

The Use of Short Rotation Willows and Poplars for the Recycling of Saline Waste Waters.

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The production of high-salinity waste waters by landfills and other waste sites causes environmental concerns. This waste water often contains high concentrations of sodium and chloride, which may end up in local ground and surface waters. Vegetation filter systems comprised of willows and poplars can be used for the recycling of saline waste water. These vegetation filters can lock waste water within the bounds of the landfill system and prevent it from entering the surrounding environment. Waste waters often contain imbalanced nutrient concentrations resulting in plant stress after irrigation. For saline waste water recycling projects to succeed, it is important that plant stress is kept to a minimum, and can be measured at an early stage. While many plant stress measurements are time consuming or costly, electrical conductivity (Ec) measurements are not and as such have great potential to be widely adopted by scientists and site managers. Nevertheless, Ec is a salinity measure that does not provide information about the health status of the plant, as such research is required to correlate Ec values with plant stress measurements such as above- and below-ground growth, stomatal conductance and leaf length. Other factors, such as salinity of waste water when applied as well as duration of application, will also influence plant stress and must be addressed as well. If managed properly, the use of vegetation filter systems may decrease cost substantially compared to conventional treatments and they have value added benefits, including increased biodiversity on the landfill site, the production of biomass as a feedstock for bioenergy and biofuel production and carbon sequestration. In this study four case studies in the USA and Sweden are evaluated to highlight the potentials of willow and poplar vegetation filters to recycle high-salinity waste waters.

Keywords: Electrical conductivity, waste sites, poplar, phytoremediation, phytotechnologies, willow.

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