

TIME-BASED NITRATE ION ANALYSIS IN A STORED DRINKING WATER SAMPLE

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Enhanced nitrate (NO₃⁻) concentration in stored drinking water poses uncertainties in its accurate detection. In this study, the nitrate concentration of a source water sample used for drinking was analysed through Ion Chromatography (IC). Samples were collected from Natiyagama in Anuradhapura district (8.3314746:80.599199) in sealed containers and were stored under three storage conditions: filtered and refrigerated at 5 °C (sample A), filtered and stored at ambient room temperature (sample B), unfiltered and stored at ambient room temperature (sample C). Each sample was filtered using 0.45 µm before IC analysis. Nitrate concentrations of samples in each storage condition were analysed weekly for 3 months. The highest nitrate increase was observed in sample B, [(Δ(nitrate): 69.4-364 ppm], and while the lowest was noted in sample C [Δ(nitrate): 69.5-74.3 ppm]. The nitrate variation in Sample A showed intermediate values, i.e. (69.5-118 ppm) compared to samples B and C. It is believed that some dissolved material in the commercial filter units may have leached, thus enhancing nitrate reduction in the sample. The possible matrix effects were minimized by collecting all samples (A-C) from the same water source. The enhanced nitrate concentration in sample B could be due to the presence of microorganisms passed through the 0.45 µm filters. However, confirmatory results for the occurrence of microbial effects warrant further research. Our results show that the best storage method to determine nitrate concentration in natural water samples requires storing them at ambient temperature and filtering them before analysis. However, further comments on the nature of filter units cannot be made at this stage due to data paucity. When using nitrate contaminated stored water for consumption, nitrate associate health risks are also poised. Further studies are also recommended on the effect of natural organic matter and the bacterial content to better understand the nitrate fluctuation of the samples upon storage.

Keywords: Filtering, Nitrate, Refrigeration, Water storage