Approved Cyclic Treatment System of Grey Water

Authors : Hanen Filali, Mohamed Hachicha

Abstract : Treated grey water (TGW) reuse emerged as an alternative resource to meet the growing demand for water for agricultural irrigation and reduce the pressure on limited existing fresh water. However, this reuse needs adapted management in order to avoid environmental and health risks. In this work, the treatment of grey water (GW) was studied from a cyclic treatment system that we designed and implemented in the greenhouse of National Research Institute for Rural Engineering, Water and Forests (INRGREF). This system is composed of three levels for treatment (TGW 1, TGW 2, and TGW 3). Each level includes a sandy soil box. The use of grey water was moderated depending on the chemical and microbiological quality obtained. Different samples of soils and treated grey water were performed and analyzed for 14 irrigation cycles. TGW through cyclic treatment showed physicochemical parameters like pH, electrical conductivity (EC), chemical oxygen demand (COD), biological oxygen demand (BOD5) in the range of 7,35-7,91, 1,69-5,03 dS/m, 102,6-54,2 mgO2/l, and 31,33-15,74 mgO2/l, respectively. Results showed a reduction in the pollutant load with a significant effect on the three treatment levels; however, an increase in salinity was observed during all irrigation cycles. Microbiological results showed good grey water treatment with low health risk on irrigated soil. Treated water quality was below permissible Tunisian standards (NT106.03), and treated water is suitable for non-potable options.

Keywords : treated grey water, irrigation, cyclic treatment, soils, physico-chemical parameters, microbiological parameters