CAPSULES
preliminary notes and applications from Bioanalytical Systems, Inc.

Determination of Iodide in Baby Formula

Purpose
Detection of iodide in milk products.

There is an increased interest in determining iodide in various commodities. This is linked to the concern that an increased iodide consumption may lead to an increased incidence of thyroid disorders.

Existing Methods
LCUV, which exhibits a low degree of selectivity and a detection limit of 100 ppb. Other methods include GC, ion-selective electrodes, microdistillation, differential pulse polarography, and neutron activation analysis.

LCEC Method
Offers a rapid, accurate, and selective alternative method.

Conditions
System: BAS 400
Detector: LC 4B/17AT
Column: Phase-II ODS, 3 µm, C_{18}, 100 x 3.2 mm (BAS P/N MF-6213)
Mobile Phase: 10.0 mM sodium phosphate, 0.82 mM hexadecyltrimethylammonium chloride, 0.5mM EDTA, 32% acetonitrile, pH 6.8. Flow rate was 1.0 mL/min.
Electrode: Ag (BAS, P/N MF-1008)
Potential: 0.0V vs Ag/AgCl
Detection Limit: 200 pg I^- injected, yielded a S/N of 3. The injection volume was 50 µL, corresponding to a concentration of 4 ppb.
Linear Range: 0.2 ng to 100 ng injected (a larger amount was not tested). This corresponds to a range of 4 ppb to 2 ppm.

Sample Preparation
A 100 mL aliquot of a commercial liquid baby formula was diluted 2.5 times with deionized water and clarified by addition of acetic acid and filtration through Whatman #2V filter paper. A portion of the filtrate was adjusted to pH 6.8 (with NaOH) and passed through a Sep-pak (Waters Associates). A 50 µL aliquot was injected into the LCEC system.

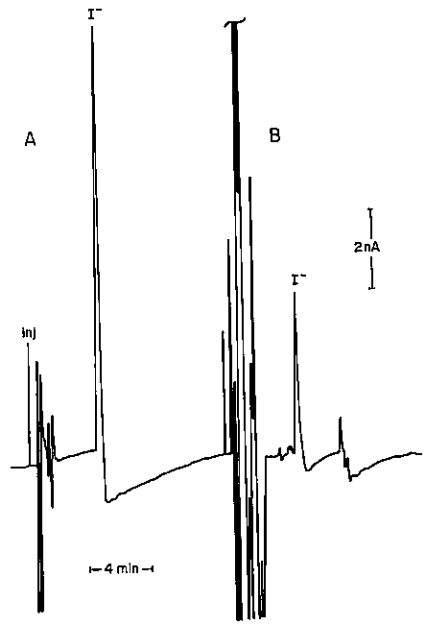

Figure 1. Chromatogram of A) an iodide standard (5.1 ng injected), and B) a commercial baby formula sample treated as outlined below (Sample Preparation). The amount of iodide in B corresponds to 1.9 ng injected, which indicates that the original sample of formula contained 211 ppb iodide.

Reference
This work was carried out in the BAS demonstration lab and has not been validated by BAS R&D.

Comments

This preliminary study demonstrates that LCEC, using a silver working electrode, is a selective and sensitive method for the determination of iodide in a complex sample. Minimal sample preparation was required prior to injection into the LCEC system.

A report outlining the LCEC determination of iodide in serum has recently appeared in the literature (HPLC Determination of Iodide in Serum Using Paired Ion Chromatography with Electrochemical Detection, W.J. Hurst, J.W. Stefovic and W.J. White, J. Liq. Chromatogr. 7(1984) 2021-2030). The authors point out that LCEC "provides a useful alternative to the current methods for determination of serum iodide." Refer also to Capsules 118 and 140, and Current Separations Vol. 7, No. 1, 1985.