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Biochar embedded septic tank system for domestic wastewater treatment

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This study was aimed at developing a rational approach to septic tank design in order to reduce health risks associated with improperly treated effluent especially in remote areas in Sri Lanka. To this end, several research tools including questionnaires, experimentation, and literature studies were done. Questionnaires were used to conduct a preliminary study with a view to ascertaining people's perception with regard to septic tank design, use, and maintenance. Sustainable sanitation is a very large factor that affects the country's development as it relates to hygiene. Public health also has a large impact on the surrounding environment, economy and even social life. Information oninstallment ofseptic tanks in nearby areas were collected through the site visits. If wastewater flowing into the septic tank does not receive adequate treatment, it is simply passed on to the ground unnoticed, thus wreaking havoc on public health. Researchers have shown that most septic tanks especially in developing countries do not even attain an average performance throughout their lifetime. Sri Lanka has high national scope for access to enhanced water supply and sanitation, at 84% and 86% percent respectively. However, these figures veil extensive aberrations and a requirement for altered arrangements in rural areas.

The subjected septic tanks were designed for a family with five members. The design was done through the regulations for the septic tank in Sri Lanka SLSL745. The National Water Supply and Drainage Board of Sri Lanka (NWSDB) is already laying septic tanks for families that do not have proper sanitary systems, through the World Bank fund. The design parameters that were selected for this research was the same as the NWSDB project mentioned above. Among those tanks 4 accessible tanks were selected for the biochar installations. Biochar was inserted into the tanks with the percentage of 10%, 25%, 25%, 50% respectively and tanks were sealed. Within a certain periods of time samples were taken and tested in laboratory. BOD, COD, TP, TN, EC parameters were taken of each and every tank respective to the time period. Graphs were plotted with the data gathered. The results revealed that the treatment systems are providing highly successful results. Therefore it is recommended that biochar is a good substitute material for replacing metal in the anaerobic filter of septic tank.

Keywords: Biochar, septic tank, domestic sewage treatment, anaerobic filter, sustainable sanitation

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