Removal of lead (II) from aqueous solution by sorption on natural hemp fibers

Lavinia TOFAN, Carmen PĂDURARU, Irina VOLF, Catalin BĂLAN - Universitatea Tehnica "Gh. Asachi" Iasi

The sorption process plays an important role in removing heavy metals such as lead from aqueous environments. In recent years, the applications of low cost sorbents have been widely studied for heavy metal ions removal from wastewaters. Natural materials that are available in large quantities or certain wastes from industrial and agricultural operations have the potential to be used as low cost sorbents, as they represent unused resources, with wide availability and are environmentally friendly. However, the necessity for investigating more and more natural and waste materials is still very important in order to obtain the best material for industrial applications. In this context, natural hemp fibers have been evaluated for Pb (II) sorption from diluted aqueous solutions. In order to establish the optimum conditions, the effect of initial pH of solution, hemp dose, Pb (II) initial concentration, and temperature and contact time of phases on the Pb (II) sorption by natural hemp has been studied. It has been found that in the studied initial pH range of 2- 5, the sorption increases with pH increasing. The values of the Pb (II) sorption percentage increase with increasing hemp dose. The amount of Pb (II) retained on hemp fibers increase with increasing Pb (II) concentration in initial solution, but the sorption percentage decreases. The temperature has a favorable effect within the batch sorption under study. The Pb (II) amounts retained on hemp increase with contact time of phases increasing. The results of this study suggest that natural hemp could be a viable and potential sorbent for the removal of Pb (II) from wastewaters with low content of the tested cation.