

Performance comparison of three compact systems in grey-water treatment

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Wastewater recycling has been and continues to be practiced all over the world for a variety of reasons including; to increase water availability, combat water shortages and drought, and support environmental and public health protection (USEPA, 2004). Nowadays, one of the most interesting issues for wastewater recycling is the on-site treatment and reuse of grey water. Grey water is defined as wastewater originating from bathtubs, showers, hand basins, washing machines, dishwashers and kitchen sinks (Eriksson et al., 2009). The advantage of recycling greywater is that it is a large source with a low organic content. To illustrate, greywater represents up to 70% of total consumed water but contains only 30% of the organic fraction and from 9 to 20% of the nutrients. Moreover, in an individual household, it has been established that greywater could support the amount of water needed for toilet flushing and outdoor uses such as car washing and garden watering. Different treatment technologies could be implemented depending on required reuse applications.

During this study the efficiency of a three different compact systems to treat grey water was examined. The commercial systems used in this study were a) Advantex, Orenco, b) Biorock and c) Bio-kinetic (Norwego). Artificial grey water was used in the experiment to assure consistency and repeatability. The composition was similar to the formulation reported by Travis et al. (2010).

Influent and effluent were sampled regularly and analyzed for pH and Electrical Conductivity (EC) according to APHA (2005). Chemical oxygen demand (COD), Total Nitrogen (TN), Total Phosphorus (TP) and Anionic Surfactants concentrations were determined spectrophotometrically by use of standard test kits (Hach-Lange). Total coliforms and *Escherichia Coli* were determined using the IDEXX Quanti-Tray[®] enumeration procedure with Colilert-18[®] reagent (APHA, 2005). Sealed trays were incubated for 18 h at 37 °C, after which the MPN of total coliforms and *E. Coli* were determined. Statistical analyses were done with MicroCal Origin 7.0 (OriginLab). The data were analyzed through one-way analysis of variance (ANOVA) to compare the effect of systems on grey water quality characteristics.

Results shown that high quality reclaimed water was obtained with Advantex when treating grey water. Biological treatment achieved COD removal of about 80% and surfactants removal of about 95%. On the other hand, pathogen risk was not eliminated, indicated that a chlorination process or a UV system should be added.

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