng mL−1 and 5–100 ng mL−1 for zinc (II), copper (II) and cadmium (II), respectively.

KEYWORDS: Dispersive liquid–liquid microextraction, Partial Least Square method, simultaneous, determination of Zn(II), Cu(II), Cd(II)

REFERENCES: