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Design, development and performance evaluation of small scale grey water treatment plant

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■ **ABSTRACT :** The design, development of grey water system was done by using locally available filtration and adsorbent media and its performance was evaluated. The media size and depth decided by experiment were sand (0.42 mm), grit (6-8 mm), gravel (15-25 mm), brick pieces (25-30 mm) and charcoal (12-16 mm) (Zainudin and Abundi, 2011) having layer thickness of 450 mm, 450 mm, 150 mm, 300 mm and 30 mm, respectively. The hydraulic retention time (HRT) of designed filter was 1.33 hours at hydraulic loading rate of (HLR) of 3.77 m day^{-1}. The filtration area of one square meter would have capacity of 3770 $lit.day^{-1}$. At steady state head of 1.5 m, the overall performance of the combined system was 82.70 per cent BOD removal, 85.10 per cent COD removal, 78.78 per cent oil and grease removal, 69.23 per cent residual sodium carbonate removal (RSC), 21.33 per cent reduction in sodium adsorption ratio (SAR) and 31.19 per cent TDS removal, respectively, were noted. The pH of the entire system remained stable (7.32 ± 0.5) throughout the experiment. The calcium, bicarbonate, potassium, nitrogen, magnesium, sodium, were also reduced after filtration by 20, 44.82, 48.76, 5.55, 33.33, 31.42 per cent, respectively. Generally, the final effluent was found to be suitable for a range of uses such as toilet flushing, irrigation and fire protection.

■ **KEY WORDS :** Grey water, Grey water filter, Hydraulic retention time, Filtration area

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