

Using treated graywater for irrigation is better for arid environments

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Credit: Mick Lissone/public domain

Reusing graywater in dry areas may require treatment for more efficient

irrigation in arid, sandy soils, according to a new study published in *Chemosphere* by researchers at the Ben-Gurion University of the Negev (BGU) Zuckerberg Institute for Water Research. Graywater includes any wastewater generated in households or office buildings except from the toilet.

Graywater use has been proven safe for agriculture irrigation. "Most of the scientific research and legislation efforts have focused on graywater's health risks, while less attention has been given to its environmental outcomes, including its effect on soil properties," says Prof. Amit Gross, head of the Department of Environmental Hydrology and Microbiology in the Zuckerberg Institute.

Prof. Gross and his team found that graywater does not infiltrate through the soil as easily as fresh water and is slower to reach plant roots. It can also cause water runoff leading to erosion.

"This condition, called 'graywater-induced hydrophobicity,' is likely temporary and disappears quickly following rainwater or freshwater irrigation events," says Prof. Gross. "However, it is a more significant concern in [arid lands](#) with negligible rainfall as compared with wetter regions."

According to the researchers, treating the graywater using biofiltration to degrade the hydrophobic organic compounds will eliminate the problem.

In the study, the researchers examined how graywater induces soil hydrophobicity, as well as its degree and persistence. They created three graywater models using raw, treated and highly treated graywater to irrigate fine-grained sand compared to a freshwater control. The result was that only the raw graywater irrigated [soil](#) showed hydrophobicity, which could be mitigated with both moderately and highly treated solutions.

"Onsite reuse of graywater for irrigation is perceived as a low risk and economical way of reducing freshwater use and, as such, it is gaining in popularity in both developing and developed countries," says Prof. Gross. "As many government authorities are establishing new guidelines, the results of this study reinforce the recommendations to treat graywater before reusing for [irrigation](#), particularly in arid regions."

More information: Adi Maimon et al, Greywater-induced soil hydrophobicity, *Chemosphere* (2017). [DOI: 10.1016/j.chemosphere.2017.06.080](#)

Provided by American Associates, Ben-Gurion University of the Negev

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