Phytoscreening and phytoextraction of heavy metals at Danish polluted sites using willow and poplar trees - DTU Orbit (17/10/2019)

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The main purpose of this study was to determine typical concentrations of heavy metals (HM) in wood from willows and poplars, in order to test the feasibility of phytoscreening and phytoextraction of HM. Samples were taken from one strongly, one moderately, and one slightly polluted site and from three reference sites. Wood from both tree species had similar background concentrations at 0.5 mg kg⁻¹ for cadmium (Cd), 1.6 mg kg⁻¹ for copper (Cu), 0.3 mg kg⁻¹ for nickel (Ni), and 25 mg kg⁻¹ for zinc (Zn). Concentrations of chromium (Cr) and lead (Pb) were below or close to detection limit. Concentrations in wood from the highly polluted site were significantly elevated, compared to references, in particular for willow. The conclusion from these results is that tree coring could be used successfully to identify strongly heavy metal-polluted soil for Cd, Cu, Ni, Zn, and that willow trees were superior to poplars, except when screening for Ni. Phytoextraction of HMs was quantified from measured concentration in wood at the most polluted site. Extraction efficiencies were best for willows and Cd, but below 0.5 % over 10 years, and below 1‰ in 10 years for all other HMs.

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