CR Consumer Reports®

Heavy Metals in Children's Foods

Heavy metal concentrations (both in terms of sample concentration and per-serving amounts) were determined for 14 children's food models. Seven models, tested in 2017 and found to have high amounts of arsenic, cadmium or lead, were retested. In addition, seven new models were also tested. A total of 42 samples plus two sample duplicates were measured for trace metals. Samples that were found to have arsenic concentrations greater than 40 parts per billion (ppb) were tested for arsenic speciation, including inorganic arsenic.

SAMPLE PREPARATION AND ANALYSIS

Total Meals

Approximately 50 grams of each sample were homogenized using laboratory-grade equipment. All sample homogenates were then prepared via a modified AOAC 2015.01 digestion. In summary, a known mass of each homogenate was weighed into a microwave digestion vessel, and then aliquots of concentrated nitric acid and hydrogen peroxide were added. The resulting digests were diluted with deionized water to a known final volume before analysis for arsenic (As), cadmium (Cd), and lead (Pb) content via inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS determinative method uses advanced interference removal techniques to ensure accuracy of the sample results.

Arsenic Species Quantitation by IC-ICP-CRC-MS

Each sample analyzed for inorganic arsenic (InorgAs), monomethylarsonic acid (MMAs), dimethylarsinic acid (DMAs) and trimethylarsine oxide (TMAO) quantitation was extracted on a hotblock in a dilute acidic solution. All resulting extractions were analyzed for arsenic species using ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS).

QUALITY CONTROL

Quality control (QC) was performed by analyzing a method blank, matrix spike, matrix spike duplicate, and laboratory control sample with each analytical batch.

RESULTS REPORTING

Sample results reported for As, Cd, and Pb were method blank corrected, while QC results were not method blank corrected. All results were evaluated using reporting limits adjusted to account for sample aliquot size.

TESTING

1. AOAC 2015.01-2015 Heavy Metals in Food

2. Total inorganic arsenic—the sum of arsenite (As III) and arsenate (As V)—monomethylarsonic acid (MMAs), dimethylarsinic acid (DMAs), and trimethylarsine oxide (TMAO) by ion chromatography-ICP-CRC-MS following the laboratory's internal analytical methods