



Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Microchemical Journal

journal homepage: www.elsevier.com/locate/microc



Ultrasound-assisted alkanol-based nanostructured supramolecular solvent for extraction and determination of cadmium in food and environmental samples: Experimental design methodology

Nail Altunay^{*}, Adil Elik

Sivas Cumhuriyet University, Faculty of Sciences, Department of Biochemistry, TR-58140 Sivas, Turkey

ARTICLE INFO

Keywords:

Cadmium
Supramolecular
Flame atomic absorption spectrometry
Ultrasound-assisted
Experimental design
Real sample

ABSTRACT

Herein, a new and green analytical method was described for extraction and determination of cadmium in food and environmental samples using ultrasound assisted alkanol-based nano structured supramolecular solvent microextraction (UA-alkanol-based-SUPRAS-ME) coupled with flame atomic absorption spectrometry (FAAS) detection. The SUPRAS was easily prepared from reverse micelles of 1-tetradecanol (as extraction solvent) in tetrahydrofuran (THF as dispersive solvent). The Box-Behnken design based on the analysis of variance and the desirability function guide was used to optimize the key variables (pH, SUPRAS volume, ligand amount, ultrasonic time) of the UA-alkanol-based-SUPRAS-ME procedure. Under the optimum conditions, the calibration graphs were linear in the range of 50–3500 $\mu\text{g kg}^{-1}$ and 1–400 ng mL^{-1} for foods and environmental samples, respectively. Acceptable limits of detection (LODs) of 15 $\mu\text{g kg}^{-1}$ and 0.3 ng mL^{-1} were calculated for food and environmental samples, respectively. Inter day RSDs% lower than 4.9% with an average recovery of 99.8%, and intraday RSDs% lower than 4.1% with an average recovery of 97% were obtained. Total cadmium was determined in the range of 48.2–186.4 $\mu\text{g kg}^{-1}$ and 35.4–124.6 ng mL^{-1} in food and environmental samples, respectively.