

Water Treatment Efficiency of Aerator and Roughing Filter in Treating Groundwater : A Case Study in Mullaitivu of Sri Lanka

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Abstract

The paper describes an investigation into the efficiency of the water treatment process used in the Mullaitivu well field in Sri Lanka. The well field experiences significant groundwater extraction, approximately 1,440,000 liters per day, due to developments and resettlements in the area over the past decade. However, the groundwater quality does not meet the standards set in SLS 614: 2013 on a few occasions. The treatment process includes a fountain-type aerator with four drops with varying heights and vertical-flow roughing filters. The water then passes through four medial filter layers in the roughing filters, each with different particle size and layer thickness. To assess the effectiveness of the treatment process, water samples were collected at regular intervals of 6 hours during 72 hours of continuous operation. The samples were taken before and after aeration and after passing through the roughing filters. The selected water quality parameters tested in the study were turbidity, color, total iron, and manganese. The results showed that the treatment process significantly removed color and total iron from the raw water with removal efficiencies of 84% and 88% respectively. Additionally, the treated water's turbidity was well below the threshold limit of 2 NTU in 100% of the treated samples, the treated manganese level was below the limit of 0.1 mg/l, and the treated total iron level was below the limit of 0.3 mg/l specified in SLS 614:2013 for drinking water. Based on the findings, the paper recommends including pre-chlorination in the treatment process to enhance oxidation and increase the total iron and manganese removal efficiency.

Keywords: *Aerator, Color removal, Groundwater, Manganese removal, Roughing filter, Turbidity removal*