# Phytoremediation Potential of Yucca elata, Carya illinoinensis, and Opuntia ficus-indica for Arsenic and Pollutant Removal in Drinking Water: A Sustainable and Affordable Approach

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In Dona Ana County, pollutants such as arsenic and chlorine, are often found in concentrations higher than what is considered safe in drinking water and bring upon long-term health consequences resulting from exposure. This poses a threat to vulnerable populations such as the homeless and those without access to bottled water or filtration systems, which are prohibitively expensive. To address this community need, we sought to design an accessible, affordable, and easily reproducible water filter to lower the concentrations of these pollutants. Three different filter types were created: a control filter with rusted nails, without rusted nails, and native plant-treated filters which include Yucca elata, Carya illinoinensis, and Opuntia ficus-indica. We filtered distilled water and tap water samples from Anthony, Chaparral, Santa Teresa, and a ditch commonly used by immigrants containing water from agricultural runoff and compared pollutant levels to those prior to filtration. Filters treated with Opuntia ficus-indica showed 59% decrease in QUAT (quaternary ammonium compounds) and 50.37% decrease in arsenic. Similarly, the C. illinoinensis based filters showed 73.37% decrease in QUAT, and 51.11% decrease in arsenic. Filters treated with Y. elata showed 42.16% decrease in QUAT, and 61.47% decrease in arsenic. All plant treated filters showed 100% decreases in chlorine. Addressing water contamination is crucial for safeguarding public health, especially in regions like Dona Ana County where pollutants pose significant risks. Our results demonstrate substantial potential for decreasing pollution levels, offering an affordable and accessible solution for communities facing water quality challenges.

**Awards Won:**