

Artículos científicos para publicación internacional como productos del proyecto

Artículo 1:

Iron biosorption assessment with totora (*Schoenoplectus californicus*) and reed (*Phragmites australis*) as potential non-conventional technology for polluted water of the Pallina River in Bolivia

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Abstract

Heavy metals are cause of health problems especially in vulnerable communities making it necessary to seek innovative low cost technologies through organic residue. The objective was to study the biosorption process of iron by applying a native plant called totora (*Schoenoplectus californicus*) and reed (*Phragmites australis*) as biosorbents. The place of study was Pallina River that flows its waters into the Cohana Bay (Titicaca Lake) in Bolivia. The biosorption experiments were carried out on a laboratory scale using synthetic solutions as first experiment stage, the effect of pH, biomass dosage, contact time, and particle size were studied in batch assays. The kinetics of the process with totora and reed biosorbents reveal a pseudo second order model assuming a chemisorption mechanism. Langmuir isotherm model was used with results of $Q_{\max} = 7.8 \text{ mg Fe}^{+2}$ per gram for *Schoenoplectus californicus*, while *Phragmites australis* was 2.9 mg Fe^{+2} per gram in synthetic solutions. For the column system as second experimental stage, both adsorbents were studied at $Co = 20 \text{ ppm}$ of iron. Results showed with a higher affinity of iron to *Schoenoplectus californicus* with a particle size of 0.710 mm and a feed rate of 0.8 mL/min - the minor in the study with iron removal of 95%. Finally, it was applied the biosorbent of *Schoenoplectus californicus* to samples of water from Pallina river giving a result of $Q_{\max} = 0.12 \text{ mg Fe}^{+2}$ per gram and a removal efficiency of 50%. Considering it as the best iron biosorbent compared to *Phragmites australis* $Q_{\max} = 0.076 \text{ mg Fe}^{+2}$ per gram.

Key words: Biosorption, iron, reed, totora, River Pallina

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Artículo 2:

Diseño de una Barrera Permeable y un Humedal artificial para la remoción de fosfatos, nitritos y materia orgánica en el sistema: Unidad de Tratamiento "Las Cholas"- Laguna del Jardín Japonés utilizando Limonita como biosorbente y al Jacinto (*Eichhornia crassipes*) como planta macrófita Alenka Arano Aquize ¹, Carolina Calamani Calamani ¹, Rosember Hurtado ², Paola Velásquez ², Ramiro Flores Mercado ³, Cecilia Soto Ríos ¹, Cristhian Carrasco ¹

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En elaboración