



## Heavy Metals Transport in Typical Portuguese Loamy Sand Soils

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Illegal discharges are of great concern among industry activities, since they occur under uncontrolled conditions. In most cases, effluents are acidic and the concentrations of heavy metals are very high. With this in mind, the main goal of this study was to evaluate the sorption of two of the most toxic heavy metals, Cr(VI) and Pb(II), in those conditions.

A loamy sand soil was collected in Oporto, Portugal. Batch equilibrium and kinetic sorption experiments were performed using both metals solutions, with concentrations among 50 mg L<sup>-1</sup> and 200 mg L<sup>-1</sup>, at pH 2 and 5, between 2 h and 288 h.

To evaluate the sorption equilibrium, eight isotherm models were fitted. Better adjustments were observed for the Redlich-Peterson and Khan models for the adsorption of chromium ( $R^2 = 0.99$ ), and of lead ( $R^2 = 0.99$ ), respectively. The sorption kinetics was evaluated using three models – Elovich, Pseudo first order and an empirical power function. The retention of lead was almost instantaneous and the empirical power function described better the sorption kinetics of chromium ( $0.89 < R^2 < 0.99$ ).

In addition, flow experiments were performed with effluents of both metals (50 mg L<sup>-1</sup>) at pH 2 and 5, for about 90 h. Results revealed a high retention of chromium, and a weak retention of lead, for low pH values. FTIR analyses to the columns samples revealed that clay minerals have an important role in the retention of both metals [1].

- [1] B. Fonseca, A. Teixeira, H. Figueiredo, T. Tavares, “Modelling of the Cr(VI) transport in typical soils of the North of Portugal”, *J. of Hazard. Mater.* (2009) doi:10.1016/j.jhazmat.2009.01.049.