

Analysis of Trace Elements in Various Matrix by Coprecipitation Method Using a Triazole Derivative Ligand

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Determination of metals in environmental samples is an important part of analytical chemistry. Nowadays, the pollution by metals is a major interest owing to their potential toxic effects on living organisms [1]. There has been an increasing interest in studying the toxicity and effect of elements on human health and environment. Hence, the development of sensitive methods is important for the determination of the elements in water and food samples. Lately, a new coprecipitation method, carrier element-free coprecipitation (CEFC), has been developed. The CEFC method has many benefits for separation and preconcentration of metals due to the lack of contamination and adsorption risks for metal ions from a carrier element [2]. In this study, the usage of ligand, in selective and simultaneous separation and preconcentration of some trace metal ions such as Cu(II) and Co(II) by using carrier element free coprecipitation (CEFC), which was brought into the literature as a new method in recent years, has been evaluated. From the obtained results, it was seen that, the 2-(3-(4-methylbenzyl)-4-[2-(1H-indol-3-yl)ethyl]-5-oxo-4,5-dihydro-1H-1,2,4-triazol-1-yl)-N'-(2-hydroxy phenyl methylidene) acetohydrazide ligand can be used in CEFC method for selective separation and preconcentration of Cu(II) and Co(II) ions at pH 7.0 (figure 1). For optimization of the developed methods, the effects of some experimental parameters such as pH, ligand amount, sample volume, standing time, centrifugation rate and time were evaluated. The interference effects of some anions and cations, which may present in the environmental samples together with the analyte ions, were investigated. In order to evaluate the analytical performance of the methods, the values of limit of detection (LOD) is 0.79-1.16 $\mu\text{g L}^{-1}$, limit of quantification (LOQ) is 2.38-3.48 $\mu\text{g L}^{-1}$ and relative standard deviations (RSD) is 3-3.7%, were calculated. After determined the optimum conditions of the methods, for checking the accuracy of them, spike tests were performed and the certified reference materials were used. The developed method were applied to environmental solid and liquid samples and food samples. The analyte ions were determined by using atomic absorption spectrophotometric method.

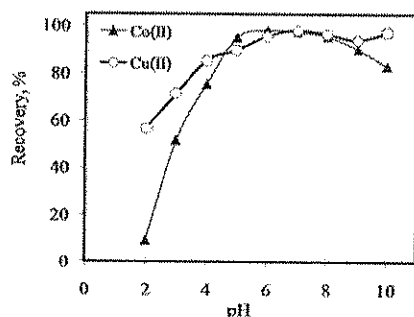


Figure 1.

KEYWORDS: trace element, separation and preconcentration, coprecipitation, carrier element free coprecipitation

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