

Greywater Treatment Using Activated Biochar Produced from Agricultural Waste

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Abstract : The increase in urbanisation in South Africa has led to an increase in water demand and a decline in freshwater supply. Despite this, poor water usage is still a major challenge in South Africa, for instance, freshwater is still used for non-drinking applications. The freshwater shortage can be alleviated by using other sources of water for non-portable purposes such as greywater treated with activated biochar produced from agricultural waste. The success of activated biochar produced from agricultural waste to treat greywater can be both economically and environmentally beneficial. Greywater treated with activated biochar produced from agricultural waste is considered a cost-effective wastewater treatment. This work was aimed at determining the ability of activated biochar to remove Total Suspended Solids (TSS), Ammonium (NH₄-N), Nitrate (NO₃-N), and Chemical Oxygen Demand (COD) from greywater. The experiments were carried out in 800 ml laboratory plastic cylinders used as filter columns. 2.5 cm layer of gravel was used at the bottom and top of the column to sandwich the activated biochar material. Activated biochar (200 g and 400 g) was loaded in a column and used as a filter medium for greywater. Samples were collected after a week and sent for analysis. Four types of greywater were treated: Kitchen, floor cleaning water, shower and laundry water. The findings showed: 95% removal of TSS, 76% of NO₃-N and 63% of COD on kitchen greywater and 85% removal of NH₄-N on bathroom greywater, as highest removal of efficiency of the studied pollutants. The results showed that activated biochar produced from agricultural waste reduces a certain amount of pollutants from greywater. The results also indicated the ability of activated biochar to treat greywater for onsite non-potable reuse purposes.

Keywords : activated biochar produced from agriculture waste, ammonium, NH₄-N, chemical oxygen demand, COD, greywater, nitrate, NO₃-N, total suspended solids, TSS

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