

Contamination of Soils Adjacent to CCA-Treated Wood Structures with Chromium, Copper, and Arsenic

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ABSTRACT

A wood preservative, chromated copper arsenate (CCA) has been widely used in Korea since the early 1980s to protect wood products from microbial decay and insect attack. However, recent research results have indicated that Cr, Cu, and As leach from the CCA-treated wood surface, thus elevating the concentrations of these constituents in soils adjacent to the structures. This study has been conducted to determine the distributions of Cr, Cu, and As in soils near or underneath CCA-treated wood structures. A natural park in Gangwon Do was visited and a chemical staining agent, Chrome Azurol S was sprayed on the surface of the wood structure before soil sampling to confirm that the structure has been treated with CCA. Soil samples were digested in a microwave digester using the USEPA Method 3051a and the resulting solution was analyzed for Cr, Cu, and As using an ICP-MS. Overall results showed that the concentrations of As in soils were remarkably elevated compared to Cr and Cu. The median As concentration in soil samples collected near the deck was significantly higher than that in the background soil samples. A lateral concentration gradient was observed for As down the slope but not for Cr and Cu. The decline of the As concentration was observed with depth for As down to approximately 25 cm. These results indicated that CCA components (especially As) are released into the environment during outdoor uses and that appropriate measures should be taken to minimize the environmental impact of CCA-treated wood uses.

Key words: CCA, Wood preservative, Soil, Chromium, Copper, Arsenic