

# Biosand Filtration as a Green Approach to Septic Tank Effluent Management in a Tertiary Institution in Ghana

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## Abstract

Sewage and household effluents at some institutions in Ghana have been discharged into the ocean for years. This degrades environmental media and is detrimental to ecological systems. The Three Local Plastic Barrel-Biosand Filter (TLPB-BSF) is an innovation on the slow sand filter that has been used to prevent discharge of raw sewage into the environment. The study aimed to test the performance of a modified BSF on sewage tank effluent and assess suitability of the filtrate for non-drinking purposes at a tertiary institution renamed KOTU to maintain confidentiality. **Method:** A filtration system made of three modified interconnected BSF was constructed on-site, with last filter connected to a storage tank. The modification was the provision of an additional media (charcoal) in the second barrel. Two sample collections were made from the system one week apart. The pre-filtrate samples were raw septic tank effluent (STE) and the samples obtained after running system was Biosand filter effluent (BSFE). Samples were analysed for physical and microbiological parameters at designated laboratories. Measured values of the parameters in pre-filtrate and filtrate samples were compared with EPA (Ghana) reference values. The removal efficiency of a parameter was computed as the difference between pre-filtrate and filtrate values expressed as a percentage of the pre-filtrate value. **Results:** Most of the effluent parameters from the BSF were within the EPA standards, while others were unacceptable. Removal efficiencies obtained for the parameters were: Nitrogen (83.3%), Phosphorus (89.5%), Total Suspended Solids (71.3%), Total Dissolved Solids (66.2%), Total coliform (99.9%), Faecal coliform (99.7%) and *E. coli* (97.6%). **Conclusion:** BSF is effective for upgrading physical and microbial quality of sewage at household and institutional level, prior to discharge in the environment. It produced a filtrate that met most of EPA standards for irrigation of non-edible crops.