Study on the Treating Ability of Palmyrah Seed Shell Based Activated Charcoal in Newly Designed Domestic Water Filter

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Activated charcoal is commonly used as a good source for removing contaminants and impurities, sediment, volatile organic compounds, taste and odor from wastewater through chemical adsorption. This study investigates the ability of activated charcoal produced from Palmyrah seed shell using a newly designed domestic level filter. Dried and same aged Palmyrah seed shells were collected randomly from Chavakacheri area in Jaffna District and activated charcoal was produced following carbonization, activation and pyrolization processes. A domestic level filter having stone layer, sand layer and activated charcoal layer was designed. Two filter models were designed placing the activated charcoal layer from Palmyrah based activated charcoal (D1) and commercially available activated charcoal (D2) separately. Then wastewater samples were randomly collected from three different sources; laboratory, industry and abandoned well. About 10 L of wastewater sample was passed randomly 3 times through each charcoal filter slowly. 13 Physio-chemical parameters of water samples were checked before and after treating them in D1 and D2 separately. The results revealed that, wastewater obtained from both industry and abandoned well have been treated sufficiently by D1 for 6 parameters, while by D2 for only 3 parameters. Both D1 and D2 have equally performed for 4 parameters. In case of wastewater obtained from laboratory, D1 has performed well for 6 parameters and D2 for 5 parameters. Both D1 and D2 have similarly performed for 2 parameters. Therefore, it can be concluded that, the newly developed domestic level water filter with Palmyrah based activated charcoal (D1) has performed better than the filter with commercially available activated charcoal (D2) for the tested wastewater samples obtained from laboratory, industry and abandoned well.

Keywords: Commercially available activated charcoal, Newly designed domestic water filter, Palmyrah based activated charcoal, Physio-chemical parameters, Wastewater treatment