HIGH SCHOOL

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Presentation Title: The Citrus Solution: Phase II Research Focus: Utilizing citrus pectin and citrus peels as filtrates for heavy metal pollutants found in a Superfund Site and the effects on Daphnia magna before and after filtration.

School: Grove High School

Presentation Type: Poster Presentation

Abstract: The purpose of this experiment was to test the effectiveness of composite filters made from citrus peels and citrus pectin along with charcoal and sand on removing heavy metal pollutants from the waters of Tar Creek. A toxicity test was also done before and after filtration using Daphnia magna. Charcoal and sand were used as filtrates to decrease the TDS and neutralize the pH of the water after filtration. Daphnia magna were used as toxicity test before and after filtration. It was hypothesized that the composite filters (citrus + sand +charcoal) will decrease the heavy metal concentration, neutralize the pH, and decrease the TDS after filtration. It was also hypothesized that a higher percentage of Daphnia magna will survive in the filtered water as compared to the unfiltered water. Water samples were collected from four different sites at Tar Creek. Each water sample went through four different citrus filters plus one control (sand + charcoal). All the citrus filters decreased the heavy metal concentration after filtration. All of the filters neutralized the pH. The citrus peel filters for Site 4 were the only filters to have a pH of 7 after filtration. Only 25% of the citrus filters decreased the TDS after filtration, while 50% of the control filters decreased the TDS after filtration. A higher percentage of Daphnia magna survived after filtration. The orange peel had the overall highest survival of Daphnia after filtration. The correlation observed before and after filtration was cadmium was most toxic to Daphnia magna.