Direct photometric determination of lead by manual and flow injection methods with gallocyanine

ABSTRACT

A direct photometric method was developed for the determination of sub-nanogram levels of lead. The method is based on complexation between lead and gallocyanin, which form a coloured dye (ɔmax 550 nm) at pH 8.0. The determination was based on the use of kinetic approach and in the lead concentration range of 1.0 × 10-3 εg/mL to 1.0 × 101 εg/mL, a smooth calibration curve was obtained. The reaction system can also be successfully adapted to flow injection analysis (FIA). The dynamic range of the proposed flow injection method was 1.0 × 10-3 εg/mL to 1.0 × 102 εg/mL and detection limit was 1.6 ng/mL at a sampling rate of 30 injections per hour. At 1:1 mole ratio of lead to the interfering ion, mercury, iron, aluminium, citrate and fluoride were found to interfere most during the determination.

Keyword: Flow injection analysis; Lead determination; Gallocyanin; Photometry