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# Rapid determination of selenium, lead and cadmium in baby food samples using electrothermal atomic absorption spectrometry and slurry atomization

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**Abstract**

Procedures for the electrothermal atomic absorption spectrometric determination of selenium, cadmium and lead in different types of baby foods using slurried samples are described. Suspensions prepared in a medium containing 0.1% (w/v) Triton X-100, 30% (v/v) concentrated hydrogen peroxide, 1% (v/v) concentrated nitric acid and a matrix modifier (0.5% (w/v) nickel for selenium, 0.2% (w/v) nickel plus 1% (w/v) ammonium dihydrogenphosphate for cadmium and 1% (w/v) ammonium dihydrogenphosphate for lead) were introduced directly into the furnace. The graphite furnace conditions were optimized for each element. Denterium background correction was used. Calibration with aqueous standard solutions was used for selenium and lead determinations, while the standard additions method was used for cadmium determination. The $3\sigma$ detection limits were 5.2, 3.4 and 0.4 ng $g^{-1}$ for selenium, lead and cadmium, respectively. The reliability of the procedures was established by comparing the results obtained with those found for five fish-based baby foods using a previous microwave-oven mineralization stage and by analyzing six biological certified reference materials. The lead concentration was below the detection limit in all the baby foods tested. 

*Keywords:* Electrothermal atomic absorption spectrometry; Slurry sampling; Selenium; Lead; Cadmium; Baby foods

## 1. Introduction

Multi-element surveys of baby foods [1] have been published because of growing interest in trace element concentrations in infant foods and the need to establish limits for infant exposure to such elements from the diet. Lead and cadmium are toxic elements, and the European Commission has proposed a regulation which sets maximum limits for these metals in certain foods [2]. The most important sources of lead exposure are industrial emission, soils, car exhaust gases and contaminated food. Vegetables with a relatively large leaf area, such as spinach and cabbage can contain high levels when grown near lead sources. Cadmium ions are easily absorbed by vegetables and, in animal-based food, are principally distributed in the liver and kidneys. The highest cadmium concentrations are found in rice, wheat, oyster, mussels and the kidney cortex of animals [3]. Selenium is an interesting trace element because it has an important antioxidant function, but if intake is excessive harmful effects appear, the difference between the necessary

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