

# MOSS BASED CONSTRUCTED WETLAND SYSTEM: IS IT POSSIBLE TO USE AQUATIC MOSS (*Warnstorfia fluitans*) FOR REMOVAL OF AS IN AN ECO-FRIENDLY APPROACH?

*Arifin Sandhi*<sup>1,2</sup>

*Maria Greger*<sup>1</sup>

<sup>1)</sup> *Department of Ecology, Environmental Science, Stockholm University, SE-114  
18 Stockholm, Sweden*

<sup>2)</sup> *Department of Biology and Environmental Science, Linnaeus University, SE-  
391 82 Kalmar, Sweden*

## Abstract

The heavy metal and metalloid contaminated groundwater is considered as one of the major global environmental disasters that need sustainable solutions. One sustainable environment-friendly solution is using plant-based remediation, or phytoremediation. For contaminated water aquatic plant based phytofiltration could be applied. A Swedish aquatic moss species (*Warnstorfia fluitans*) have been discovered to accumulate high levels of As (arsenic) from the water. In a number of areas in Sweden, the As content in the groundwater is high due to mining activities and geochemical conditions. Our hypothesis was that since this moss species could accumulate As from contaminated water it would be possible to apply in constructed wetland system for removal of As from water. The aim of this study was to investigate the removal of As from the outlet water by using *W. fluitans* in constructed mesocosm type wetland systems with various water flow speeds under greenhouse conditions. Besides these, As content in the vegetables (lettuce, *Latuca sativa*) grown in this outlet water was also analysed. The total As concentration was analysed with hydride generated atomic absorption spectrophotometry (HG-AAS). Results showed that *W. fluitans* could reduce the As concentration in the water with 36 and 56% from initial As concentration at high (5 mL/min) and low (1.5 mL/min) water flow rate, respectively. The As concentration in the vegetables was also lower when low flow outlet has been applied as irrigation water. In conclusion, the result fits our hypothesis that aquatic moss could be used in the constructed wetland system to reduce As content in irrigation water and by that also in the irrigated vegetables.

**Keywords:** Arsenic, Accumulation, Irrigation, Phytofiltration, Phytoremediation, Vegetables, Wetland