

## Reuse feasibility of pre-treated grey water and domestic wastewater with a compact household reverse osmosis system

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### ABSTRACT

Many countries in the Mediterranean basin are facing water shortage issues. Since water is becoming a rare resource, grey water and domestic wastewater reuse arises as a sustainable solution to reduce the overall water demand. In this study, a compact household reverse osmosis unit was used in order to determine the feasibility of pre-treated grey water and domestic wastewater reuse. The preliminary studies revealed that the compact system used was able to treat the wastewaters studied with quite high organic matter and nutrient removal efficiencies. For pre-treated grey water, the COD and BOD removal rates were around 80%. For pre-treated domestic wastewater, the organic matter removal rates were higher. In addition, soluble nutrients, such as nitrate and phosphate were also studied. The conductivity of permeate was reduced to 15  $\mu\text{S}/\text{cm}$  and 55  $\mu\text{S}/\text{cm}$  for grey water and domestic wastewater, respectively, within 15 min. The permeate obtained was free of suspended solids and had an excellent physical appearance. The overall results indicated that the product can be used for gardening, fire hydrants, field irrigation, or alternatively for toilet flushing after disinfection.

*Keywords:* Reverse osmosis; Grey water; Domestic wastewater; Reuse

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