

Phytoscreening for Chlorinated Ethenes to evaluate outflowing groundwater pollution to surface water

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ABSTRACT

With the water framework directive presented by EU in 2000, increased focus on pollution of ground- and surface water was introduced. Followed by a need for cheap and useful methods to investigate and screen water pollution, to get a better knowledge of the extent of a pollution. Phytoscreening is a relatively new method to evaluate contamination on a site, using that trees take up contaminants with water when transpiring. Tree cores can thus provide a picture of the underlying water pollution. Sampling tree cores is a cheaper and faster method than taking groundwater samples.

Previous studies using phytoscreening for chlorinated ethenes have mainly focused on tetrachloroethylene (PCE) and trichloroethylene (TCE). A main aim in this project is to improve the method to evaluate on the degradation products, which are as hazardous as PCE and TCE. The location for the fieldwork is Grindsted Å in Southern Jutland, and the interesting aspect with this specific site is groundwater-surface water interaction. The method extension presented can however be used as a generalized method.

Previous studies have examined the concentration distribution with height along and around the trunk in a given height. Also seasonal variation of concentrations in tree cores has been examined. These things are included in this project as well, but with additional focus on the hazardous degradation products. The experimental outline is illustrated in Figure 1, along with the generalizable knowledge provided by this project.

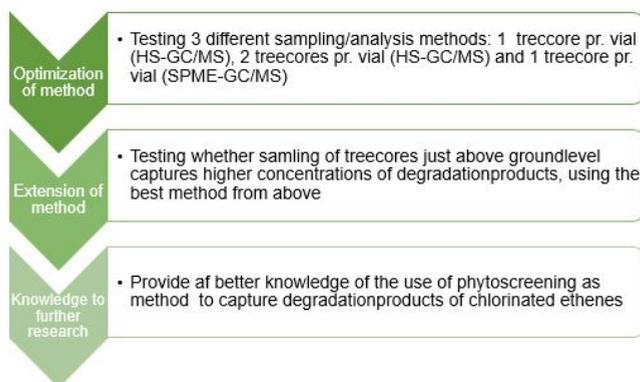


Figure 1: Process to improve phytoscreening as a method to screen for degradation products.

A significant result is that additional wood mass in a sample can lower the detection limit of the degradation product 1,2-dichloroethene. It is thus recommended to use this extension in future phytoscreening for this degradation product. Additional results are presented at GRØNDYST.

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