

Treatment Wetlands: An Alternative to Remove Arsenic from Water

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Abstract

Arsenic is a metalloid naturally present in many groundwater sources destined for human consumption, which entails a public health risk. In Mexico, reverse osmosis (RO) is the most popular arsenic removal process currently available. Its greatest limitation is the amount of water that the process rejects (50%). This feature and its high operation costs make it expensive for many communities, especially those in rural areas; it is therefore necessary to find alternatives for efficient arsenic removal. Constructed wetlands (CWs) have been considered as a possibility for As removal in previous studies. The objective of the present study was to determine the feasibility of using this process for the treatment of the water with high arsenic content.

The experiment was performed in three CW_s prototypes, operating in parallel with subsurface flow. Two of the units (CW1 and CW2) were planted with *Eleocharis macrostachya*. The third unit was used as a control (CW3), without plants. The support medium was lime-sand. Two influx arsenic concentrations (0.1 and 0.4mg/L) were used during this experiment.

Results indicate that CWs prototypes were able to retain an average of 90 to 95% of the arsenic present in feed water. The arsenic retention of the wetland with no plants was only 23%, which shows the importance of the plants in arsenic removal. The system as a whole (soil + plants) was able to keep As concentrations in the treated water under 0.025mg/L (maximum value allowed for drinking water in Mexico).

Key words: Arsenic; constructed wetlands; *Eleocharis macrostachya*; phytoremediation; water.