Pumice Soil: A Potential Wetland Substrate for Treatment Of Domestic Wastewater

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Abstract
Laboratory and fieldwork studies were carried out to evaluate the potential of pumice soil for use as a wetland substrate in wastewater treatment. The composition of pumice soil was analysed by x-ray fluorescence (XRF) and x-ray diffraction (XRD) techniques. Adsorption kinetic studies were carried out in a semi-batch recycle system. Fieldwork tests were carried out on Subsurface Flow Constructed Wetland (SSFCW) cells planted with *Phragmites mauritianus* and *Vetiveria zizanioides*. The results have shown that pumice soil composition contains among other elements Al, Ca, Fe and Mg, which are positive indicators for phosphorus adsorption. The main minerals observed by XRD were augite, hematite, and sodium titanium silicate. Phosphorus adsorption kinetics have shown that phosphorus is adsorbed on pumice soil following first order kinetics and the adsorption was highly influenced by mass transfer. Approximately 3% of the phosphorus was removed by plant uptake.