Physico-Chemical and Bacteriological Quality of Reverse Osmosis Water in Vavuniya District

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Vavuniya district is situated in Northern Province of Sri Lanka. The groundwater is the main drinking water source which has been under serious threat with the intensive resettlement and infrastructure development after the civil war and extensive application of fertilizer. Reverse Osmosis (RO) technique is widely used to convert the contaminated groundwater to drinking water. This study was designed to evaluate the physico-chemical and bacteriological qualities of RO water consumed by general public and to compare test results with SLS and WHO recommendation. Ninety (90) samples were collected in precleaned poly propylene bottles and all the testing was based on APHA and SLS method. Test Results reveal Turbidity was below SLS limit of 2 NTU which ensures efficient removal of undesired solids from groundwater. pH was in the range of 4.83 - 8.87 and 31 samples were below the 6.5 which is acidic in nature and facilitate releasing toxic metals from storage tank. EC and TDS ranges and their mean values were 4 - 257 μS cm^{-1}, 10 - 167 mg L^{-1}, 79 I.LS cm $^{-2}$ and 52.7 mg L^{-1} respectively. TDS of 93.3% samples were below 100 mg L^{-1} which was recommended as minimum limit for demineralized water by WHO. Total Hardness was in the range of 8 - 136 mg L^{-1} and maximum and median of Calcium was 22 mg L^{-1}, 3 mg L^{-1} respectively and 44.4% of the sample were below the LOD of 0.8 mg L^{-1}. Chloride level was in the range of 6 - 62 mg L^{-1}. Maximum level of Fluoride was 0.83 mg L^{-1} with the median of 0.16 mg L^{-1}. Range and median of Nitrate and Phosphate was < 0.001 - 42.971, 4.565 mg L^{-1}, < 0.01 - 0.7 and 0.15 mg $1,^{-1}$ respectively. Six samples were contaminated by Total Coliform which is an indication of the poor sanitary conditions and it can be due to post contamination in the storage tank. E-Coli was not reported in any of the samples. The results showed that RO technique can be used to purify the contaminated groundwater but mineral content of the filtered water was very low and can be considered as partially demineralized water. RO water does not provide a useful contribution to daily dietary intake and it is highly suitable for low mineral diets rather than sources for necessary daily mineral intake. It is recommended to re-mineralize the RO water before consumption and RO effluent water with high TDS should not be disposed back to ground as it will further damage the aquifer.

Keywords: Reverse Osmosis, Physio- Chemical, Groundwater