

IMPACT OF DETERGENTS ON CHEMICAL, BIOLOGICAL AND PHYSICAL PROPERTIES OF ALFISOL IN ANURADAPURA, SRI LANKA

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Disposal of untreated laundry greywater into natural environment is a common practice in developing countries. Laundry greywater contains significant amount of detergents that can alter the soil properties. The objective of this study was to evaluate the characteristics of laundry grey water and evaluate its impacts on soil physical, chemical and biological parameters. Fifteen soil samples were collected from laundry grey water disposal sites of selected households in *Puliyankulama, Anuradapura*. Simultaneously, a reference soil sample was obtained from nearby locations of each sampling point which is not influenced by grey water. Soil samples were taken from 0-30 cm and 30-60 cm depths. Similarly, undisturbed soil core samples were collected from 0-30 cm depth. Grey water samples collected from each household were analyzed for TDS, pH, EC, NO_3^- -N, PO_4^{3-} -P, Heavy Metals (As, Pb, Cd) and cations (Na, Mg, Ca, and K). Soil samples were analyzed for pH, EC, total N, PO_4^{3-} -P, Cd, As, Pb, Cation Exchange Capacity (CEC), Exchangeable Na, Mg, Ca, K, bulk density, biomass carbon and CO_2 evolution. Soil chemical, physical and biological properties of greywater contaminated sites and corresponding reference samples were compared by paired t test. Results indicate that, significantly ($p < 0.05$) lower biomass carbon and CO_2 evolution were observed in top soil samples contaminated with laundry greywater compared to reference samples and significantly ($p < 0.05$) higher pH, EC, Na, total N and available P were observed both in top and sub soil samples compared to reference samples. Moreover, CEC and Mg of topsoil in the samples were significantly ($p < 0.05$) higher compared to reference samples. However, there were no significant ($p > 0.05$) difference in bulk density, Mg in subsoil, K, Ca and heavy metals in top soil. This concludes that impact of detergents on soil chemical and biological parameters are significant compared to the physical parameters.

Keywords: Detergents, Laundry grey water, Soil parameters