Removal of Copper and Nickel onto Low Cost Adsorbent: Aquatic Mosses

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A realistic scenario is that man's use of metals seriously began to affect the environment during the Industrial Revolution. Today, two thousand years later, we can say to be in the Metal Removal Age and we are all too aware of the risks inherent to the uncontrolled dissemination of heavy metals into the environment. From the environmental point of view, the metals that are of greatest concern are those that, either by their presence or their accumulation, can have a toxic or an inhibitory effect on living beings. Metals can be dispersed, both naturally and by man's activities, into any of the earth's compartments: water, soil or air. However, the water and wastewater will be the main focus of this work.

The biosorption of Cu(II) and Ni(II) from aqueous solution plays an important role in water pollution control and recovery of valorous heavy metals. In recent years, there has been a considerable interest in the use of low-cost biosorbents (by-products or wastes by forest, agricultural, food, wastewater treatment or pharmaceutical, for this purpose as alternative of dispendiouses technologies (activate carbon, membranes). The aquatic mosses have proved to be an important support for heavy metals removal from polluted waters (Srivastav *et al*., 1994; Martins and Boaventura, 2002).

In this way, copper and nickel removal by dead biomass of aquatic plants was studied. In this work, an aquatic moss, *Fontinalis antipyretica*, was tested for treating wastewaters prepared in the laboratory, and containing the selected metal. The batch sorption experiments were carried out by shaking 50 ml metal ion solution with 100 mg of sorbent in a 250 ml Erlenmeyer at 140 U min^{-1}. A temperature-controlled rotary shaking machine operating for 24 hours was used for the study. Sorption tests were performed in the temperature range 5-20ºC, pH 5.0-5.2 and metal concentration range 10-100 mg l^{-1}. The concentration of metal was determined by atomic adsorption spectrophotometry.

Langmuir, Freundlich and Redlich-Peterson isotherm models were studied to fit the experimental data of equilibrium concentrations (Figure 1 and 2).

Results showed that dead biomass of *Fontinalis antipyretica* are a suitable biosorbent for Cu^{2+} and Ni^{2+}.

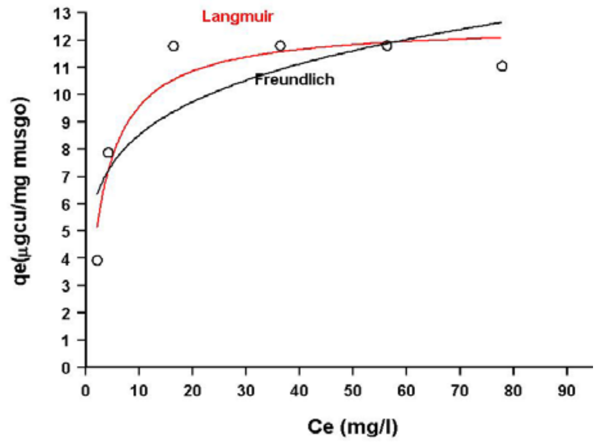

Figure 1: Langmuir and Freundlich isotherms of Cu^{2+} at 20ºC.

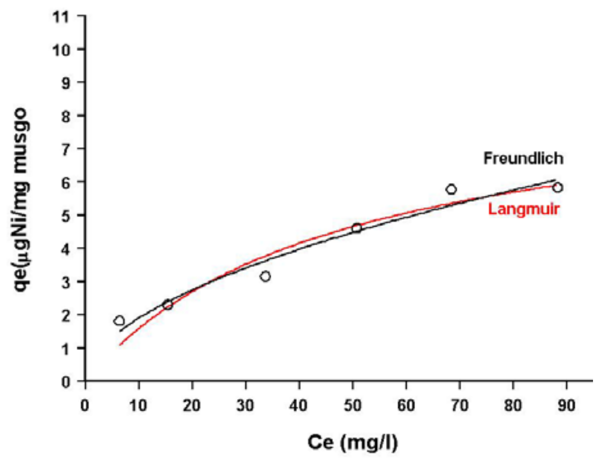

Figure 2: Langmuir and Freundlich isotherms of Ni^{2+} at 20ºC.

References

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