AOAC Stakeholder Panel on Strategic Food Analytical Methods (SPSFAM)

Meeting Minutes
Sunday, September 18, 2016, 8:30 a.m. - 12:00 p.m.

Attendees

SPSFAM Members (Present during all or part of the meeting):

- **Erik Konings**, Nestlé (SPSFAM Chair)
- **Susan Audino**, SA & Associates, LLC
- **Lei Bao**, Nestlé
- **Justin Bickford**, ELISA Technologies
- **François Bourdichon**, Danone
- **Dan Braese**, LGC Group
- **Amy Brown**, Florida Dept. of Agriculture
- **Paula Brown**, BCIT
- **Carolyn Burdette**, NIST
- **Anton Bzhelyanski**, USP
- **Bob Clifford**, Shimadzu Scientific Instruments
- **David Cunningham**, Ocean Spray Cranberry
- **Thierry Delatour**, Nestlé
- **Jon DeVries**, DeVries & Associates
- **Quanyin Gao**, Herbalife
- **Russell Gerads**, Brooks Applied Labs
- **Esther Campos Gimenez**, Nestlé
- **Tetsu Goto**, Shinshu University (Ret.)
- **Cathy Halverson**, US Tax and Trade Bureau
- **Norma Hill**, US Treasury (Ret.), AOAC President
- **Greg Hostettler**, Perrigo
- **Holly Johnson**, Alkemist Labs
- **George Joseph**, AsureQuality NZ
- **Diana Kavolis**, The Hershey Company
- **Estela Kneeteman**, INTI
- **Barbro Kollander**, National Food Agency of Sweden
- **Terry Koerner**, Health Canada
- **John Lawry**, Covance
- **Cindy Ludwig**, AOCS
- **Soo K. Lee**, FDA
- **Alex Liu**, SCIEX
- **Huafen Liu**, SCIEX
- **Lifu Ma**, Certified Labs
- **Sandy Mangan**, SPEX
- **Farzaneh Maniei**, Coca-Cola
- **Vicki Manti**, Danone
- **Kate Mastovska**, Covance
- **Mary McBride**, Agilent
- **Josh Messerly**, Eurofins
- **Ang Wei Min**, HAS Singapore
- **Bill Mindak**, FDA
- **Allen Misa**, Phenomenex
- **Deepali Mohindra**, Thermo Fisher
- **Lee Sun New**, SCIEX
- **Gary Niehaus**, NEOMED/CDX
- **Vincent Paez**, SCIEX
- **Josephine Pompei**, WSDOH
- **Eric Poitevin**, Nestlé
- **Rick Reba**, Nestlé
- **Klaus Reif**, Phytolab
- **Joe Romano**, Waters
- **Adam Ross**, LGC Standards
- **Travis Ruthenburg**, SC Labs
- **André Santos**, Agilent
- **Olga Shimelis**, MilliporeSigma
- **Darryl Sullivan**, Covance
- **Brian Schaneberg**, Starbucks
- **Jayant Shringarpure**, Tyson Foods Inc.
- **Christopher Smith**, Coca-Cola
- **Lanny Smith**, Vicam
- **Matt Snyder**, SPEX
- **Kathy Steenerson**, MilliporeSigma
- **Cheryl Stephenson**, Eurofins
- **Joan Stevens**, Agilent
- **Rebecca Stevens**, Restor Corp.
- **John Szpylka**, Mérieux NutriSciences
- **Eric Verdon**, ANSES
- **Jian Wang**, CFIA
- **Wayne Wargo**, Abbott
- **Paul Winkler**, SCIEX
- **Bryan Wirthwine**, Q Laboratories
- **Seth Wong**, TEQ Analytical
- **Jason Wubben**, Archer Daniels Midland
- **Sudhakar Yadlapalli**, First Source Lab
- **Dorothy Yang**, Agilent
- **Jinchaun Yang**, Waters
- **Yang Zhou**, Eurofins
- **Jerry Zweigenbaum**, Agilent
- **Richard Zywicki**, Covance

AOAC Staff Members (Present during all or part of the meeting):

- **Jim Bradford**
- **Scott Coates**
- **Christopher Dent**
- **Dawn Frazier**
- **Nora Marshall**
- **Tien Milor**
- **Robert Rathbone**
I. **Welcome and Introductions**

Jim Bradford opened the meeting and led introductions throughout the room. He then gave the floor to Erik Konings, Chair of SPSFAM. Konings highlighted the AOAC policies and procedures found in the meeting eBook¹ and advised all SPSFAM members to familiarize themselves with it. Konings then asked for a motion to approve the meeting minutes from the March 24, 2016 SPSFAM meeting minutes.

**MOTION by Winkler to approve the March 16, 2016 Meeting Minutes. Second by Boison. 22 in favor, 0 opposed, 0 abstentions. The motion passed.**

Konings then provided a presentation² regarding the history of SPSFAM and the success of the 2015 Working Group Initiative, which allows standards development working groups to be formed by organizations coming together to support them. Konings also updated SPSFAM on the status of current Expert Review Panels (ERPs): Kombucha ERP will be held in the afternoon of September 18, 2016 and Food Allergens ERP will be held in the afternoon of September 19th. Konings invited Rick Reba, Chair of the Heavy Metals ERP, to the floor to update the panel on their work. Reba explained that the protocol for the heavy metals in food method has been drafted and Reba is coordinating a collaborative study. Reba invited any interested labs to contact him. Samples are expected to be shipped in November. Konings advised that the Heavy Metals Working Group will not be reconvened without support from new or existing Organizational Affiliates (OAs).

II. **Working Group Launch: Cannabis Potency**

Konings then introduced Susan Audino, Chair of the SPSFAM Working Group on Cannabis Potency. Audino took the floor and gave a presentation³ on the background and fitness for purpose of cannabis potency. Audino acknowledged and thanked the sponsors of this working group – GW Pharmaceuticals, SC Laboratories, SCIEX, SPEX, Sigma Aldrich and CEM. She proceeded to review the background of medical cannabis, its use in foods, the significance of testing these foods, analytical needs, major challenges, existing methods, and lack of regulatory guidance before proposing the following fitness for purpose:

*Standard Method Performance Requirements (SMPRs) for quantitative methods for various measurements of cannabinoids in raw materials and extracts.*

After a lengthy discussion regarding the legal and analytical challenges facing cannabis testing, the group returned to the proposed fitness for purpose and modified it to read:

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¹ https://griegler-aoac-org.cld.bz/September-2016-SPSFAM-Book
² ATTACHMENT 1: SPSFAM UPDATE PRESENTATION
³ ATTACHMENT 2: LAUNCH PRESENTATION: CANNABIS POTENCY WORKING GROUP
Standard Methods Performance Requirements (SMPRs) for quantitative methods for various measurements of cannabinoids in raw materials, extracts, topical applications and foods.

MOTION by Audino to accept the fitness for purpose statement as amended. Second by Konings. 20 in favor, 0 opposed, 2 abstained.

The motion passed and the SPSFAM Working Group on Cannabis Potency was formally launched.

### III. Working Group Launch: Proanthocyanidins in Cranberry (PAC) Products

Konings then introduced Brian Schaneberg, Chair of the SPSFAM Working Group on PAC. Schaneberg provided a presentation on the issue of proanthocyanidins in cranberry products. He reviewed the background of the analyte, including the uniqueness of PACs in cranberries, the significance of the issue, the general analytical needs (quick and easy), the challenges, existing methods and regulatory guidance. He then proposed the following fitness for purpose for the PAC Working Group:

The method should be applicable to the analysis of cranberry fruit, juice, beverage, dried cranberry, cranberry sauce, ingredients (concentrates, extracts and powders) and dietary supplement formulations, applicable to two potential purposes: (1) Quantitative QC method able to quantify total proanthocyanidin content, preferentially as the total sum of all individual oligomers and polymers present, or alternatively as the total sum with reference to a suitable surrogate standard, in samples typically ranging from 0.01% to 55% on a w/w basis; and (2) a Qualitative method to verify authenticity, able to provide information on the distribution of proanthocyanidin oligomers and polymers present and confirm presence of A-type versus B-type

After a brief discussion, Konings called for a motion on the proposed fitness-for-purpose statement.

MOTION by Schaneberg to accept the PAC fitness-for-purpose as presented. Second by Mastovska. 22 in favor, 0 opposed, 0 abstentions.

The motion carried and the SPSFAM Working Group on PAC was formally launched.

### IV. Update on the International Stakeholder Panel on Alternative Methodologies (ISPAM)

Konings provided a brief update on ISPAM. He indicated that ISPAM working groups are looking into rapid food allergen detection focusing on egg, milk, tree nuts and peanuts; which in some ways compliments the SPSFAM work on allergens. Konings said that he looks forward to continuing collaboration between ISPAM and SPSFAM.

### V. Potential Future Topic: Emerging Contaminants and Multi-Residue Analysis of Veterinary Drugs

Konings invited Thierry Delatour to the floor. Delatour is Suggroup Chair of AOAC’s Chemical Contaminants & Residues in Food Community. Konings explained that this presentation, on behalf of the Community, does not constitute a working group launch; rather it is a potential topic for SPSFAM to work on if there is enough interest among the panel to generate funding for such an

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4 ATTACHMENT 3: LAUNCH PRESENTATION - PROANTHOCYANIDINS IN CRANBERRY PRODUCTS WORKING GROUP
5 ATTACHMENT 4: ISPAM UPDATE PRESENTATION
effort. Delatour then provided a presentation detailing AOAC’s current activities in the areas of contaminants and veterinary drugs, current regulations and health issues, quality testing, available literature and existing methods, and the current analytical needs. He stated that a method is needed that will demonstrate full compliance of veterinary drugs, and he encourages SPSFAM members to seek support for a working group on this topic. Following a brief discussion on the topic, Frazier took an action to work with the community to identify specific needs and get the support to potentially launch a working group in March, 2017.

VI. Other Business and Next Steps

Konings continued the conversation on potential new topics for SPSFAM. By straw poll, he determined that about one-third of those present would be interested in a working group on sugars, and a smaller number of those present would be interested in a project on plastic microbeads; giving SPSFAM three potential future projects to work on. With no further business, Konings adjourned the meeting at 11:30 a.m.

Actions

1. All who are interested in joining the cannabis and/or PAC working groups should sign up for them at https://form.jotform.com/52325189177158

2. AOAC Staff to work with working group chairs to set up first teleconference meetings

3. Frazier to work with the communities to secure support for the potential new SPSFAM topics

Attachments

Attachment 1: SPSFAM Update Presentation
Attachment 2: Launch Presentation: Cannabis Working Group
Attachment 3: Launch Presentation: Proanthocyanidins in Cranberries Working Group
Attachment 4: ISPAM Update
Attachment 5: Presentation: Emerging Contaminants & Multi Residue Analysis of Veterinary Drugs

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6 ATTACHMENT 5: DELATOUR PRESENTATION
Overview of Stakeholder Panel on Strategic Food Analytical Methods (SPSFAM)

September 18, 2016

Erik Konings
Chair, SPSFAM
Nestlé Research Centre, Lausanne, Switzerland

Stakeholder Panel on Strategic Food Analytical Methods (SPSFAM)

• AOAC Initiated this panel to address issues of Organizational Affiliate (OA) members – specifically the multi-national food and beverage companies
• SPSFAM focuses on the OA issues and builds consensus within the community related to food or strategic growth of the food industry
• SPSFAM Inaugural Meeting held on June 30, 2011
• Initial areas decided by the Advisory Panel included antioxidants, contaminants, flavonols, and ingredients
• Working groups initiated and Standard Method Performance Requirements (SMPRs) developed in each area
AOAC Organizational Affiliate Members

- 3M Food Safety
- Abbott Nutrition
- Agilent Technologies, Inc.
- American Proficiency Institute
- Archer Daniels Midland Company
- BioControl Systems, Inc.
- BioMérieux, Inc.
- Bio-Rad Laboratories
- Canadian Food Inspection Agency
- CEM Corporation
- Coca-Cola Company
- Danone
- Deerland Enzymes
- DuPont Nutrition & Health
- Elanco / Eli Lilly & Co.
- The Fertilizer Institute
- Fonterra Cooperative Group Ltd.
- GT’s
- Health-Ade Kombucha
- Health Canada
- Herbalife
- Hershey
- Kellogg Company
- Kombucha Brewers International
- KPL
- Mars Botanical
- Mead Johnson Nutrition
- Medallion Labs / General Mills, Inc.
- Megazyme
- Merck KGaA - EMD Millipore
- Mérieux NutriSciences - Silliker
- Microb laboratories, Inc.
- Microbiologics, Inc.
- MPI Research
- Neogen Corporation
- Nestle Research Center
- NSF International
- NSI Lab Solutions, Inc
- PepsiCo
- Promega Corporation
- Q Laboratories, Inc.
- QIAGEN GmbH
- R-Biopharm, Inc.
- ROMER Labs Division Holding GmbH
- SCIEX
- SC Labs
- Shimadzu Scientific Instruments, Inc.
- SPEX
- Starbucks Coffee Company
- Synutra International, Inc.
- Thermo Fisher Scientific
- Waters Corporation

SPSFAM Highlights/Accomplishments: SMPRs

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Matrices</th>
<th>SMPR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antioxidants</td>
<td>Foods, Beverages, Beverage Materials, Dietary Supplements</td>
<td>2011.11</td>
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<tr>
<td>Flavonols</td>
<td>Foods, Beverages and Beverage Materials, Fruit Juice, wines, Fruit &amp; Fruit products, Coca Powder Chocolate, Spices and Condiments</td>
<td>2012.01</td>
</tr>
<tr>
<td>Heavy Metals</td>
<td>Foods, Beverages and Beverage Materials, Chocolate, Chocolate products, Fruit Juices, Infant formula</td>
<td>2012.07</td>
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<tr>
<td>St. John’s Wort</td>
<td>Dietary Supplements</td>
<td>2013.01</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>Foods</td>
<td>2012.03</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>Foods</td>
<td>2012.04</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>Foods</td>
<td>2012.05</td>
</tr>
<tr>
<td>Vitamin K</td>
<td>Foods</td>
<td>2012.06</td>
</tr>
<tr>
<td>Arsenic speciation</td>
<td>Selected foods and beverages</td>
<td>2013.006</td>
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<tr>
<td>Ethanol</td>
<td>Kombucha</td>
<td>2016.001</td>
</tr>
<tr>
<td>Food allergens</td>
<td>Whole egg, Milk, Peanut, Hazelnut</td>
<td>2016.002</td>
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</table>
SPSFAM Highlights/Accomplishments: OMs First Action

<table>
<thead>
<tr>
<th>AOAC Official Method First Action</th>
<th>Title</th>
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<tbody>
<tr>
<td>2012.04</td>
<td>Method for the Determination of Antioxidant Activity in Foods and Beverages by Reaction with 2, 2'-diphenyl-1-picrylhydrazyl (DPPH): Collaborative Study</td>
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<tr>
<td>2012.03</td>
<td>Analytical Parameters of the Microplate-Based ORAC-Pyrogallol Red Assay</td>
</tr>
<tr>
<td>2012.23</td>
<td>Development and Validation of an Improved Oxygen-Radical Absorbance Capacity Assay Using Fluorescein as the Fluorescent Probe</td>
</tr>
<tr>
<td>2013.04</td>
<td>Method for the Determination of Catechin and Epicatechin Enantiomers in Cocoa-Based Ingredients and Products by High Performance Liquid Chromatography: Single-Laboratory Validation</td>
</tr>
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<td>2013.24</td>
<td>Determination of Flavanol and Procyanidin (by Degree of Polymerization 1-10) Content of Chocolate, Cocoa Liquors, Powder(s), and Cocoa Flavanol Extracts by Normal Phase High-Performance Liquid Chromatography: Collaborative Study</td>
</tr>
<tr>
<td>2013.03</td>
<td>Analysis of Cocoa Flavanols and Procyanidins (DP 1-10) in Cocoa-Containing Ingredients and Products by Rapid Resolution Liquid Chromatography</td>
</tr>
<tr>
<td>2015.01</td>
<td>Heavy metals in food</td>
</tr>
<tr>
<td>2016.04</td>
<td>Four Arsenic species in Fruit Juice by ICP-MS</td>
</tr>
</tbody>
</table>

SPSFAM Mid-Year Meeting 2016

- Draft SMPR for determination of ethanol in Kombucha approved
- Draft SMPR for Detection and Quantification of selected Food Allergens by Mass spectrometry based methods approved
  - Originally 8 allergens considered, but was too broad scope for this SMPR, which include now requirements for Whole egg, Milk, Peanut, and Hazelnut allergens
  - Need for the other SMPRs for the other allergens remains
ERPs at annual meeting to review submitted methods

• Ethanol in Kombucha (18/09: 1-3pm State 1)
  – 5 methods submitted
• Detection and quantitation selected Food Allergens (19/09: 1-3.30pm State 1)
  – 2 methods submitted

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Agenda I

Stakeholder Panel on Strategic Food Analytical Methods (SPSFAM)

Chair: Erik Konings, Nestlé,

September 18, 2016 | 8:30AM - 12:00PM CT
Registration Opened at 7:30 a.m.
Sheraton Dallas Hotel | 400 North Olive Street | Dallas, TX, USA
Conference Room: San Antonio B

AGENDA

I. Welcome and Introductions (8:30 a.m. – 8:50 a.m.)
   Jim Bradford, AOAC; Norma Hill, AOAC President; Erik Konings, Nestlé, SPSFAM Chair
   a. Policies and Procedures
   b. Approval of March 24, 2016 Minutes
   c. Working Group Initiative Success Stories

II. ERP Updates (8:50 a.m. – 9:00 a.m.)
   Erik Konings, Nestlé, SPSFAM Chair

III. Working Group Launch Presentation: Cannabis Potency * (9:00 a.m. – 10:00 a.m.)
   SPSFAM Working Group on Cannabis Potency - Chair: Susan Audino, Audino and Associates LLC
   [BREAK]
Agenda II

IV. Working Group Launch Presentation: Proanthocyanidins in Cranberry Products* (10:15 a.m. – 11:15 a.m.)
SPSFAM Working Group on Proanthocyanidins in Cranberry Products - Chair: Brian Schaneberg, Starbucks

V. International Stakeholder Panel on Alternative Methodology (ISPAM) Update (11:15 a.m. – 11:25 a.m.)
  Erik Konings, Nestlé, SPSFAM Chair

VI. Emerging Contaminants and Multi-Residue Analysis of Veterinary Drugs (11:25 a.m. – 11:55 a.m.)
  Thierry Delatour, Nestlé, Member of Chemical Contaminants and Residues in Food Community

VII. Other Business and Next Steps (11:55 a.m. – 12:00 p.m.)
  Erik Konings, Nestlé, SPSFAM Chair

VIII. Adjourn

Collaborations with ISPAM

- Address specific method/technology needs
  - Unique client needs
  - Analyte/Target combination not currently approved
  - Advantages
    - Method Developers in ISPAM
    - Potential Customers in SPSFAM
Cachexia, Cancer, Chronic Pain, Epilepsy, Glaucoma, HIV, AIDS, Multiple Sclerosis, Nausea, ALS, Crohn’s, Hepatitis C, Anorexia, Arthritis, Migraine, Parkinson’s, Damage to the Nervous Tissue of the Spinal Cord with Objective Neurological Indication of Intractable Spasticity, PTSD, Traumatic Brain Injury, Use of Azidothymidine, Tourette Syndrome, Lupus, Chemotherapy or Radiotherapy, Reflex Sympathetic Dystrophy, Neurofibromatosis, Arnold-Chiari Malformation, Hydrocephalus, Residual Limb Pain, Terminal Illness with a Life Expectancy Under One Year, Hospice Care, Huntington’s, Chronic Renal Failure …

*If you or someone you know suffers or endures any one of these, you have an interest in the medical marijuana industry and recognize the importance of analytical testing.*

Stakeholder Panel on Strategic Food Analytical Methods: Background and Fitness for Purpose for CANNABIS

Susan Audino, PhD
S.A. Audino & Associates, LLC

AOAC International – Dallas, TX
September 18, 2016
Cannabis Advisory Panel

- Susan Audino, Chair
- GW Pharmaceuticals – Peter Gibson
- SC Laboratories – Josh Wurzer
- SCIEX – Paul Winkler
- SPEX – Patricia Atkins
- Sigma Aldrich – Jennifer Claus
- CEM – Bob Lockerman

Medical Cannabis Background

- Medicinal Marijuana is legal in 24 states & D.C.
- Schedule I Drug = “No medicinal value” → Federal Prohibition
- States are self-regulated
- Several require analytical testing
  - Potency
  - Pesticide Residue
  - Microbial
  - Solvent Residue
Medical Cannabis Background

• The PLANT
  • Highly complex herb; heterogeneous within and between
  • More than 400 constituents – approximately 114 are “phyto cannabinoids” which are naturally occurring cannabinoids
  • About a dozen of these have demonstrated medicinal value
  • Only one is psychoactive
  • More than 29 flavonoids

• The CANNABINOIDS
  • All contain carboxylic acid groups that are kicked off with heat
  • Interest in both “acid” and “neutral” compounds
  • Cannabinoid acids are devoid of psychotropic effects

Some Medicinal Applications & Benefits

• Decreases intra-ocular pressure – **Glaucoma**
• Provides some abatement of severe anxiety – **PTSD**
• Reduces seizure activity; in some cases from 300 to 1/week
• Provides suppression of muscle spasms – **Multiple Sclerosis**
• Provides calming effect on the immune system - **Lupus**
# How does this work?

- **Endocannabinoid Receptor System (ECS)**

- Discovered in mid-1990s and found in every living being except insects.

- Two known receptors (more expected on the horizon)
  - CB1 and CB2

  - CB1: predominantly found in the brain; helps modulate and moderate pain

  - CB2: primarily found in the immune system; has anti-inflammatory properties
Cannabis “Dosing”

- Inhalation: Smoke, Vapors
- Transdermal: Patches, Salves
- Oral: Edibles, Tinctures
- Most challenging: Edibles
- Hottest Topic of the Day: Pesticide Residues
Cannabis in chocolate to be as normal as caffeine in drinks, says startup Défoncé Chocolatier

Related tags: Marijuana, Cannabis, Apple, California

Défoncé Chocolatier’s founder and CEO, Erik Cairns, is waiting for the final vote on California’s Adult Use Marijuana Act in November. If passed, the cannabis-infused chocolates can be sold in the state for recreational purposes.

“When I started this company, the main’s focus was solely on creating a high-purity vehicle for people to get high,” the former marijuana producer turned chocolatier told ConsumerNews.

Défoncé currently has eight chocolate bars. Each bar is 100 g and sells for $30 in California.

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Food Items & Label Claims
Significance

If edibles are the vehicle for dosing, then knowing what and how much of the analyte is present becomes the single most critical factor.

Reliable and Effective Testing is IMPERATIVE.

What does this mean?

• Producers are making potency and constituent claims.
• How can they be challenged?
• **Consumer Safety**
Analytical Challenges

• COMPLEX MATRIX
  • Raw Plant material
    • Trim
    • Bud
    • Flower
    • Stem
    • Composite

• Heterogeneity
  • Within a single plant
  • Between different plants – same strain or different strains

Analytical Challenges

• Food Matrices
  – when is cannabis introduced into the product?
    • Beginning of process
    • Mid-Process
    • Topical/surface

- What is the end product?
  - And what/if any loss in cannabis is realized?
Significance and Implications

- The LACK of consensus methods
  - Inadequate testing
  - Inappropriate testing
  - Non-Reproducibility
  - Inherently unreliable

- Constant battle between growers and test labs → SAMPLE SIZE

- Instrumentation – better testing costs more in $$ and time

- Balancing scientific acumen with business

General Analytical Needs

- Potency
  - THC, THCA, THCV
  - CBD, CBDA, CBDV
  - CBG
  - CBN

- Pesticide Residues
- Matrices
  - Raw
  - Extracts
  - Edibles
General Analytical Needs

- Consensus methods
  - Validated
  - Statistically Sound
  - Reproducible
  - Repeatable
  - Reliable
  - Robust
  - Correct Technology
- Affordable to consumers
- Traditional methodology

Challenges

- Federal Prohibition
- Matrix Effects
- Fiscal concerns:
  - Sample Size
  - Instrumentation
  - Analyst skill set
  - Turn-around-time
  - Qualitative vs. Quantitative
- Pesticides – which ones??
General Methods:
US Herbal Pharmacopoeia Monograph

- No standardized methods
- Methods are outlined but seem to lack validation data.

- GC-FID: quantitation of phytocannabinoids
- ICP-MS: Metals (Ar, Cd, Cr, Pb, Hg)
- GC/HPLC: Pesticides
  - Refers to FDA Pesticide Analytical Manual
- TLC

No /Inconsistent Regulatory Guidance

- NO Federal Guidance: FDA EPA USDA
- States are self regulating and developing their own sets of standards and requirements
  - ISO/IEC 17025
  - TNI
  - Other
  - None
- State Oversight
  - DOH
  - Agriculture
  - Commissions
  - Other
Sense of Urgency

- In the interest of consumer safety, an advisory panel has formed and is committed to developing consensus methods for specific use in the cannabis industry.

- The field is large; our initial objective(s) is to systematically target most urgent needs which may include:
  - Determining the most cost efficient and scientifically sound sample preparation method(s)
  - Determining potency of the most significant phyto-cannabinoids
    - For example: THC, THCA, THCV, CBD, CBDA, CBDV, CBN, CBG
  - Determining pesticide residues
  - Determining solvent residues

Proposed Fitness for Purpose

~ Standard Methods Performance Requirements (SMPRs) for quantitative methods for various measurements of cannabinoids in raw materials and extracts ~
Next Steps

• Form Working Group(s) of interested and capable personnel with commitment to solve this problem.

• Advantages
  • Close work with highly reputable analysts
  • Be a trend setter!
  • Be among the first to establish critical methods for the benefit of consumer safety

QUESTIONS & DISCUSSION

Susan Audino, PhD
Susan.Audino@gmail.com
410.459.9208
Stakeholder Panel on Strategic Food Analytical Methods: Background and Fitness for Purpose for Proanthocyanidins in Cranberry Products

Brian Schaneberg
Dallas, TX
September 18, 2016

Background on the Analyte

- Cranberry juice has been used traditionally for the treatment and prevention of urinary tract infections
- Effectiveness first demonstrated by Avorn, et. al. in a randomized, double-blind, placebo-controlled study in 1994
- Sobota first proposed a bacterial (E. Coli) anti-adhesion (uroepithelial cell) mechanism for cranberry in 1984
- Howell, et. al. used an anti-adhesion bioassay directed fractionation of cranberry juice and identified A-Type proanthocyanidins as the active components in 1998
- Feliciano, et. al. have also shown A-type PACs inhibited gut colonization of uropathogenic E. coli in 2013
**Structures of PACs**

Mixtures of oligomers and polymers composed of flavan-3-ols

**Flavan-3-ols**

![Flavan-3-ols](image)

- (+)-Catechin
- (-)-Epicatechin

**Oligomeric and polymeric PACs**

![Oligomeric and polymeric PACs](image)

- DP: degree of polymerization
- Oligomers: DP 2–10
- Polymers: DP > 10
- Epicatechin is the primary constituent monomer in cranberry PACs

**Cranberry PACs are unique**

![Cranberry PACs are unique](image)

- 95% of cranberry PAC oligomers contain 1 or more A-type bonds.
- 26% of cranberry PAC oligomers contain 2 or more A-type bonds.
Background on the Analyte (continued)

- Cranberries containing proanthocyanidins are typically not consumed “as is” due to their naturally low sugar content and high acid content, compared to common fruits such as apples and grapes, and instead are used in a wide variety of ways or products such as beverages, sauces and relishes, dried cranberries, snacks, ingredients (juice concentrate, dried powders, extracts) and dietary supplements.

- In addition to urinary tract health, proanthocyanidins contribute to the antioxidant activity exhibited by cranberry and other fruits rich in polyphenolic compounds.

Significance (or implications)

- Companies want to market products (foods, dietary supplements, medical foods and botanical drugs) that can be formulated to deliver effective and consistent concentrations of proanthocyanidins to consumers.

- Need to standardize products used by researchers for clinical studies.

- Companies need to evaluate the impact of processing on and the shelf-life of proanthocyanidins in various products.
General Analytical Needs

Recognize two basic analytical needs:
1. Quantitative QC method to support product manufacture
   a) Quick
   b) Easy
2. Qualitative method to verify authenticity

Challenges

- Recognize four primary challenges in the analysis of cranberry proanthocyanidins
  1. Analyte heterogeneity and complexity
     a) Not a single compound
     b) Wide range of DP and Isomers
     c) Differentiating structural characteristic (A-type versus B-Type)
  2. Range of solubility impacts sample preparation and analysis
  3. Lack of standards
     a) Results differences between methods
  4. Achieving methodology consensus
Existing Methods (Official)

- Two AOAC methods of analysis (2012.24 and 2013.03)
- Applicable to cocoa based matrices
- NP-HPLC Chromatography
- Quantify procyanidins from DP1-10 based on Fluorescence RF

Existing Methods (Official)

- European Pharmacopeia
- Dried hawthorne berry assay procedure (assay minimum 1.0%)
- Colorimetric method
- Reports procyanidin content expressed as cyanidin chloride
Existing Methods (General)

- Gravimetric assays
  - Bioassay directed fractionation
- Ytterbium precipitate
- DMAC based colorimetric assays
  - BL-DMAC
  - ICT BL-DMAC
  - CPS BL-DMAC
  - OSC DMAC
- Vanillin colorimetric assay
- Acid Butanol colorimetric assay
- Bates-Smith colorimetric assay
- Thiolysis/Phloroglucinolysis
- Chromatography
  - HPLC
  - Size exclusion

PAC Method Survey Study

<table>
<thead>
<tr>
<th>Method</th>
<th>Principal</th>
<th>Standard</th>
<th>Blank</th>
<th>Pros vs. Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>BL-DMAC</td>
<td>DMAC react with terminal unit of PAC molecules to form a colored compound detected at 640 nm</td>
<td>A2</td>
<td>solvent</td>
<td>Fast, high throughput; standard no ideal</td>
</tr>
<tr>
<td>ICT BL-DMAC</td>
<td>DMAC react with terminal unit of PAC molecules to form a colored compound detected at 640 nm</td>
<td>A2</td>
<td>solvent</td>
<td></td>
</tr>
<tr>
<td>CPS BL-DMAC</td>
<td>CPS BL-DMAC</td>
<td>A2</td>
<td>solvent</td>
<td></td>
</tr>
<tr>
<td>CPS DMAC-c PAC</td>
<td>CPS DMAC-c PAC</td>
<td>c-PACs</td>
<td>solvent</td>
<td>c-PAC is more accurate than A2; not commercially available</td>
</tr>
<tr>
<td>OSC-DMAC</td>
<td>Vanillin react with PAC to form a colored compound detected at 500 nm</td>
<td>RF</td>
<td>solvent</td>
<td>Good for cranberry products; not accepted outside OSC</td>
</tr>
<tr>
<td>Vanillin</td>
<td>Vanillin react with PAC to form a colored compound detected at 500 nm</td>
<td>catechin</td>
<td>sample</td>
<td>Time consuming; less sensitive; overestimated PACs</td>
</tr>
<tr>
<td>Acid Butanol</td>
<td>PACs molecules are cleaved and converted to anthocyanidins detected at 550 nm</td>
<td>c-PACs</td>
<td>solvent</td>
<td>Easy to operate; overestimate PACs; water content and ions affect results</td>
</tr>
<tr>
<td>Bates-Smith</td>
<td>PACs molecules are cleaved and converted to anthocyanidins detected at 550 nm</td>
<td>c-PACs</td>
<td>sample</td>
<td>Easy to operate; Water content and metal ions affect results; side reaction</td>
</tr>
<tr>
<td>European Pharmacopoeia</td>
<td>Degradation of PACs into monomers and then analysed using HPLC</td>
<td>RF</td>
<td>solvent</td>
<td>A pharmacopeia method; for hawthorn berries</td>
</tr>
<tr>
<td>Thiolysis</td>
<td>Degradation of PACs into monomers and then analysed using HPLC</td>
<td>epicatechin</td>
<td>solvent</td>
<td>Total PACs and mean DP; Thiol agent is not lab-friendly; time consuming</td>
</tr>
<tr>
<td>HPLC</td>
<td>2-8 mers are separated and quantified, polymers&gt;10 are eluted together</td>
<td>epicatechin</td>
<td>A2, RF</td>
<td>USDA accepted method; No response factor for A-type oligomers</td>
</tr>
<tr>
<td>Gravimetry</td>
<td>PACs are extracted, purified and weighted</td>
<td>NA</td>
<td>NA</td>
<td>Time consuming, easy to overload</td>
</tr>
</tbody>
</table>
PACs Content in Fruit

Regulatory Guidance (if any)

- To date there has been only one regulation issued regarding the proanthocyanidin content of cranberry products.
- In 2004 the French agency AFSSA, now known as ANSES, approved a urinary tract health claim saying a product must contain 36 mg of proanthocyanidins.
- In 2010 this claim was modified to say a product must contain 36 mg of proanthocyanidins as measured by the BL-DMAC method, which had been recently published by Prior, et. al.
Proposed Fitness for Purpose

The method should be applicable to the analysis of cranberry fruit, juice, beverage, dried cranberry, cranberry sauce, ingredients (concentrates, extracts and powders) and dietary supplement formulations, applicable to two potential purposes:

1. Quantitative QC method
   Able to quantify total proanthocyanidin content, preferentially as the total sum of all individual oligomers and polymers present, or alternatively as the total sum with reference to a suitable surrogate standard, in samples typically ranging from 0.01% to 55% on a w/w basis

2. Qualitative method to verify authenticity
   Able to provide information on the distribution of proanthocyanidin oligomers and polymers present and confirm presence of A-type versus B-type
AOAC International
Stakeholder Panel on Strategic Food Analytical Methods:
Emerging Contaminants & Multi-Residue Analysis of Veterinary Drugs

Lucie RACAULT, Thomas BESSAIRE, Aurélien DESMARCHELIER & Thierry DELATOUR*
Nestlé Research Centre, Lausanne, Switzerland

*Member of Chemical Contaminants and Residues in Food Community
*Chair of Subgroup Environmental & Emerging Contaminants

Sept. 18, 2016

AOAC International
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AOAC 130th Annual Meeting & Exposition, Dallas, TX, Sept. 18-21, 2016

Community
Chemical Contaminants and Residues in Food

► Subgroup ‘Veterinary drugs’
  Meeting on Tuesday 20 September, 11:45 am – 1:15 pm

► Subgroup ‘Metals’
  Meeting on Tuesday 20 September, 1:30 pm – 3:00 pm

► Subgroup ‘Environmental and Emerging Contaminants’
  Meeting on Tuesday 20 September, 4:30 pm – 6:00 pm

► Subgroup ‘Pesticides’
  Meeting on Tuesday 20 September, 6:15 pm – 7:45 pm

Community meeting on Monday 19 September, 5:00 pm – 7:00 pm
New Topics of Interest

► **Subgroup ‘Environmental and Emerging Contaminants’**
  - Validation procedure (guidelines?) for fingerprinting-based methods
  - Guidelines for untargeted analysis aimed at identifying unknowns
  - Platform for suitable information in the case of a response to crisis

► **Subgroup ‘Veterinary drugs’**
  - International Standard for multiresidue analysis of veterinary drugs in food
Veterinary Drugs

**Definition**

“Any substance applied or administered to any food-producing animal, such as meat or milk producing animals, poultry, fish or bees, whether used for therapeutic, prophylactic, or diagnostic purposes, or for modification of physiological functions or behaviour.”

by Codex Alimentarius

**Use & Actions**

- To treat an existing illness
- To prevent future diseases
- To promote growth

Main pharmacological actions:
- Antibiotics to control bacterial diseases
- Sedative, pain killers and anti-inflammatory medicines
- Wormers (anthelmintics) to control internal parasites
- Coccidiostats to control protozoal diseases in poultry
- Carbamates and pyrethroids to control external parasites
- Dyes (Malachite green) as fungicide, parasiticide, and disinfectant in aquaculture
- Substances having anabolic effect (Stilbenes, antithyroid agents, steroids, resorcylic acid lactones, beta-agonists)

**Regulation & Health Issues**

- **MRLs:** Maximum Residue Limits from mg/kg (ppm) to < µg/kg (ppb). A withdrawal period must be respected to avoid residues in animal tissues.
- **Prohibited substances:** These substances are not allowed to be administered to food-producing animals. E.g. Listed in Commission Regulation (EU) No 37/2010 under prohibited substances for which MRLs cannot be established (e.g. Chloramphenicol, Nitrofurans)

- Antibiotic used for treating animal diseases are also applied in human medicine
- MRLs must be respected to avoid increasing bacterial resistance to antibiotics used in therapeutics
- **Acute:** Allergenicity/Hypersensitivity/β-Agonist
- **Long term:** Teratogens/Cancer
Antimicrobial Resistance

“The overlap of critical lists for human and veterinary medicine can provide further information, allowing an appropriate balance to be struck between animal health needs and public health considerations”

Integrated Approach for Analytical Development

Team of experts to define an integrated approach

Early Warning/Chemical Contaminants Experts/Corporate Quality
Assess likelihood of occurrence
Anticipate and mitigate incidents

Agricultural Services (Corporate and Zones)
Field information
Fraud scenarios
Training

Regulatory
Local regulation (e.g., EU, US, China etc…)
Codex

Corporate requirements

Alignments on official national control plan
Alignment with authorities control plan in global monitoring program

Analytical Development

Early Warning

Agricultural

Local Needs

Corporate requirements

Official Control

Alert System

Market and specific needs
Supply constraints
Operator skills
Specific regulation
Restricted importation

Corporate Requirements
Analytical Volume
Internal vs External Approach

Internal Alerts System
Early Warning, Positive findings data capture system

External Alerts
Consumers, Suppliers, Contaminants network

Critical Important Antimicrobials for Human Medicine
3rd Revision 2015
Quality Testing along the Supply Chain & Manufacturing

- Farm
- Raw material collection center
- External supplier
- Arrival at factory
- Factory raw material warehouse
- Factory line
- Finished product warehouse
- Rapid methods for effective release
- Confirmatory methods for full compliance
**Literature Available for Veterinary Drugs by LC-MS/MS**

Over 77 methods described from 2009 on...  

- 65 methods developed for a single food matrix  
- 7 methods developed for two food matrices  
- 5 methods developed for more than two food matrices

https://www.scopus.com/  
Keywords: Veterinary drugs, LC-MS/MS, multi-class, validation, pub year > 2009

---

**What About Fitness-for-Purpose?**

- M. Danesaki and N. Thomaidis (Analytica Chimica Acta, 2015, pp 103-121)  
  - Validated level ≥ 100 µg/kg for all the 155 compounds i.e. far above numerous MRL  
  - Incomplete and/or not compliant for some Penicillins, Cephalosporins, Tetracycline, β-Agonists, Steroids...

- S. Chung and C.-H. Lam (Analytical Methods, 2015, pp 6764-6776)  
  - 78 compounds without inclusion of Penicillins, Sulfonamides, or Tetracyclines  
  - Incomplete and/or not compliant for some Amphenicols, Cephalosporins, Quinolones, β-Agonists, Steroids...

- X.-J. Deng et al. (Journal of Liquid Chromatography and related Technology, 2011, pp 2286-2303)  
  - 105 compounds without inclusion of Penicillins, Cephalosporins, ß-lactams etc.  
  - Incomplete scope for Tetracyclines
What About Fitness-for-Purpose?

- C. Robert et al. (Food Additives and Contaminants Part A, 2013, pp 443-457)
  - Most complete scope (154 analytes in milk, muscle, egg and honey)
  - Incomplete and/or not compliant for some Penicillins, Cephalosporins, Tetracycline, β-Agonists, Steroids

- D. Chen et al. (Journal of Chromatography B, 2016, pp 82-88)
  - Validation level claimed between 1.5 – 8 µg/kg, but validation data not shown
  - Calibration curves in solvent for matrices as different as edible muscles, hen eggs, and cow’s milk

- M. Danesaki and N. Thomaidis (Analytica Chimica Acta, 2015, pp 103-121)
  - Validation level = 100 µg/kg for all the 155 compounds i.e. far above numerous MRLs
  - Incomplete and/or not compliant for some Penicillins, Cephalosporins, Tetracycline, β-Agonists, Steroids

- S. Chung and C.-H. Lam (Analytical Methods, 2015, pp 6764-6776)
  - 78 compounds without inclusion of Penicillins, Sulfonamides, or Tetracyclines
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- X.-J. Deng et al. (Journal of Liquid Chromatography and related Technology, 2011, pp 2286-2303)
  - 105 compounds without inclusion of Penicillins, Cephalosporins, Avermectins etc.
  - Incomplete scope for Tetracyclines

A Compliance-driven Approach

**Multi-class**

- (n = 105)
  - Aminocoumarins (3), Amphenicols (3), Diaminoptyrimidines (2), Lincosamides (2), Macrolides (8), Quinolones (18), Rifamycins (2), Streptogramins (1), Sulfonamides (22), Avermectins (6), Benzimidazoles (14), Diphenylsulfoxides (1), Halogenated phenols (2), Imidazothiazoles (1), Organophosphates (1), Salsolinolides (4), Tetracyclomycinides (2), NSAIDs (5), Coccidiostats (12), Tranquilizers (3).
### A Compliance-driven Approach

<table>
<thead>
<tr>
<th>Class</th>
<th>Compounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetracyclines</td>
<td>Chlortetracycline + 4-epi, Demedicycline + 4-epi, Doxycycline + 6-epi, Tetracycline + 4-epi, Tetracycline + 4-epi.</td>
</tr>
<tr>
<td>Aminoglycosides</td>
<td>Apramycin, Dihydrostreptomycin, Gentamycin (C1, C2, C2), Hygromycin B, Kanamycin (A), Neomycin (B), Paromomycin, Spectinomycin, Streptomycin, Tobramycin, Amikacin.</td>
</tr>
<tr>
<td>Beta-lactams</td>
<td>Penicillins (12), Cephalosporins (11).</td>
</tr>
<tr>
<td>Growth pro.</td>
<td>β-Agonists (8), Anabolic steroids (6), Stilbenes (3), Reovacyclic lactones (3), Corticosteroids (7).</td>
</tr>
<tr>
<td>Multi-class</td>
<td>Aminocoumarins (1), Amphenicols (3), Diaminopyrimidines (2), Lincosamides (2), Macrolides (8), Quinolones (18), Rifamycins (2), Streptogramins (1), Sulfonamides (22), Avermectins (6), Benzimidazoles (14), Diphenylation (1), Halogenated phenols (1), Imidazothiazoles (3), Organophosphates (1), Salicylanilides (4), Tetrahydropyrimidines (1), NSAID (5), Coccidiostats (12), Tranquillers (3).</td>
</tr>
</tbody>
</table>

$n = 179$
Stream for 23 β-Lactams

- Low MRL requirement e.g. 4 µg/kg in milk for Amoxicillin (Commission Regulation (EU) No 37/2010)
- Massively used as broad spectrum antibiotic. No amoxicillin = no method for β-lactams
- Polar compound(s) with multiple pKₘ but sensitive to acidic/basic conditions

→ **Multiclass, Multiresidue Methods fail to cover all β-lactams at their MRL**

![LC-MS/MS chromatograms of 23 β-lactams in an infant formula spiked at 1x STC level](image)

Stream for 10 Tetracyclines

- Chlortetracycline, Oxytetracycline, Tetracycline are regulated as « the sum of parent drug and its epimer » (Commission Regulation (EU) No 37/2010)
- Chromatographic challenges:
  - Separation between parent drug and corresponding epimer
  - Chelation of compounds in the LC-MS/MS system

→ **Multiclass, Multiresidue Methods fail to cover all tetracyclines and epimers**

![LC-MS/MS chromatograms of 10 Tetracyclines in chicken powder spiked at 1x STC (25 µg/kg)](image)
Relevant Food Commodities

An approach including raw materials, semi‐finished and finished products

<table>
<thead>
<tr>
<th>Milk-based products</th>
<th>Meat/Seafood-based products</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Milk-based products image]</td>
<td>![Meat/Seafood-based products image]</td>
</tr>
</tbody>
</table>

The «USUALLY-SHOWN» matrices
- Raw milk
- Fresh or cooked meat, fish and seafood

The «FORGOTTEN» matrices
- Milk fractions
  (e.g. Skimmed milk powder, whey protein concentrate, hydrolyzate, lactose etc.)
- Formulae with milk
  (e.g. Infant, follow-on, grow-up formulae, hydrolyzed formulae, adult formulae etc.)
- Infant Cereals with milk
- Meat, fish and seafood powder
  (e.g. Shrimp, duck, meat, pork, lamb, beef, chicken, seal etc.)
- Infant Cereals with meat tissues
- Formulae with meat tissues
- Babyfood in jars and pots
  (based on vegetables, meat/fish, pasta, cereals, vegetable oil etc.)

✓ Need for «Quick Easy Cheap Rugged and Safe» like methods
Beyond Raw Milk Analysis

“Whole milk powder and skimmed milk powder will remain the most traded agricultural commodities”

监测数据：兽药残留监控

- 确认的阳性样本：15
- 总样本数：1,912
- 阳性率：0.78%

2012年，非合规样本：1,000
- 总样本数：425,000
- 非合规率：0.24%
Monitoring Data for Veterinary Drug Residues

Overall, non-compliance is steady or decreasing

Analytical Strategy

- **Aim**: to check if samples are below or potentially above the Screening Target Concentration (STC)
- **Results**: are either < STC (given in µg/kg) or **Suspect**
- **Response**: relative comparison between Peak Area in Unspiked Sample ($A_u$) vs. Peak Area in the related Spiked Sample ($A_s$)

**Validation scheme according to EU CRL 2010 / 01 / 20**

- **Samples**
  - **Milk-based products**: Milk fractions (16), infant formulae & milk powders (15), milk-based infant cereals (5)
  - **Meat/Seafood products**: Meat/seafood powders (10), Meat/seafood fresh and cooked (10), meat-based baby foods
- **Design**
  - 67 samples
  - Fortified at 0, 1, 2 STC
  - Three analysts involved
  - Over 15 days
- **Quality Criteria**
  - Cut-off level: False suspect rate: < 10%
  - False negative rate: < 5%
  - Retention time: < 0.2 min
  - Identification: 2 MRM

**Full validation by the developing lab + Multi-site implementation (France, Singapore, USA)**
Uncontrolled occurrence of veterinary drugs in food is a health concern, particularly with regard to antimicrobial resistance.

Multiresidue analysis is needed for an effective control.

Mass spectrometry is needed for full compliance testing.

A single LC-MS-based method capable to demonstrate full compliance of veterinary drugs in food does not exist so far.

Matrix scope should represent current practices in terms of trade and business.

Method performance should fit with throughput and positive rate for as-low-cost-as-possible analysis.
International Stakeholder Panel on Alternative Methods (ISPAM)

- Driven and supported by AOAC Organizational Affiliates and contributing members who participate in the AOAC Research Institute Program

- ISPAM was formed initially to develop harmonized, internationally accepted standard validation guidelines for alternative (rapid) chemical and microbiological methods by leveraging global networks of experts to reach consensus on an analytical validation protocol.

- The goal is to achieve optimal efficiency and avoid duplication of efforts in order to meet regulatory and product safety testing requirements.

- Initially three (3) working groups:
  - Microbiology
  - Qualitative Chemistry
  - Statistics
**ISPAM Highlights/Accomplishments**

- Approved harmonized approaches for several testing parameters *according to ISO 16140 parts 1 and 2*
  - Number of levels/samples/fractional positives
  - Results analysis/criteria/statistical analysis
  - Number of data sets for collaborative study/sample size
  - ISPAM voted to recommend to replace “all foods” with a claim for a “broad range of foods”

---

**ISPAM Highlights/Accomplishments**

- *Appendix N: ISPAM Guidelines for Validation of Qualitative Binary Chemistry Methods*
  - Approved March 14, 2013

- First Microbiology SMPR approved- 2014.017 Detection of Salmonella species in romaine lettuce and baby spinach as presented.
  - Unanimous approval on 9/6/14
Changing the Course

– How can we develop SMPRs in areas of interest to the Stakeholders?
– Consensus based priorities drive the direction of ISPAM
– SMPRs, developed and approved by Stakeholders, are used to evaluate the best candidate methods for possible adoption as First Action Official Methods™
– Accepted worldwide, relevant and valuable to industry

ISPAM Mid-Year Meeting 2016

• Panel discussion on Global Food Safety Needs
  – Speakers
    • GMA
    • FDA-ORA
    • USDA-FSIS
    • Chinese Institute of Food Science and Technology
    • University of Buenos Aires
    • Laboratorio Tecnologico del Uruguay
  – Most critical needs
    • Allergen detection methods
    • Enrichment issues with Pathogen Detection
    • Environmental Sampling Plans and Testing- Data Acceptance
    • Whole Genome Sequencing- Standards
• AOAC-RI Board of Directors agreed to form a working group on food allergens
  – Focus on rapid method technology
  – Molecular, Immunoassay, new and emerging technologies
  – Complement to SPSFAM current WG for select allergen detection using mass spectroscopy.

---

Background and positioning our Working Group

- Working Group reporting to the AOAC International Stakeholder Panel on Alternative Methodologies (ISPAM) to improve food allergen methods.

- WG tasked specifically to develop recommendations for the establishment of Standard Method Performance Requirements (SMPR) for food allergen methodologies

- WG creation follows a priority setting exercise for work on Food Allergens SMPR – Thought Leader Advisory Meeting on June 15th at AOAC HQ.
Background on Food Allergens Methods

- Most Methods are Antibody based methods:
  - ELISA tend to dominate existing methodologies being applied for food control purposes
  - Other detection approaches are possible e.g. SPR-based biosensors

- Some methods are DNA/RNA based methods – used generally as complementary methods (particularly in jurisdictions where the regulations are based on protein requirements)

- Methods based on Mass-Spectrometry detection (with the associated separation technique) are confirmatory approaches.

Outputs of the AOAC Priority Setting process – Meeting June 15th 2016

- Recommendations were made to consider the following priorities:
  - Egg
  - Milk
  - Tree nuts (priority to be determined)
  - Peanut
  - In a parallel track to examine Gluten based methodologies

- Recommendation to consider ELISA-based methodologies as a priority, both plate-based methods (Quantitative approaches) and Lateral flow device based techniques (semi-quantitative methods generally).

- Leverage work conducted previously under the auspices of AOAC’s Food Allergen Community between 2006-2015 and SPSFAM in 2015-2016
PURPOSE

To develop recommendations for SMPRs for ELISA-based Food Allergen Methods using the priority sequence established by the Thought Leader Advisory group

Agenda

International Stakeholder Panel on Alternative Methodology (ISPAM)
Advisory Panel on Food Allergens

Sunday, September 18, 2016
Meeting Start Time: 8:30AM (Central US)

I. WELCOME & INTRODUCTIONS (Bradford/Crowley – 8:30AM-8:45AM)

Jim Bradford (AOAC) will open the meeting and initiate the introduction of participants, and introduce the chair, Erin Crowley who will call the meeting to order.

II. AOAC ISPAM OVERVIEW/UPDATE/GOALS (Crowley – 8:45AM-9:00AM)

Crowley will review the ISPAM meeting Agenda and meeting goals. She will give an overview of ISPAM and provide background on the new ISPAM effort to develop standards for the rapid detection of priority area food allergens as determined by the Food Allergen Advisory Panel at their meeting on June 15, 2016.

III. STANDARDS DEVELOPMENT PROCESS/ORIENTATION (9:00AM-9:30 AM)

Deborah McKenzie and Scott Coates (AOAC) will provide information on the AOAC standards development process and the development of Standard Method Performance Requirements (SMPRs).
IV. ISPsAM WORKING GROUP ON FOOD ALLERGEN ASSAYS - CHAIR PRESENTATION INCLUDING FITNESS-FOR-PURPOSE (Working Group Chair – 9:30AM – 12:00PM) Samuel Godefroy (Université Laval)

Godefroy will present an overview of prioritized food allergens (egg, milk, peanut, and tree nut of choice), including background, analytical challenges, regulatory requirements, and fitness-for-purpose for each. He also will present a recommendation for the initial food allergen SMPR to be undertaken by ISPsAM WG on Food Allergen Assays. ISPsAM members will discuss and come to consensus on the first priority SMPR.

~ WORKING LUNCH (12:00PM – 1:00PM) ~

V. WORKING GROUP ON FOOD ALLERGEN ASSAYS (Godefroy/Coates 1:00PM – 2:30PM)
1. Review of Endorsed Fitness-for-Purpose
2. SMPR Development

VI. NEXT STEPS (Crowley/McIver – 2:30PM – 2:45PM)

Erin Crowley (Q Laboratories) and Krystyna McIver (AOAC) will discuss next steps for the working group activities, wrap up all discussions and answer any additional questions.

~AFTERNOON BREAK – 2:45PM – 3:00PM~

VII. WELCOME & INTRODUCTIONS (Crowley – 3:00PM-3:15PM)

Erin Crowley (Q Laboratories, Inc.) will welcome all to the second half of the meeting and introduce the Agenda for the afternoon session, which will deal with ISPsAM harmonization efforts.

VIII. NEED FOR METHOD ACCEPTANCE CRITERIA FOR QUANTITATIVE METHODS (TBD - 3:15PM-4:00PM)

IX. DEVELOPMENT OF STANDARDS FOR THE DETECTION OF BACTERIA IN CANNABIS – ISPsAM POTENTIAL INVOLVEMENT IN – (TBD - 4:00PM-4:45PM)

X. NEXT STEPS/WRAP-UP (Crowley/McIver – 4:45PM-5:00PM)

Erin Crowley (Q Laboratories) will discuss next steps for ISPsAM activities, wrap up all discussions and answer any additional questions.
Collaborations with SPSFAM

• Address specific method/technology needs
  – Unique client needs
  – Analyte/Target combination not currently approved
  – Advantages
    - *Method Developers in ISPAM*
    - *Potential Customers in SPSFAM*