

Redistribution of Cd and Zn in the upper soil layer after 10 years of poplar growth on dredged sediment

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Abstract

Biota can play a significant role in metal cycling. We determined the metal content in soil and biomass compartments in a 10-year-old poplar plantation on a disposal site for dredged material. Because of the strong texture gradient, two plots with different soil texture were sampled. In both plots, the poplars took up large amounts of Cd and Zn (8.1 mg Cd kg⁻¹ DM and 475 mg Zn kg⁻¹ DM in the fresh leaves). When the estimated concentrations of the decomposed litter were higher than the soil concentrations, the concentrations in the upper soil layer increased due to redistribution of the metals via litterfall. This occurred for Cd and Zn on the least polluted part of the site and the increase even caused the Cd concentrations for this horizon to exceed the legislative limits. Risk assessment should not only account for the concentrations in the soil, but also for the amounts of metals in the biota and the redistribution caused by the biota.

Capsule: As a result of the high uptake of Cd and Zn in poplar leaves, the concentration in the upper soil layer might increase, depending on the soil characteristics.

Keywords: Populus; trace metals; redistribution; dredged sediment; uptake