Putting the Brakes on Pollution: Temporal Efficacy of P. ostreatus in the Mycofiltration of Copper, Lead, and Zinc

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Minnesota’s 4 million drivers release heavy metals into the environment through their vehicles’ emissions. Copper, Lead, and Zinc account for 90% of vehicle-derived heavy metal pollution, which is carried by runoff into waterways, adversely impacting aquatic life. Published studies report mycofilters can decrease concentrations of heavy metals in solution, but no single mycelium-based water filter has been engineered to remove Lead, Copper, and Zinc. Inspired by my results using the mycelium of a fungus found in Minnesota, Pleurotus ostreatus, to treat pollutants in residential runoff, this project tests if P. ostreatus can reduce the concentration of aqueous Copper, Lead, and Zinc. Eight bins were filled with solutions of tap water and either Copper Gluconate or Zinc Glycinate. Burlap bags containing living P. ostreatus mycelium were placed in each solution except for the controls. Every 3 days, the concentration of Copper, Lead, and Zinc in all eight bins was measured using water test strips. Results showed a 60% reduction in the concentration of Lead in the Copper Gluconate solutions, but the data for the other metals was inconclusive, so a second phase of testing was conducted for Copper and Zinc using titration kits for more sensitive readings. After 5 days, concentrations of Zinc were reduced by an average of 85%. After 23 days, concentrations of Copper were reduced by an average of 66.66%. The efficacy of P. ostreatus in heavy metal reduction supports their use as a low-cost, sustainable solution to protect fragile ecosystems from the impact of human life.

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