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Assessment of physiochemical characteristics and microbial quality of bottled drinking water in Kalutara District

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Bottled water is a frequently used drinking water source in modern day society. Therefore, the bottled water market is highly competitive leading to a possible loss in water quality. Thus, this study was conducted to determine the physical (pH, conductivity (EC), and total dissolved solids (TDS), chemical (total hardness, iron, chloride and sulphate, sodium, potassium, magnesium, calcium and aluminum) and microbial (*E. coli* and Coliform) parameters of drinking water in the Kalutara District. A water sample from the Kethhena (K) municipal water treatment plant was analyzed as a control sample. Ten different brands (A to J) of bottled drinking water were collected randomly from the Kalutara District. Triplicate measurements were taken from each brand and three readings were taken from each replicate. The pH and EC were determined by Hach Sension 3 and HANNA HI 8633 conductivitymeter, respectively. Total dissolved solid was analyzed by HANNA TDS meter HI 2300. Iron was measured using Vogel's standard method using GBC Cintra 10e spectrophotometer. Total hardness, chloride and sulphate concentrations were determined using titrimetric methods. Calcium and Al ion concentrations were determined using the Varian Atomic Absorption Spectrometer – A280 by the standard methods presented in its manual. Determination of Coliform and *E. coli* bacteria were done by the standard methods described in SLS 614: Part 2: 1983.

The pH value of the samples varied from 4.88 – 6.34 with a mean of 5.5 (± 0.39) while the recommended value by SLS was 6.5 – 8.5. EC of the samples was very low, varying from 24 – 107 $\mu\text{S}/\text{cm}$ with a mean of 53.49 (± 23.29) $\mu\text{S}/\text{cm}$. TDS of the samples varied from 16.6 – 80.06 mg/L with a mean of 38.58 (± 20.23) mg/L. Iron content varied from 0.0457–0.1364 mg/L with a mean of 0.084 (± 0.024) while the given value by SLS was 0.3 mg/L. Total hardness of the samples varied from 10.82 – 35.57 mg/L with a mean of 20.79 (± 7.97) mg/L, while the given standard value by SLS was 250 mg/L. Ca^{2+} concentrations varied from 0.29 – 10.19 mg/L with a mean of 4.7 (± 3.2). Al^{3+} concentration varied from 0.037 – 1.33 with a mean of 0.48 (± 0.41). Chloride content varied from 0.15 – 8.2 mg/L with a mean of 3.6 (± 2.3) and the sulphate content ranged from 0.34 – 9.4 mg/L with a mean of 4.2 (± 3.04). Coliform and *E. coli* bacteria were not detected in any of the bottled water samples. The above parameters of all the bottled water samples were according to the specifications of the SLS guidelines for bottled (packaged) drinking water.