

Using the alternative (low-cost) adsorbent for environmental pollution control: a cadmium removal from aqueous solutions

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Abstract

Over the last few years, pollution of water is a high concern from natural and anthropogenic sources. Another apprehensive fact of pollution is the high presence of contaminants in the environment, especially those with toxic and hazardous properties. Since we are dealing with a high amount of contaminants, remediation of the environment has an enormous cost, and reducing pollution is critical. The big challenge currently is to find the most eco-friendly path that leads to the decontamination of the environment.

This study presents the use of environmentally low-cost waste adsorbents, such as potato and pumpkin peels, shells of peanut and sunflower seeds, chamomile tea residues, and coffee as a cadmium removal from an aqueous solution. The known concentration of this metal was measured before and after the peel treatment. For the cadmium ion concentration measurement, a Thermo Scientific Orion star A211 benchtop pH-meter with a cadmium ion-selective electrode was used and confirmed with inductively coupled plasma atomic emission spectroscopy. (ICP-AES). The adsorption properties of the peels and waste were studied with scanning electron microscope (SEM) infrared spectra (FTIR) and differential scanning calorimetry (DSC). Preliminary results of our research showed promising outcomes using these bio waste-derived bio sorbents for the removal of cadmium from an aqueous solution.

Keywords: cadmium, environmental pollution, ICP-AES technique, SEM.