

## **Graywater Application for Household Irrigation as a Viable Means to Meet Water Demand in Arid Regions**

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**Abstract.** As communities throughout the United State and abroad are becoming interested in innovative approaches to water resource sustainability, household graywater reuse for residential landscape irrigation is gaining popularity. In a typical household, graywater (near 28 gallons per person per day) is nearly 50% of the total wastewater generated. If used for irrigation of a typical residential landscape, it could supply about 30% of the demand, and with increasing emphasis on xeriscape in the semi-arid West, it has the potential to supply 100% of the irrigation demand in some areas. Separation of graywater from blackwater offers many advantages because blackwater is more contaminated with nutrients and pathogenic bacteria than graywater. Minimal treatment of graywater is required for reuse applications. Despite the water conservation benefits of utilizing graywater for household landscape irrigation, graywater reuse has not become widespread due to lack of knowledge and regulations for safe reuse. Current knowledge on graywater composition and fate of graywater contaminants in the environment will be provided, with a focus on surfactants. The impacts of graywater chemical constituents and pathogens on soil quality, groundwater quality, and plant health have not been adequately assessed. However, research indicates that the removal of graywater chemical constituents may be increased in plant based systems when compared to classic biological wastewater treatment operations. A funded study will be described that has been designed to examine the long term effects of graywater application for household irrigation in four states. Quantitative data collected on the fate of graywater constituents and effects to plant health will provide a factual based framework for decision making regarding safe reuse of graywater for residential landscape irrigation.