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# Mercury contamination in wastes of water treatment in Juturnaíba Lake, Rio de Janeiro, Brazil

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## Abstract

In order to treat water for human consumption, a lot of chemical products must be used, mainly when natural water has low quality, or a lot of suspended matter. The most used coagulants and flocculants for water treatment are aluminum sulfate and lime that in developing countries generate sludges that are dumped directly in the environment. In the Juturnaíba Lake two water treatment plants have disposed their sludges in two waste piles that may constitute a threat because of the aluminum compounds, but also other chemicals that may be associated with aluminum. In the present work, it was aimed to evaluate the presence of mercury in two water treatment plants waste piles of the Jurutnaíba Lake, Rio de Janeiro, Brazil. Five 30 cm sediment cores were collected in both waste piles and sliced every 3 cm. Total extractions were carried out ( $3\text{HCl} + 1\text{HNO}_3$ ) and extracts were analyzed by cold vapor atomic absorption spectrophotometry. Regardless the fact that there is no possible source of mercury contamination in the region, a large range of concentrations was observed in the waste piles (9.42 - 2,966.49 ng g<sup>-1</sup>). Although the lowest values indicate the absence of natural sources, the average concentration was quite elevated (321,5 ng g<sup>-1</sup>) and the standard deviation was also elevated (632.8 ng g<sup>-1</sup>). The sludges are basically constituted of the suspended matter of the natural water, but previous studies of this material showed no considerable contamination. The amount of chemicals added in both water treatment plants since the beginning of the operation was calculated as 30 tons of aluminum sulfate and 4.7 tons of lime. It is therefore assumed that some of the chemical products bought through the years should be contaminated with mercury, which was recorded in the waste pile of the water treatment plants.

**Keywords:** Water treatment sludge, core samples, mercury, aluminum sulfate

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