

Evaluation of water quality in KFUPM drinking water system.

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Abstract

A study aimed at defining the nature and possible causes of deterioration of KFUPM drinking water system is described. The study involved search of the relevant literature, an audit survey of the drinking water distribution system, and the performance of the Reverse Osmosis treatment plant. Conventional tests (temp, pH, TDS, turbidity, DO, alkalinity, hardness, chlorine residual, total coliform, total count), and special tests (Fe, Mn, Zn, Cu, Pb, Cr, F, TOC) were conducted at different sampling locations within the distribution system, over a period of about eight months to evaluate the quality of drinking water. Samples were also collected after different stages of treatment from the main R.O. treatment plant, to determine the nature of treatment provided.

The study indicated that KFUPM drinking water quality was exceeding the acceptable limit of World Health Organization (WHO) in terms of TDS (500 mg/L), hardness (100 mg/L as CaCo), iron (0.1 mg/L), and fluoride (0.7mg/L for Saudi Arabia based on temperature). Chlorine residual was also found to be below the desired concentration of 0.1-0.5 mg/L quite often.

Survey at the main reverse osmosis (R.O) treatment plant indicated that various operational and maintenance problems existed at the treatment plants which resulted in frequent leaks and early exhaustion of R.O. membranes. The membranes after exhaustion were not replaced and resulted in high TDS product water. The staff lacked adequate training in the operation of the treatment plant, and maintenance of the quality of product water. The drinking water at the treatment plants and at other sampling location was found to be aggressive in nature due to improper addition of chemicals for stability of the product water.