



Assessment of household greywater discharge from village houses using Streeter–Phelps model in stream

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ABSTRACT

The present study aimed to assess the effect of greywater discharged into the drainage system on DO concentrations using the Streeter–Phelps model. The result revealed that biochemical oxygen demand (BOD_5) was 172 mg/L, chemical oxygen demand (COD) was 400 mg/L and pH was 4.5. The highest BOD_5 loading rate for daily flow rate was observed at Drain (III) with the values of 63 kg/d and 369 m³/d. These drains have a high frequency of household activities and number of occupants leads to high amount of pollutant loading rate produced from greywater drainage. Moreover, the assessment of greywater pollution modelling was measured using Streeter–Phelps model. The DO deficit (D_t) and time critical (t_c) were 3.54 and 3.80 mg/L and 0.007/d, respectively, as recorded at the distance of 10 m upstream (Station₁) of the discharge point. The findings show that the degradable organic matter and travel time as a critical oxygen deficit point occurred at 10 m upstream as the kinetics of BOD reaction. Hence, the greywater discharge with mixing stream showed no risk of pollution occurrence near the river flow in this study.

Keywords: Greywater; Deoxygenation; Reaeration; Self-purification; Stream; Streeter–Phelps model

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