

Title: The effects of copper oxy-chloride waste contamination on selected soil biochemical properties at disposal site. *Science of the Total Environment*

Author: Masaka J, Muunganirwa

Abstract

A study was carried out at a sanitary waste disposal site for Kutsaga Tobacco Research Station, Zimbabwe, which uses large amounts of copper oxy chloride for sterilization of recycled float trays in flooded bench tobacco seedling production systems. Soil samples randomly collected from six stream bank zones (bands up the valley slope) varying in their distance ranges from the centre of both the wastewater-free and wastewater-affected paths [0–5 m (B1); 6–10 m (B2); 11–15 m (B3); 16–20 m (B4); 21–25 m (B5) and 26–30 m (B6)] in two sample depths (0–15; 15–30 cm) were analysed for metal copper, organic matter contents, and soil pH and subjected to agarized incubation for microbial counts. Results suggest that the repeated disposals of copper oxy chloride waste from tobacco float tray sanitation sinks into a creek amplify metal copper loads in the soil by 500 fold. The greatest concentrations of copper in both the topsoil and upper subsoil were recorded in the B3, B4 and B5 stream bank zones of the wastewater path. The concentration of copper was significantly lower in the middle of the waste-affected creek than that in the stream bank zones. This trend in the copper concentration coincided with the lowest acidity of the soil. Overloading the soil with copper, surprisingly, enhances the content of soil organic matter. The repeated release of copper oxy chloride waste into a stream causes an accelerated build-up of metal copper and soil acidity in the stream bank on-site while contamination is translocated to either underground water reserve or surface stream water flow in the middle of the wastewater path.