Antimony remediation using a new magnetic system in potable aqueous samples.

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Heavy metals are serious pollutants because of their toxicity, persistence, and non-degradability in the environment. Sb is easily accumulated in organism and will cause deleterious effects on human beings when the content goes beyond the allowable limit. As a cumulative toxic element, antimony has chemical and toxicological properties.

Currently, Drinking Water Treatment Plants (DWTP) are incapable to eliminate totally the Sb concentration in natural waters, and due to its toxicity is needed. In this work, the adsorption process of a recently patented magnetic material (M@GOPS) towards Sb has been studied.

Magnetic solid phase extraction (MSPE) with magnetic particles (MPs) as the adsorbents has aroused great interest in analytical community in recent years. Superparamagnetic iron oxide particles as sorbents in SPE have received increasing attention because they are attracted to a magnetic field but do not retain any magnetism after the field is removed. Thus, a chelating sorbent which employs magnetic nanoparticles (MNPs) and graphene oxide functionalized with [1,5-bis (2-pyridyl) 3-sulfophenylmethylene] thiocarbonohydrazide M@GO-PS was used to adsorb trace amounts of metal ions of Sb (III) in natural waters sources of drinking water for citizens. Also, the material presents magnetic properties, biocompatibility and low toxicity. The Sb determination in the treated water was aborded by Graphite Furnace Atomic Absorption Spectrometry (GFAAS).

The kinetics of the process have been studied, showing a good approximation to the Langmuir's theoretical model. The magnetic adsorption procedure has shown a performance of 50% in 60 min for the elimination of Sb, with a dosage of 1 g/L of M@GO-PSTH in a potable water with an initial concentration of 0.001 g/mL of Sb.

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