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Sediment contamination of the Sorocaba River (SP - Brazil) as indicators of pollution

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Highlights:

Check for contaminants in sediment.

Influence of urbanization on the Sorocaba River.

Environmental aspects of the presence of potentially toxic elements.

Keywords: Potassium; hydrogen; sediments.

INTRODUCTION

Surface waters play an important role in supporting the life of human and aquatic organisms, directly influencing water quality in rivers, a vital aspect for human health and the preservation of aquatic ecosystems (Dandwate, 2020). The progressive degradation of river water quality, resulting from human activities and human development, combined with the insertion of sediments, through wastewater discharge and other uses, emerges as a pressing concern (Gomez et al., 2021). This deterioration represents a significant threat to the sustainability of aquatic ecosystems, especially in tropical environments, where large amounts of sediment are inserted into water courses both naturally and anthropically. The presence of contaminated sediments, in addition to implications for water quality, can alter the aquatic ecosystem through eutrophication (Santos and Medeiros, 2023) and be harmful to human health (Habib et al., 2023). Furthermore, heavy metals associated with such sediments, due to their toxic nature, assume the role of global pollutants in the aquatic environment (Leão et al., 2021). The objective of this work was to analyze sediments obtained from the Sorocaba River, in the municipality of Sorocaba - SP. Estes sedimentos

METHODOLOGY

Potassium and hydrogen were identified in the sediment of the Sorocaba River, along eight collection points in the urban perimeter of the municipality of Sorocaba - SP, which were monitored during the year 2023. A dredger was used to collect the sediments collection, and the entire procedure for collecting, transporting and packaging the samples followed as described in the Standard Methods for the Examination of Water and Wastewater (APHA, 2005). The metals analyzed were hydrogen and potassium, in which the analyzes followed as described in Raij et al. (2001). In general, the sediments contained in the Sorocaba River are suspended in floods and dredging processes.

RESULTS AND CONCLUSIONS

When analyzing the hydrogen parameter as an indicator of pH (Figure 1), sediments with greater acidity can increase the mobility of certain heavy metals and other toxic contaminants, potentially leading to a greater risk of toxicity. Acidic sediments can negatively affect organisms living at the bottom of bodies of water, altering benthic community composition and affecting nutrient cycling. Higher concentrations indicate greater acidity. Thus, point 8, in February, and point 7 in September, showed significantly higher acidity compared to other samples. Potassium is an essential nutrient for plant growth. However, high levels of potassium in sediments can affect the ionic balance of water and, potentially, the health of aquatic ecosystems. When analyzing the behavior of this nutrient in sediments from the Sorocaba River (Figure 2), it is possible to observe that in February, potassium concentrations in the sediments are consistently higher than in September, for almost all samples, suggesting a relationship between runoff surface (rain) that contributed to inserting such a potassium load into the system. There is still a hint of spot pollution or a seasonal accumulation of potassium, as indicated by point 6 in September.

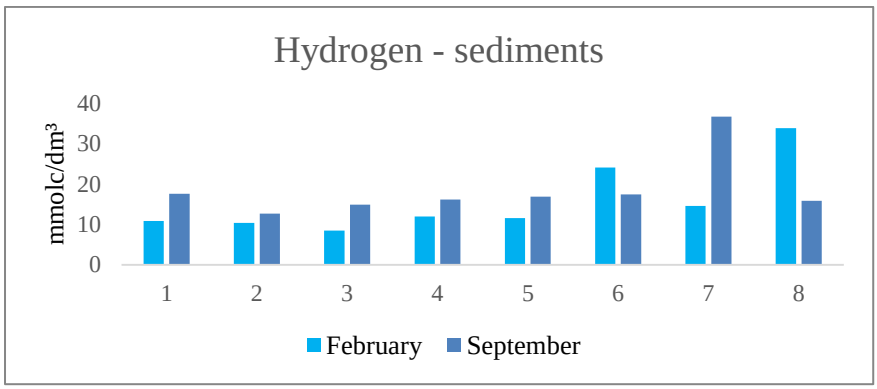

Figure 1 – Hydrogen in sediment concentration.

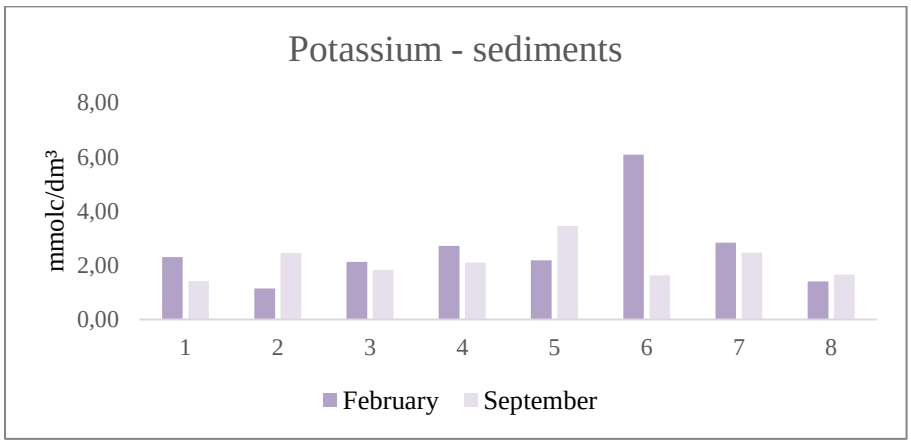

Figure 2 – Potassium in sediment concentration.

Elevated levels of hydrogen and potassium in sediments can affect the ionic balance of water and potentially the health of aquatic ecosystems. This finding highlights the critical importance of

continued and systematic studies like the present one, which not only offer an environmental diagnosis, but also direct attention to critical areas that require intervention and remediation in the Sorocaba River.

Acklowlegments

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