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Raw and highly porous adsorbents as potential adsorbents of cobalt (II) ions from contaminated wastewater

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Cobalt is a heavy metal commonly used in alloys, dye and pharmaceutical industries. Filtration, reverse osmosis, exchange resins and activated sludge are the current techniques that are used in the elimination of cobalt from wastewaters. A cost-effective and selective methodology for its removal has always been wanted. Spent peppermint (PM) leaves and alginate beads (AB) were used as potential adsorbents of Cobalt (II) ions in aqueous solutions. Equilibrium parameters such as pH, mass of adsorbent, salinity and initial metal concentration were studied to optimize the adsorption in batch experiments of aqueous solutions at room temperature.It has been shown by experimental data that adsorption of cobalt (II) is maximized at pH 5 using 150 mg of both adsorbents. Furthermore, the adsorbents also reached their highest adsorption in the absence of salts with maximum initial concentrations of cobalt (II) of 100 ppm. Adsorbent characterization by FTIR indicates the presence of alcohol and carboxyl groups as the most relevant active sites on the adsorbents. Finally, SEM micrographs elucidate the heterogeneous surface of these materials as a positive property for the adsorption of pollutants.

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