AOAC Metals Subgroup

Our vision:
To excel as a science-based regulator, trusted and respected by Canadians and the international community.

Our mission:
Dedicated to safeguarding food, animals and plants, which enhances the health and well-being of Canada’s people, environment and economy.

Chemical Contaminants and Residues in Food Community
AOAC Metals Subgroup Meeting

Tuesday, September 9, 2014, 6:15 – 7:45 pm

SubGroup Co-Chairs
Cory Murphy, Canadian Food Inspection Agency (cory.murphy@inspection.gc.ca)
Michelle Briscoe, Brooks Rand Labs (michelle@brooksrand.com)

Agenda
1. Update from SPSFAM and Heavy Metals Working Group (Stakeholder Panel on Strategic Food Analytical Methods) – Cory Murphy
2. Summary of Heavy Metals ERP – Rick Reba (chair of ERP)
3. Discussion of Current (First Action Status AOAC Method 2013.06) and Potential AOAC ICP-MS Methods – Michelle Briscoe
4. Update on Current FDA Activities Related to Metals in Food – Cory Murphy
5. Update on Current Canadian Activities Related to Metals in Food – Cory Murphy
6. Update on Current European Union Activities Related to Metal in Food – Jens Sloth
7. Summary of 2nd Annual International Arsenic Speciation Interlaboratory Comparison Study – Michelle Briscoe
8. Nanoparticles in Foods – Cory Murphy
9. Webinar for Training New Technology for the Analysis of Metals in Foods – Michelle Briscoe
SPSFAM Update

- Stakeholder Panel on Strategic Food Analytical Methods
  - Builds consensus on methodology impacting food community and develop standards related to food testing
- Heavy Metals ERP – Rick Reba is the chair
- Metals Speciation Working Group – Chris Smith is the chair
  - Topics for consideration by the panel were presented
  - Hope to identify areas for the development of a SMPR
  - Call for methods in the near future?
UPDATE ON AOAC METALS METHODS

Michelle Briscoe
Method 2011.19

Chromium, Molybdenum, and Selenium in Infant Formula & Adult/Pediatric Nutritionals by ICP-MS
[SMPR 2011.009]

Status: First Action Official Method
Under consideration for Final Action Status

Multi-Lab validation completed and data presented yesterday by Joseph Thompson (Abbott Nutritionals)

ERP scheduled for yesterday evening…Final Action?
Method 2013.06

As, Cd, Hg, & Pb in Food by Pressure Digestion and ICP-MS (LOQs in the 30 – 90 ppb range)

Status: First Action Official Method

Was considered for modification to meet requirements of new SMPR (2012.007); however, the author retired, therefore, there will be no future work on this method.
Method 2014.XX
New Method out of SPSFAM

Heavy Metals (Arsenic, Cadmium, Lead, and Mercury) in a Variety of Foods and Beverages by ICP-MS [SMPR 2012.007] (with priority given to rice and/or rice products, chocolate, fruit juice and/or fruit concentrates, and infant formula)

LOQs in the 8 – 10 ppb range

In ERP (Rick Reba – Chair)

Method HVYM-01 recommended for First Action Status pending edits and more SLV data (submitted)

AOAC did not schedule this ERP to meet at either AOAC meeting in 2014 😞
Method 201X.XX
New Method out of SPIFAN

Minerals & Trace Elements in Infant Formula & Adult/Pediatric Nutritionals

SMPR 2014.004 {Can’t find on AOAC website}
USFDA-CFSAN Activities related to Metals Testing in Food

- FDA Elemental Analysis Manual (EAM) method 4.7 will be expanded to also include Cr, Cu, Mn, Ni, Mo and Zn. Multi-lab validation with FDA and state FERN labs to be done in FY15.
- Iodine in food: New ICP-MS method. Completed single lab will do multi-lab in FY15.
- Purchased a laser ablation system that will allow spatial mapping of elements.
- Arsenic speciation is still an important issue. Need methods for foods other than juice and rice.
- Starting on a method for arsenic speciation in fish and seafood.
- Installed new Agilent 8800 QQQ ICP-MS. Will use it to evaluate reaction chemistry as a means for interference abatement.
CFIA activities related to Metals Testing in Food

• Speciated arsenic survey
  • 2009-10 – approx. 200 samples of pear based products and 200 of rice based foods
  • 2010-2015 – multiple food commodities – 1000-1200 samples per year
  • Rice and rice products – brown/white rice, rice flour, rice based cereals, rice cakes, rice flour, rice milk
  • Bottled water
  • Seaweed
  • Breakfast cereals – single grain, multi-grain, adult/children cereals
  • Wheat bran
  • Infant cereals – formula, soy and milk based formula, jarred food
  • Fruit products – candies, sauces, juice, cider
  • Meal replacements and protein supplements
  • Brown rice containing products
CFIA activities related to Metals Testing in Food

- Methyl Hg
- Speciated Sb in water
- Total As in geoducks
- Speciated As in fish products
- Nanoparticles
- Environmental issue in BC
  - Mine tailings pond
- Purchased new Agilent 8800 Triple Quadrupole ICP-MS
Projects on standardized methods for metals in food and feed in EU (CEN-methods)

CEN TC275 WG10 (Elements and their species in foodstuffs)
CEN TC327 WG4 (Heavy metals, trace elements and minerals)

1. Inorganic arsenic in marine feed by SPE HG-AAS (EN16278, publ 2012)
7. Multielement method by ICPMS in animal feed (2014-17)
UPDATE ON ARSENIC SPECIATION INTERCOMPARISON IN FOOD

Michelle Briscoe
2013 International Intercomparison Study for Arsenic Speciation in Food and Juice

Global Participation

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of Participants</th>
<th>Number of Labs</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>25</td>
<td>64%</td>
</tr>
<tr>
<td>Europe</td>
<td>8</td>
<td>21%</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
<td>15%</td>
</tr>
</tbody>
</table>

Table 4. Number of participating laboratories by region

Report available at:

Graph 3e. Numbers of laboratories per mean score for of the test matrices combined. Overall mean score for the study was 2.6.
2nd Annual International Intercomparison Study for Arsenic Speciation in Food (2014)

- Registrations accepted through end of July
- 31 participants from 10 countries
- Sample kits shipped first week of August
  - Tuna fish (freeze-dried)
  - Cocoa powder
  - Bivalve tissue (freeze-dried)
  - White rice powder
  - Seaweed snack (seaweed, oil, and salt)
- Results due to EcoChem by Sept 30th
- Final report expected by late December
Nanomaterials In Food: Is It Safe To Eat Nanoparticles?

By Connor Adams Sheets 

Do you know what you’re eating? The number of American food products containing nanomaterials has increased tenfold since 2008, said a report released this week, revising concerns about our plate.

The Friends of the Earth environmental group reports that its researchers found hundreds of popular food products contain nanoparticles—sample preparation and off-line fractionation strategies.

Title “Tiny Ingredients, Big Risks,” nanoparticles in food products present nanomaterials “have been found to be carcinogenic,” and a number of ind conditions as carcinogenic, the report said. But humans’ ingestion of nanomaterials can be recommended. With respect to precision, time consumption, applicability, as well as to economic demands, ultrafiltration in combination with microwave digestion was identified as best practice.

Keywords Nanoparticle quantification - Total concentration - Sample preparation - Dissolution fraction - IC-MS

Introduction

Due to an increased use of engineered nanoparticles (ENPs) in a variety of products and applications, the exposure of workers and consumers as well as the release into the environment has to be expected. To ensure the safety of the different ENPs and to reduce environmental and (eco)toxicological impacts, an appropriate risk assessment...
TRAINING OPPORTUNITIES: ICP-MS WEBINAR

Michelle Briscoe
Hour-long Webinar
Advances in ICP-MS for Food Testing

- All three major ICP-MS vendors on board (or will be soon 😊)
- 20 minutes per presentation
- Costs covered by vendors (low)
- Sciencey…not salesy
- Minimal overlap in content (moderated)
- Interest?
- Timing?