Determination of trace metal ions in water and plant samples using polyurethane foam modified with 2-aminothiazole

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ABSTRACT

2-Aminothiazole (AT) was covalently bonded to polyurethane foam (PUF) via –N=N–NH– group and used for preconcentration/separation of Ni(II), Zn(II), and Cd(II) from water, black tea, and plant leaves prior to flame atomic absorption spectrometry determination. The resulting AT–PUF sorbent was characterized by density measurement, elemental analysis, UV–vis, and IR spectroscopy. The optimum sorption of these elements was achieved at sample pH 5–6. The sorption capacity was found to be 461 ± 1.4, 341 ± 1.3, and 435 ± 2.4 μg g⁻¹ and limit of detection (3σ) was 2.0, 3.0, and 3.0 μg L⁻¹ for Ni(II), Zn(II), and Cd(II), respectively. The preconcentration factor was 100 for all elements. The developed method was successfully applied for determination of these elements in tap and lake water, spinach and parsley leaves, and black tea samples and the corresponding relative standard deviation values were less than 10%.

Keywords: 2-Aminothiazole; Polyurethane foam; Preconcentration; Metal ions; Water and plant analysis

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