

Sequential Extraction of Cr, Cu and V in Soil and Determination Using ICP-MSA.R.A. Nogueira¹, S.R. Bianchi^{1,2}, J.A. Nóbrega²

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Among the instrumental techniques that can be used for determination of trace elements in soils, inductively coupled plasma mass spectroscopy (ICP-MS) presents advantages such as multi-elemental character and superb sensitivity. However, aspects such as the content of total dissolved solids and the polyatomic ions formed in complex matrices may limit its application. The determination of Cr, Cu and V may suffer from polyatomic interferences either originated in the argon plasma or in the matrix. In the case of $^{65}\text{Cu}^+$ the main interferents are $^{23}\text{Na}^{40}\text{Ar}^+$ and $^{23}\text{Na}^{40}\text{Ca}^+$. The determination of $^{52}\text{Cr}^+$ is affected by $^{40}\text{Ar}^{12}\text{C}^+$ and $^{51}\text{V}^+$ is affected by $^{35}\text{Cl}^{16}\text{O}^+$. Notwithstanding, all these elements also have less abundant isotopes not affected by severe interference processes. The goal of this study was to determine Cr, Cu, and V in soil sequential extraction fractions (BCR) using strategies such as the choice of less abundant isotopes and/or the introduction of H_2 gas in the collision reaction interface (CRI - Varian 820-MS) when measuring the major isotope. Solutions containing $5 \mu\text{g mL}^{-1}$ of Cr, Cu, and V were prepared in different media ($\text{CH}_3\text{COOH } 0.11 \text{ mol L}^{-1}$, $\text{NH}_2\text{OH.HCl } 0.05 \text{ mol L}^{-1}$ and $\text{CH}_3\text{COONH}_4 0.05 \text{ mol L}^{-1}$) and addition and recovery studies were performed, evaluating the introduction or not of 60 mL min^{-1} of H_2 in the skimmer cone. The results have shown that the determination of Cu and Cr can be performed using the less abundant isotopes of these elements, i.e. $^{53}\text{Cr}^+$ and $^{65}\text{Cu}^+$, respectively, with recoveries around 120%. The determination of the $^{50}\text{V}^+$ was not possible due to their low abundance (0.25%), leading to too high standard deviations. Otherwise, the $^{51}\text{V}^+$ isotope can be properly determined using by adding H_2 in the CRI for destroying $^{35}\text{Cl}^{16}\text{O}^+$.

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