

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

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Arsenic, one of the main environmental pollutants and potent natural poison, is a chemical element that is spread throughout the Earth's crust. It is well known that the toxicity of arsenic is highly dependent on its chemical forms. Generally, the inorganic species are more toxic than its organics forms, and As(III) is 60 times more toxic than As(V). In environmental waters, arsenic exists predominantly in two chemical forms: As(III) and As(V).

In this work, a new magnetic solid phase extraction method based on magnetic nanoparticles (MNPs) coupled to graphene oxide (GO) functionalized with [1,5-bis (2-pyridyl) 3-sulfophenylmethylene] thiocarbonohydrazide M@GOPS was developed.

The new system was based on the adsorption of As(III) and As(V) using M@GO-PS to remove them from natural waters. The As determination in the untreated and treated waters was realized by inductively coupled plasma mass spectrometry (ICP MS), because the high sensitivity of this technique.

Today, Drinking Water Treatment Plants (DWTP) are unqualified to eliminate totally the As 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 As (III) and As(V) has been studied. For this study, a drinkable water from Alcaucín, a village of Malaga, was contaminated with As in order to develop all the adsorption experiments.

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 100% in less than 30 min for the elimination of As, with a dosage of 1 g/L of M@GO-PSTH in a potable water with an initial concentration of 0.01 g/mL of As.

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