AAFCO 2021
LABORATORY
CAPABILITY
SURVEY -
PURPOSE

To assess current laboratory analytical capabilities in response to the method needs survey sent to State Agriculture Regulatory Programs in 2020

Gather data on current capabilities

Gather data on method needs

Gather data on training needs

Gather data on equipment/technology needs

Implement a strategic plan for addressing the hazards/contaminants of concern identified by the State Agriculture Regulatory
GENERAL STATISTICS - RESPONSES

- All state agriculture laboratories were sent the survey – only State labs received this survey - no private, federal or local labs
- 23 State Agriculture laboratories responded to the survey – Thank you! 😊
DOES YOUR STATE AG LAB ATTEND AND/OR PARTICIPATION IN THE AAFCO LMSC?

<table>
<thead>
<tr>
<th>Yes - Attend</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>4</td>
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</tbody>
</table>
DOES YOU LABORATORY PARTICIPATE IN THE AAFCO PT PROGRAM?

Yes: 22
No: 1
ACCREDITATION STATUS OF RESPONDING LABORATORIES

- ISO17025:2017 Accredited
- Working towards accreditation
- No plans to become accredited
- Lab wants to be accredited - lack of funding
MICROBIOLOGY TESTING CAPABILITY SUMMARY

- **Have Capability**
- **No - our lab does chemical testing only**
- **Not currently - Need equipment**

The chart shows the distribution of the capability to perform microbiology testing. It indicates that a significant portion of the respondents do not currently have the capability, likely due to the need for equipment.
MICROBIOLOGICAL METHOD CAPABILITY – DETECTION AND ISOLATION OF SALMONELLA SPP.

Methodology

- Salmonella FDA BAM Chapter 5
- Salmonella rt-PCR
- Salmonella rapid test kit
MICROBIOLOGICAL METHOD CAPABILITY – DETECTION AND ISOLATION OF LISTERIA

Methodology

- Listeria VIDAS and FDA BAM Chapter 10
- Listeria rt-PCR
- Listeria other rapid test kit
MICROBIOLOGICAL METHOD CAPABILITY – DETECTION AND ISOLATION OF SHIGA TOXIN-PRODUCING E. COLI (O157:H7 AND NON-O157 STEC)

Methodology

- STEC and O157:H7 by FDA BAM Chapter 4
- E. coli O157:H7 ONLY VIDAS and FDA BAM
- E. coli O157:H7 only rt-PCR and FDA BAM Confirmation
MOLD IDENTIFICATION

NONE OF THE SURVEYED LABORATORIES REPORTED CAPABILITY FOR THIS ANALYSIS
TOXIC METALS CAPABILITY – ARSENIC SPECIATION

- No Capability - Need Equipment: 60.00%
- Have Capability - Need Method: 10.00%
- Have Capability - Need Training: 20.00%
- Have Capability: 0.00%
TOXIC METALS CAPABILITY – CHROMIUM

- No Capability - Need Equipment
- Have Capability - Need Method
- Have Capability - Need Training
- Have Capability
TOXIC METALS CAPABILITY – CHROMIUM SPECIATION

- No Capability - Need Equipment: 70.00%
- Have Capability - Need Method: 30.00%
- Have Capability - Need Training: 20.00%
- Have Capability: 10.00%
TOXIC METALS CAPABILITY – COBALT

- Have Capability
- Have Capability - Need Method
- Have Capability - Need Training
- No Capability - Need Equipment
TOXIC METALS CAPABILITY – LEAD

- No Capability - Need Equipment
- Have Capability - Need Method
- Have Capability - Need Training
- Have Capability
TOXIC METALS CAPABILITY – NICKEL

- Have Capability
- Have Capability - Need Method
- Have Capability - Need Training
- No Capability - Need Equipment
TOXIC METALS CAPABILITY – MERCURY

- Have Capability
- Have Capability - Need Training
- Have Capability - Need Method
- No Capability - Need Equipment
TOXIC METALS CAPABILITY – SELENIUM

- No Capability - Need Equipment
  - 10.00%
- Have Capability - Need Method
  - 0.00%
- Have Capability - Need Training
  - 10.00%
- Have Capability
  - 80.00%
MYCOTOXIN CAPABILITY – TOTAL AFLATOXINS (B1, B2, G1 AND G2)
MYCOTOXIN CAPABILITY – FUMONISIN (B1, B2)
MYCOTOXIN CAPABILITY – DEOXYNIVALENOL (DON)
MYCOTOXIN CAPABILITY – OCHRATOXIN

- Have Capability
- Have Capability - Need Training
- Have Capability - Need Method
- No Capability - Need Equipment
MYCOTOXIN CAPABILITY – ZEARALENONE

- No Capability - Need Equipment
- Have Capability - Need Method
- Have Capability - Need Training
- Have Capability
MYCOTOXIN CAPABILITY – T2 AND HT2

- Have Capability
- Have Capability - Need Training
- Have Capability - Need Method
- No Capability - Need Equipment
DIOXIN

- No Capability - Need Equipment: 60.00%
- Have Capability - Need Method: 40.00%
- Have Capability - Need Training: 20.00%
- Have Capability: 0.00%
PENTOBARBITAL

- No Capability - Need Equipment
- Have Capability - Need Method
- Have Capability - Need Training
- Have Capability
VITAMINS AND VET DRUGS – VITAMIN D BY HPLC

- Have Capability
- Have Capability - Need Training
- Have Capability - Need Method
- No Capability - Need Equipment

0.00% 10.00% 20.00% 30.00% 40.00% 50.00% 60.00% 70.00% 80.00%
VITAMINS AND VET DRUGS – VITAMIN D BY LC/MS

- Have Capability
- Have Capability - Need Method
- No Capability - Need Equipment
- Have Capability - Need Training
VITAMINS AND VET DRUGS – LASALOCID BY HPLC

- Have Capability
- Have Capability - Need Training
- Have Capability - Need Method
- No Capability - Need Equipment
VITAMINS AND VET DRUGS – LASALOCID BY MICROBIOLOGICAL PLATE METHOD

No Capability - Need Equipment

Have Capability - Need Method

Have Capability - Need Training

Have Capability
VITAMINS AND VET DRUGS – MONENSIN BY HPLC

No Capability - Need Equipment
Have Capability - Need Method
Have Capability - Need Training
Have Capability
VITAMINS AND VET DRUGS – MONENSIN BY LC/MS
VITAMINS AND VET DRUGS – MONENSIN BY MICROBIOLOGICAL PLATE METHOD
DRUG RESIDUES BY MASS SPECTROSCOPY

- No Capability - Need Equipment
- Have Capability - Need Method
- Have Capability - Need Training
- Have Capability
PESTICIDE RESIDUES BY MASS SPECTROSCOPY

- No Capability - Need Equipment
- Have Capability - Need Method
- Have Capability - Need Training
- Have Capability
SUMMARY - MICROBIOLOGICAL CAPACITY

- 27% of the labs responding are chemical testing labs only with no micro capability
- 1 lab responded that they could have this capability but need the proper equipment
<table>
<thead>
<tr>
<th>Low training needs identified</th>
<th>Medium Training Needs Identified</th>
<th>High Training Needs Identified</th>
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<tbody>
<tr>
<td>• Toxic metals by ICP</td>
<td>• Ochratoxin and T2/HT2 being the highest needs</td>
<td></td>
</tr>
<tr>
<td>• Mycotoxins – variety of methods based on what equipment lab has</td>
<td>• Monensin LCMS/HPLC</td>
<td>• Dioxin and Pentobarbital</td>
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<tr>
<td>• Pesticide Residues</td>
<td></td>
<td>• Vitamin D - any method</td>
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<tr>
<td></td>
<td></td>
<td>• Drug Residues LCMS or GCMS</td>
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SUMMARY – METHOD NEEDS IDENTIFIED

High Priority Method Needs
- Vitamin D
- Dioxin
- Pentobarbital
- Drug Residues by MS

Medium Priority Method Needs
- Toxic metals including speciation
- Ochratoxin, Zearalenone and T2/HT2 mycotoxins
- Monensin by LC/MS and HPLC

No Method Needs – Well published, variety of methods already exist
- Microbiological Pathogens (Salmonella, STEC, Listeria)
- Aflatoxins, Fumonisins, DON mycotoxins
- Lasalocid by HPLC
**SUMMARY – EQUIPMENT NEEDS (NO CURRENT CAPABILITY)**

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<thead>
<tr>
<th>High Priority</th>
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<tbody>
<tr>
<td>• Plate methods for antibiotics but these methods are antiquated – Is this really a priority if HPLC or LC/MS methods were available?</td>
</tr>
<tr>
<td>• Vitamin D LC/MS</td>
</tr>
<tr>
<td>• Dioxin</td>
</tr>
<tr>
<td>• ICP-MS to perform speciation of toxic metals (Arsenic, Selenium, Chromium)</td>
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<table>
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<th>Medium Priority</th>
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<tbody>
<tr>
<td>• Drug Residues by LC/MS or GC/MS</td>
</tr>
<tr>
<td>• Microbiology testing (pathogens)</td>
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<table>
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<tr>
<th>Low (most labs already have the equipment, but personnel might be an issue)</th>
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<tr>
<td>• Mycotoxins</td>
</tr>
<tr>
<td>• Pesticide residues</td>
</tr>
<tr>
<td>• Toxic metals (ICP-OES or ICP-MS)</td>
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<tr>
<td>• Vet Drugs</td>
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NEXT STEPS

- **Create**
  
  Create Best Practice guidance for existing methods

- **Discuss**
  
  Discuss the possibility of having an “expert lab” hold on-site training for other analysts in need of training

- **Research**
  
  Research existing methods to fill in gaps where methods are needed

- **Form**
  
  Form sub-committees within LMSC to work on each identified need
THANK YOU FOR LISTENING! THANK YOU TO ALL WHO VOLUNTEERED! THANK YOU TO THOSE THAT RESPONDED TO THE SURVEY!