

Speciation of chromium and vanadium in medicinal plants in the vicinity of ferrochrome and vanadium smelters

Adejimi A A, Owolabi I A and Mandiwana K L
Tshwane University of Technology, South Africa

There exists abundant evidence globally that anthropogenic activities have polluted the environment with heavy metals such as V(V), which eventually find their way into the human food-chain with the subsequent adverse effects. In this study, the graphite furnace atomic absorption spectrometry (GFAAS) was used in the determination of V(V) and total V in medicinal plants collected from the farm in the vicinity of the vanadium smelter but unable to sampling the medicinal plants near ferrochrome smelter. The determination of V(V) in medicinal plants by (GFAAS) was applied based on their leaching with 0.1 M Na₂CO₃. The solution was filtered through a PDVF 0.45 mL hydrophilic filter prior analysis by GFAAS. The results suggest that the pyrolysis temperatures of 1300°C - 1500°C are effective to eliminate the majority of the matrix prior to atomization and any residual amounts of Na₂CO₃ had no influence on the release of V during atomization. The concentration of V(VI) in medicinal plants were in the range between 1.1±0.08 µg g⁻¹-17±1.7 µg g⁻¹ and total V were varied from 18±0.08 µg g⁻¹ and 439±1.6 µg g⁻¹. The procedures were validated by the analysis of Certified Reference Materials (CRMs): MESS-3, PACS-2, and SRM 2704. The findings from this study provided the basis for the urgent need to ascertain the levels of V(V) in medicinal plants especially in economically important plants in farms in the vicinity of mines. This measure is necessary to ensure that the overall aim for better health is not compromised through possible contamination and toxic effects of these metals.

adejimola2001@yahoo.com

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