

METAL DIFFUSION THROUGH A COMPACTED LATERITIC CLAY

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This paper presents a study of metal diffusion through a compacted lateritic clay, with a view to contribute to the utilization of local soils in the construction of clay liners for waste disposal sites in tropical countries. Lateritic clays have been extensively used in dam, embankment and road construction in Brazil, due to availability and adequate geotechnical properties. Nevertheless, specific knowledge about geo-mechanical and chemical parameters related to pollutants migration must be acquired to employ such soils as material for clay liners. The researched soil is representative of a group of lateritic clays which occur all over the country, including highly industrialised and densely populated regions. Diffusion tests were carried out with soil specimens compacted at expected field conditions. Twelve metals controlled by regulations for potable water, and general components of domestic and industrial waste leachates were studied: aluminum, arsenic, barium, cadmium, lead, copper, chromium, iron, manganese, silver and selenium. Solutions of each metal, with concentrations of 100 mg/L and 5mg/L, and pH values of 1 and 4, were applied to the soil specimens. Concentrations in liquid samples were determined by plasma mass spectrometry (ICP-AES). Results show that diffusion may be an important mechanism of transport of metals in acidic solutions through a compacted layer of lateritic clay. However, metal concentrations in soil pore water at the end of the diffusion tests indicate that metals were retained in the soil upper layers. On the other hand, in concentrated acidic solutions, elements Al, Mn and Ba were extracted from soil minerals.