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Study of natural and modified zeolites for the removal of arsenic and glyphosate in a freshwater system with the presence of phytoplankton.

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Zeolites are minerals that can be used as adsorbent substrate due to their high porosity and chemical properties. With the previous knowledge of a zeolite showing relatively good performance as arsenic adsorbent [1, 2]. In the present study, we analyzed how zeolites work in the presence of arsenic and glyphosate as co-ocurring contaminants. In order to apply it on waters containing phytoplanktonic communities. To evaluate the contaminants effects on the phytoplanktonic community and the possible recovery. An experiment was conducted in culture chamber and under controlled laboratory conditions with mesocosm filtered water with phytoplankton presence. The treatments glyphosate, arsenic and the combination where randomly assigned at initial time. Negative controls were performed, mesocosms water without any contaminant substance. Grain zeolite were added in half of the experimental units per treatment in 8 g/L ratio. Treatments were conducted by triplicate. In situ measures were taken at initial and final time (24 hrs.). The zeolitic material comes from the deposit Anita from La Rioja, Argentina. Its species was determined by X-ray diffraction of a representative sample. Presenting a composition exclusively from the Clinoptilolite-Heulandite series. To improve the adsorption of the zeolitic material it was modified with iron only and sodium plus iron. The adsorption isotherms for the two modified zeolites were made for the different contaminants. Although multiple tests are still necessary, the results obtained contribute to the understanding of the interactions between contaminants and key basal elements of the trophic network, aiming to improve recovery pathways and building environmental awareness.

References

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