LMSC---Best Practice Workgroup

Phosphorus

2016 Mid-Year AAFCO Laboratory Methods & Services Committee
History/Timeline

- Tackled & completed “Fat”
- Next Topic “Phosphorus”

Mission:

- Create documents to assess methods used & to recommend methods appropriate for feed matrices
- Science based recommendations

Survey

- Compiled based on methodology
- Matrix & phosphorus level dependent
- AAFCO codes included for ease of use
Survey Results

- 20 laboratories responded
  - 10 government
  - 9 state & 1 federal
  - 9 industry & private
  - 1 anonymous (submitted via AAFCO)

- High level P samples seem to be more problematic

- Wide variety of methods or combination of methods in use

- About half of labs responding employ dry ashing, mainly on feed materials
Survey Results, Cont’d

- Mineral mixes generally undergo acid digestion
- 48% quantitate P via ICP
- 34% utilize a colorimetric method
- 17% use a gravimetric method
Comments about Challenges

- Variability
- Liquid Feed w/High Sugar
  - Foaming during dry ashing, cloudy solution
- Colorimetric: None
- ICP: Spectral Line Overlap
  - High Cu may cause interference
  - High Ni can interfere w/Gallium internal standard
  - Wavelength works is 213.619
    - 171 & 178 drift higher over time
Very high levels must be diluted quite a bit
- Adds a step & possible point of error
- Lab uses flow analyzer

Very few problems with ICP & included lengthy paragraph on their QC which is good

6 Labs
- None or did not answer
Survey Conclusions

- High level P samples seem to be more problematic
- Wide variety of methods or combination of methods in use
- About half of labs responding employ dry ashing, mainly on feed materials
- Mineral mixes generally undergo acid digestion
- 48% quantitate P via ICP
- 34% utilize a colorimetric method
- 17% use a gravimetric method
Next Steps

- Phosphorus Matrix Developed
Next Steps

- Phosphorus Matrix Developed
  - AAFCO Codes Used in CSP
  - Matrices & P levels found from original JAOC papers
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<th>Feed, Premix</th>
<th>Feed, Premix</th>
<th>Super Phosphate</th>
<th>Triple Super Phosphate</th>
<th>Calcium Metaphosphate</th>
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<th>Laying Ration</th>
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<th>Monocalcium Phosphate</th>
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William Hoover (TAMU) 50, 937, (1976)

Technical Communication as Referee for minerals in feed

Dry Ash
- Low recovery of P in mineral mix feeds

Wet Ash
- May form refractory compounds when ashed at 550°C, insoluble in following acid digestion portion of method
- Not recognized in collaborative study, sample type not included

Recommend added statement in all dry ash method “not appropriate for mineral mix feeds”

Statement appears in AOAC 968.08 (D)(a)
Conclusions Thus Far

- Survey based on AAFCO CSP method codes
  - High level P most challenging
- JAOAC 59, 937 (1976)
  - Dry Ash methods not appropriate method for mineral mix feed
    - Low recovery for Ca, Cu, Fe, Mn, P, Zn up to 50%
    - Mg least effected by ashing process---only up to 3%
- Matrix by Method and Scope
  - Updated
- Next Steps
  - Help with matrices for ISO methods
  - Circulate updated matrix by methods to WG
  - Write up white paper
Updates

- White Paper
- Matrix vs phosphorus
- Documents reviewed in Denver August 2015
  - No comments received
- Email sent & Documents on Foodshield
  - No comments received

- Workgroup moves that consensus has been achieved, ready for LMSC to vote to accept
Conclusions

- Best Practice Workgroup (BPW) has successfully achieved mission
- BPW moves via consensus that LMSC vote to accept documentation or reject
- BPW moves to move forward with next task
  - Moisture
  - Fiber
  - Other?