PHYSICO-CHEMICAL COMPONENTS OF WATER DISTRIBUTED BY KERICHO WATER AND SANITATION COMPANY

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ABSTRACT

Many of the developing countries have a challenge of providing safe and portable water to their people. Challenges faced range from inadequate control, operation and maintenance of the water distribution system. Among the components that can make water unsafe for human consumption is physico-chemical components, which is the basis of this study. This study was conducted to ascertain the extend of portability of water supplied by Kericho Water and Sanitation Company (KEWASCO). Physico-chemical parameters analysed were: conductivity, total alkalinity, total hardness, pH, Total dissolved solids (TDS), residual chloride, turbidity and heavy metals (Pb, Cd and Cr). Samples were collected from Ngecherock and Timbilil Treatment Plants, Municipal tap water of Kericho prisons staff residence, Kericho main prisons (kitchen tap), Moi estate, Nyagacho estate, dumpsite leachate and river Tiony Soet. Heavy metal contents were determined using atomic absorption spectrophotometer (AAS while residual chlorine was measured using a commercial Colour Wheel and visual comparator. Total alkalinity and total water hardness were measured by titration method, conductivity and TDS by conductivity meter, turbidity by turbidimeter while the pH was determined by pH meter. The results obtained ranged from: pH 6.2-8.2, conductivity 35-70 µs, turbidity 0.4-3.7 NTU, total alkalinity 18-40 mg/L, total hardness 3-20 mg/L, TDS 16-30 mg/L and residual chloride 0-1.2 mg/L. Pb, Cr and Cd from water at the treatment plants and consumer points reported values which were within allowable WHO limits. However, not all stations reported appreciable levels of heavy metals during the sampling period. In January, the mean levels of the metals in the leachate samples reported Cr having the highest value (2.92 mg/L) followed by Pb (1.70 mg/L) and then Cd (1.48 mg/L). From the mean levels, the concentrations for the metals in river water recorded the highest Cr value of 2.34 mg/L followed by Cd (1.34 mg/L) and then Pb (1.29 mg/L) in the month of January. Generally, all the three metals showed a decrease in trend from January to March. The trend in average metal concentrations in both leachate and river water was Cr > Pb > Cd. Overall, the levels of metal concentrations in various sites and stations followed the order: dumpsite leachate > river water > consumer points > treatment plants. Most of the measured parameters were, however, within the water quality standards for municipal piped water and therefore fit for drinking.

Keywords: Turbidity, Water portability, Heavy metals.