

REMEDIATION OF CONTAMINATED STORMWATER THROUGH PHYTOEXTRACTION AND FILTER TECHNIQUES

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Abstract

Stormwater from roads is often contaminated not only with metals but also with organic pollutants and microplastics. This water is usually released without further purification and ends up in streams and finally the sea, thus causing pollution. In this PhD project, we study if rain gardens using selected plants and different filter materials can be used to purify stormwater collected from the highly trafficked highway E6 in Gothenburg, Sweden. Additionally, the opportunity to recover metals that are enriched in the plants is to be evaluated.

An initial literature review indicated that a combination of thrift, common rush, red fescue, and sea buckthorn have the potential to extract the complex mixture of pollutants that are present in the stormwater. The filters are built up in different layers using soil, gravel, and compost but also peat, biochar, and bottom ash from waste incineration are added in various combinations to investigate their ability to adsorb the pollutants when watering the filters with the stormwater. Thereafter, the plants can expectantly extract and/or degrade the pollutants. The efficiencies of the filters containing peat, biochar, or ash are compared with a control filter only containing soil, gravel, and compost.

Our results show that all plants survived the first cultivation season and no significant variations in the growth between the different filters could be seen. The particulate matter is lower in the stormwater after the water has passed the filters compared to the original water, indicating some purification. Chemical analyses also indicated purer stormwater after passing through the filters but with variations depending on filter type as well as on the chemical compound itself.

Keywords: stormwater, phyto extraction, filter beds