SLOW SAND FILTRATION FOR SECONDARY SEWAGE EFFLUENT STABILIZATION

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Thematic area: Environmental conservation

ABSTRACT

Slow Sand Filtration (SSF) is a simple technique used for pathogen and particle removal in drinking water purification. It may be adapted for wastewater stabilization but only a few studies have been done on such application thus the need for scientific research on their effectiveness. The primary aim of this study was to evaluate the effectiveness of SSFs for improvement of secondary sewage effluent quality as a potential process for stabilization before disposal into waterways. This was achieved by comparing effluent quality data from filtered and unfiltered effluent of sewage water collected from University of Eldoret sewage treatment plant. The SSFs were assembled using plastic pipes and samples of filtered and unfiltered effluents were sampled and analyzed on a monthly basis for 6 consecutive months. Removal efficiency was determined in terms of percent removal of total coliforms (TC), faecal coliforms (FC), faecal *Streptococcus* (FS), total bacterial counts (TBC), biochemical oxygen demand (BOD_5), dissolved oxygen (DO), conductivity, pH, total suspended solids (TSS) and nutrients. ANOVA was used to evaluate performance of the assembled SSFs and Duncan's Multiple Range Test in separation of means. Results of this study indicated that there were significant differences in numbers of bacteria and levels of physicochemical parameters in filtered and unfiltered effluents. The average removal efficiency of bacteria was approximately 96%, 97%, 82% and 89% for FS, TC, FC and TBC respectively. The highest reduction for the physicochemical parameters was observed for BOD_5 followed by phosphates (92.77% and 90.31% respectively) while the least reduction was observed for pH (7.41%). Negative percent reduction (-19.93%) was observed for DO implying that DO increased in effluents upon filtration. From this study, it was concluded that SSFs are efficient in improvement of secondary effluent quality and can be successfully employed for conservation of the environment.

Keywords: Slow sand filtration, wastewater stabilization, bacteria, physicochemical parameters, environmental conservation