

## E2-12: Speciation of aluminium in acidic well waters using differential pulse adsorptive stripping voltammetry

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Possibility of using different pulse adsorptive stripping voltammetric analysis of aluminium-8-hydroxyquinoline electro-active complex, on glassy carbon (GC) electrode for determination of labile inorganic species of aluminium in acidic well water at Ranala, Kaduwela was investigated.

An EG & G Princeton Applied Research polarographic analyzer coupled to a EG & G X-Y recorder was used for the study. An electrochemical cell equipped with a 3 mm GC working electrode, 2 mm platinum wire electrode and a laboratory fabricated saturated calomel electrode (SCE) were employed for all measurements. All analytical grade reagents and deionized water were used for preparation of solutions in pre-acid washed polyethylene containers. All analytical solutions were deaerated with purified N<sub>2</sub> before obtaining voltammograms.

Peak currents of differential pulse stripping voltammograms corresponding to oxidation of Al(III)-8-hydroxyquinoline complex at +1.1 V vs. SCE, depend on the (1) concentration of electrolyte (NH<sub>4</sub>OAC) used, (2) pH of the complexation medium, (3) potential applied for deposition of the complex on the GC electrode, (4) deposition time and (5) concentration of 8-hydroxyquinoline (HOX). Optimum value of each of these parameters was determined using a series of concentrations of Al ranging from  $4.00 \times 10^{-8}$  to  $4.00 \times 10^{-3}$  mol dm<sup>-3</sup>, a series of Al-HOX complexes were prepared and under optimum conditions peak currents for these. Al concentrations were determined. The concentration of aluminium in well waters was determined using the calibration curve. The relative standard deviation for 10 determinations, the percentage recovery of aluminium and limit of detection were 4.12%, 88.36% and  $4.00 \times 10^{-5}$  mol dm<sup>-3</sup> respectively.

The method is rapid, highly reproducible and requires no prior separation of the species to be determined. Concentrations of labile inorganic species of aluminium in all well waters were above the safe limit of 50 µg dm<sup>-3</sup> recommended by World Health Organisation.