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ASSESSMENT OF MAJOR ANION CONCENTRATIONS IN A STORED DRINKING WATER SAMPLE

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Determination of the fluctuation of concentration of anions of a drinking water sample during storage is a crucial aspect in attaining reliable water quality monitoring. Water samples collected from a well in Natiyagama, Sri Lanka, during September to December 2023, were used for this research due to the availability of other geological and hydrologic data, which were crucial in assessing analytical data fluctuations upon storage. Well log data showed three aquifer layers: a shallow zone below 10 m MSL, an intermediate fractured zone between 10 – 80 MSL, and a deeper confined zone below 80 m MSL. Each has distinct water chemistry, however, mixing between them due to multi-depth extraction alters their individual characteristics, making it difficult to isolate the chemistry of individual layers. The analysis was performed weekly for seventeen weeks through high-performance liquid chromatography-ion chromatography (HPLC-IC). The sample was filtered before analysis through a 0.45 µm filter unit into a glass vial. The sample was stored at 4 °C between weekly analyses. The highest concentration fluctuation was shown in nitrate (NO_3^-) ions (52.65 – 117.86 ppm), and the least concentration fluctuation was evident in sulphate (SO_4^{2-}) ions (43.02 – 56.27 ppm), while chloride (Cl^-) ions (22.82 – 24.42 ppm) showed intermediate concentration fluctuations. The possible reasons for a notably high fluctuation of NO_3^- ion concentrations could be the intensification by anthropogenic activities due to the presence of microbes that metabolise nitrate or related compounds even at refrigerated temperatures. Chloride ions are generally more chemically stable at refrigerated conditions, maintaining a stable fluctuation. The chemical stability of SO_4^{2-}ions could be a possible influence in showing the least concentration fluctuation under the given storage conditions. The results revealed that the spike in the increase of all three anions was seen in the ninth week of analysis. To increase the statistical significance further, advanced statistical procedures, such as the paired *t*-test, are recommended with increased sample data points.

Keywords: Drinking water, Refrigeration, Sulphate, Nitrate, Chloride