Desalination and Water Treatment
www.deswater.com

24 (2010) 226–235
December

1944-3994/1944-3986
doi: 10.5004/dwt.2010.1542

Impact of system factors on the water saving efficiency of household grey water recycling

S. Liu[a*], D. Butler[b], F. Memon[b], C. Makropoulos[c], Q. Wang[a]

[a]*Department of Environmental Science & Engineering, Tsinghua University, Beijing, 100084, China*
Tel/Fax +861062787964; email: shumingliu@tsinghua.edu.cn
[b]*Centre for Water Systems, School of Engineering, Computer Science and Mathematics, University of Exeter, Exeter EX4 4QF, UK*
[c]*Department of Water Resources, Hydraulic and Maritime Engineering, National Technical University of Athens, 5 Iroon Plytechniou Str, Athens, Greece*

Received 17 September 2009; accepted 24 May 2010

ABSTRACT

A general concern when considering the implementation of domestic grey water recycling is to understand the impacts of system factors on water saving efficiency. Key factors include household occupancy, storage volumes, treatment capacity and operating mode. Earlier investigations of the impacts of these key factors were based on a one-tank system only. This paper presents the results of an investigation into the effect of these factors on the performance of a more realistic 'two tank' system with treatment using an object based household water cycle model. A Monte-Carlo simulation technique was adopted to generate domestic water appliance usage data which allows long-term prediction of the system's performance to be made. Model results reveal the constraints of treatment capacity, storage tank sizes and operating mode on percentage of potable water saved. A treatment capacity threshold has been discovered at which water saving efficiency is maximised for a given pair of grey and treated grey water tank. Results from the analysis suggest that the previous one-tank model significantly underestimates the tank volumes required for a given target water saving efficiency.

Keywords: Grey water recycling; Household water cycle; Sustainability; Water saving efficiency

*Corresponding author