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KINETICS AND EQUILIBRIUM OF COPPER AND CHROMIUM IONS REMOVAL FROM AQUEOUS SOLUTIONS USING SAWDUST

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Abstract

This work presents the removal of heavy metal ions (Cu^{2+} and Cr^{3+}) from aqueous solutions with the use of pine (*Pinus silvestris*) sawdust. The experiments were conducted in a batch mode. Kinetic and equilibrium parameters of biosorption – which are best described by pseudo-second order and Langmuir models – were determined. The maximum sorption capacity at pH 5 and a temperature of 20°C for pine sawdust amounted to 21.47 mg/g for Cu^{2+} ions and 39.63 mg/g for Cr^{3+} ions, respectively. Thermodynamic parameters of biosorption were found out; the process of binding of ions turned out to be spontaneous and endothermic. Four eluents for ions desorption from a used sorbent were proposed of which 0.1M HCl was found to be the most useful for the purpose. Pine sawdust is a sorbent characterized by a high effectiveness even in four cycles of sorption-desorption.

Key words: biosorption, heavy metals, low-cost sorbent, water treatment

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