

## **Determination of measurement uncertainty in chloride analysis in groundwater by APHA 4500Cl<sup>-</sup> method**

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Testing laboratories must be able to provide reliable results when performing analytical tests for clients or for regulatory purposes. The concept of measurement uncertainty has become important in the area of analytical quality, providing a single measure of accuracy of analytical results. Chloride (Cl<sup>-</sup>) ion- is one of the major inorganic anions in water and wastewater. Chloride content of the Jaffna district is varying from 200mg/L to 1200mg/L depends on the location of the area. In this study all possible uncertainty sources associated with testing of chloride in groundwater is taken into account. The measurement uncertainty sources are grouped according to input quantities and schematically presented in the form of the so-called “fish-bone” diagram. Sampling and analysis of groundwater chloride is done based on methods stipulated by American Public Health Association (APHA). “A grade” volumetric apparatus were used for the analysis and analytical balance was calibrated by accredited calibration laboratory. The titrant AgNO<sub>3</sub> was standardized by the primary standard (NaCl, Normality 0.0141, purity 99.9%). Groundwater samples were collected from various location of Jaffna district and chloride concentration was determined. Uncertainty of standardization of titrant AgNO<sub>3</sub>, Sample measurement, Volume of titrant AgNO<sub>3</sub> are 0.0142, 0.0035, 0.0033 respectively and combined uncertainty is 7.1mg/L for chloride concentration of 473.7mg/L. It was found that  $473.7 \pm 14.2$ ,  $K=2$ , which is around 3% of chloride concentration. The uncertainty associated with standardization of titrant AgNO<sub>3</sub> is comparatively high.

**Key Words:** *Measurement uncertainty, Chloride, standard solution*

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