



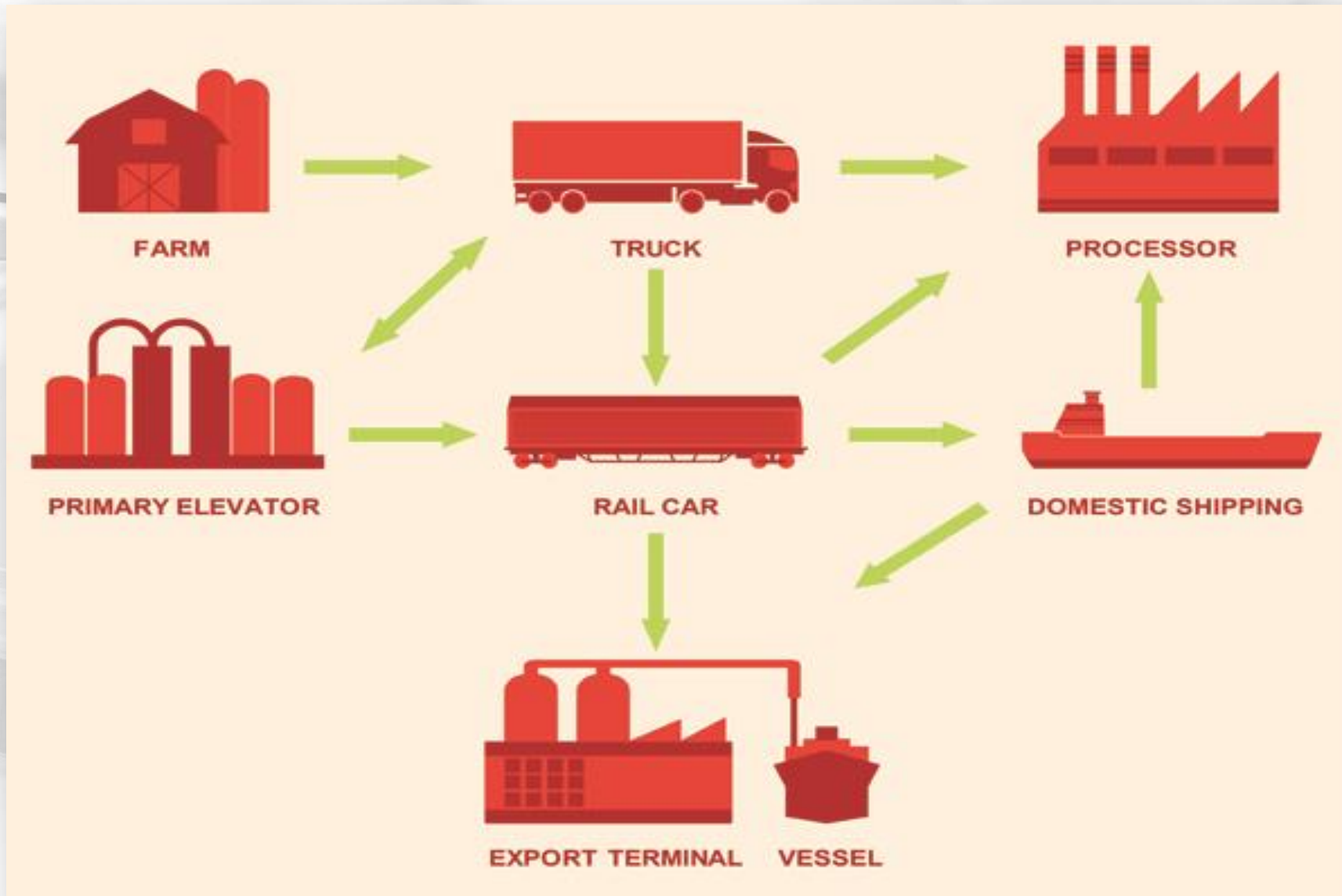
Essential Tools to Manage Grain and Flour Quality - Standards and Proficiency Rating Programs

Anne Bridges, Ph.D.
Technical Director

IAOM Bangalore, December 7th 2018



Wheat Supply Chain - Delivery of Product Quality



Wheat Sources Vary - Location and Year

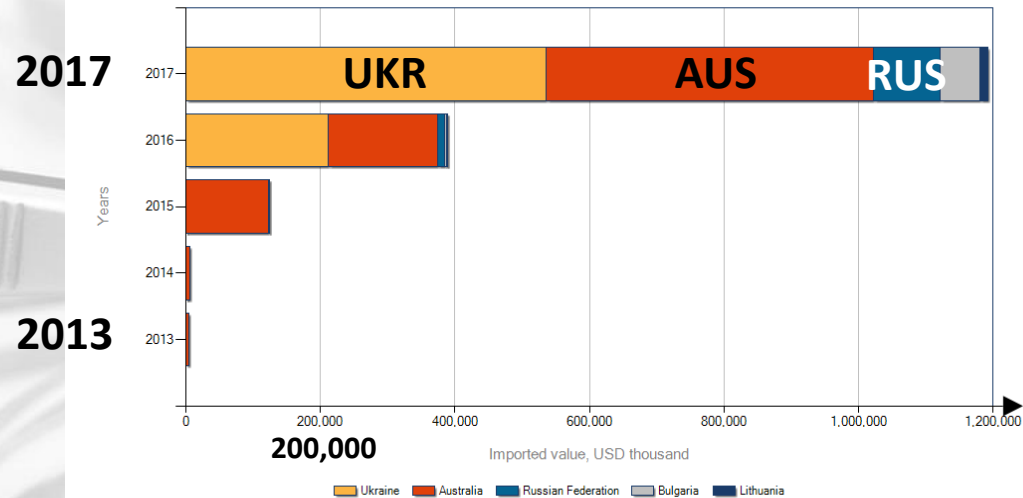
- Government requirements
- Domestic supplies
- Market opportunities - new products
- International sourcing

e.g. Australia 22.9 Mt, exports 2018 15.5 Mt

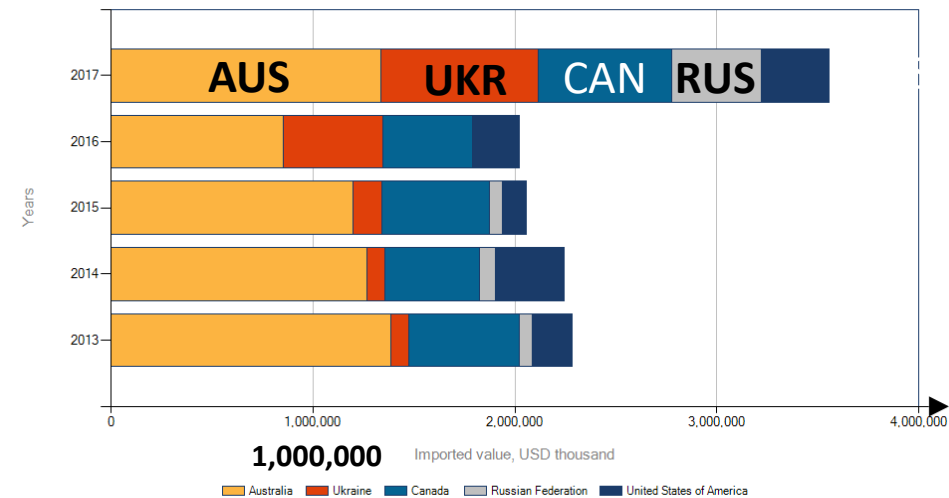
Lowest level in 9 years

Wheat Sources Vary - Location and Year

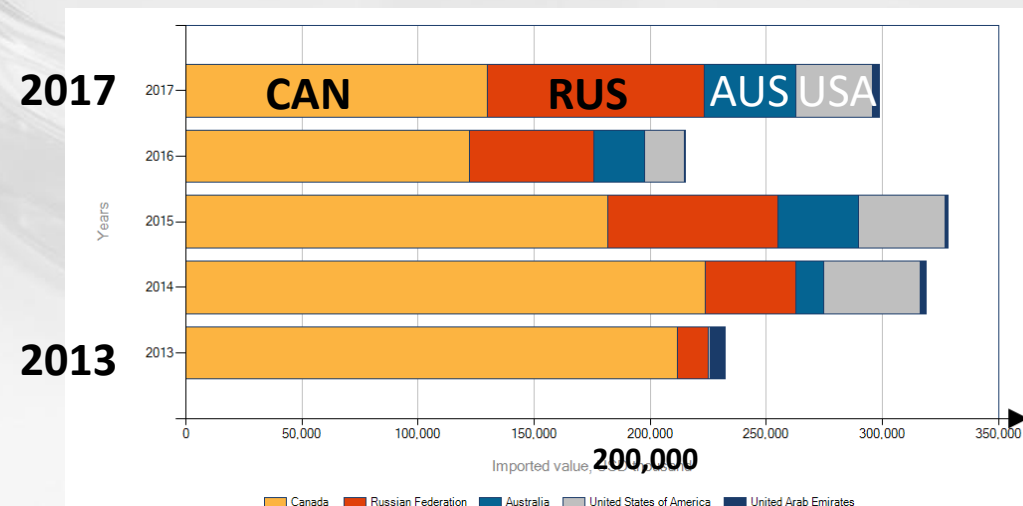
India



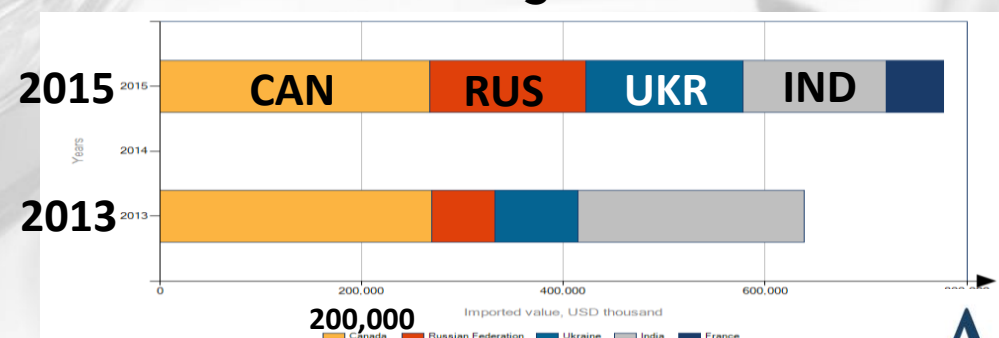
Indonesia



Sri Lanka



Bangladesh



Standards for Grain - Specific to Commodity

Based on a range of factors that include (but not limited to):

- * **Customer contract**
 - Importing country Government regulations for quality
- * **Relevant food safety laws**
 - Requirement to improve quality of grain supplies
- * **Competitor grades and quality**
 - Available quality of grain given restrictions of varieties, growing and harvesting conditions, pest and disease resistance of crop
 - International protocols such as Cartagena and Codex Alimentarius
 - Ability of the storage system to segregate or commingle grain
 - Land protection and quarantine laws

What is a Standard?

A **published specification** that establishes a common language, and contains a technical specification or other precise criteria and is designed to be used consistently, as **a rule, a guideline, or a definition.**

International
standards

Creating
CONFIDENCE
globally



What is a Standard?

Standards can be set by

- governments
- regional and intergovernmental agencies
- standards development organizations
- trade organizations
- learned societies with input from industry and end-users

International
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Creating
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globally



Relevant Food Safety Standards - Laws

International Standards Organisations

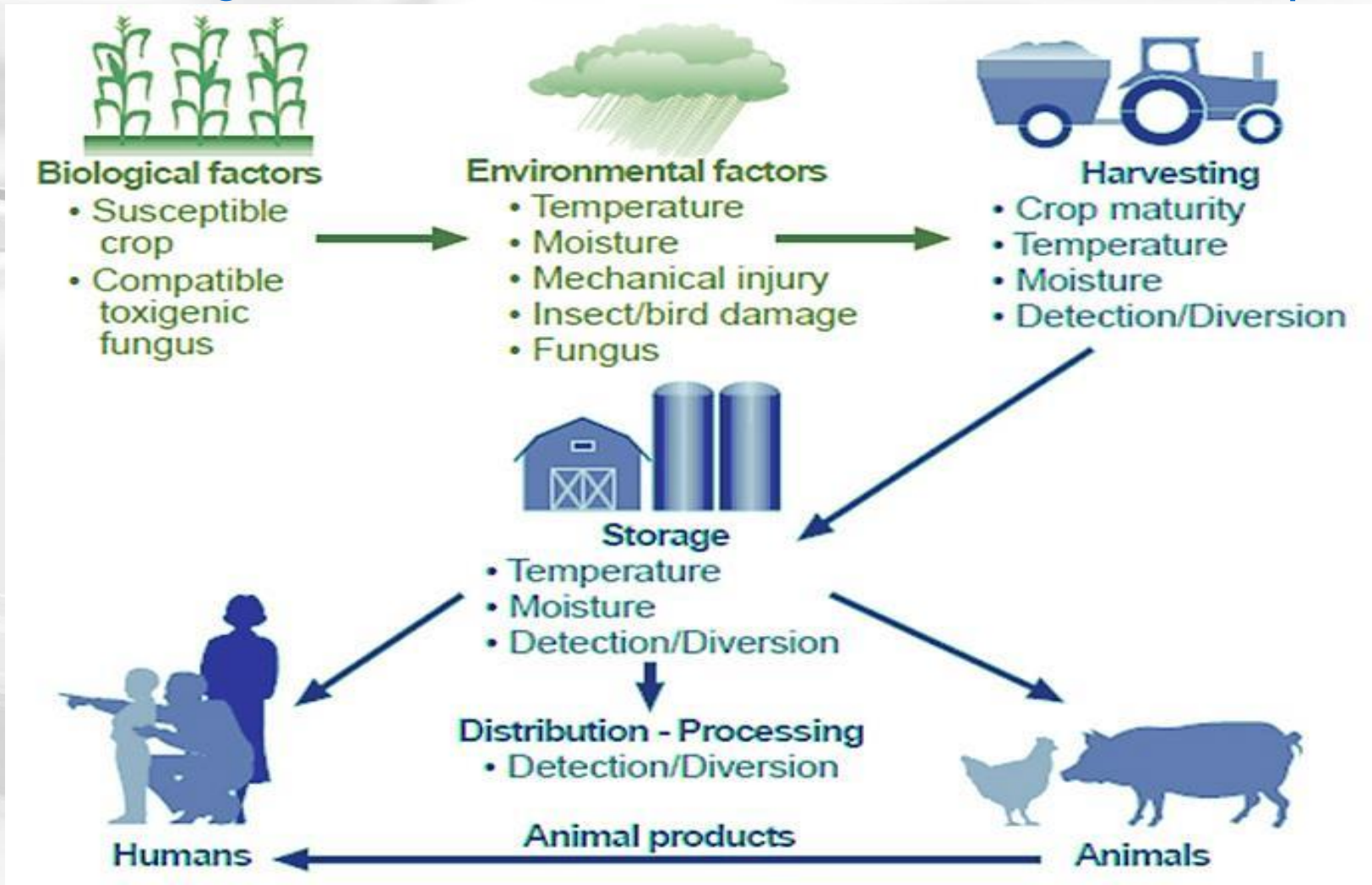
- Codex Alimentarius
- Scientific Organizations
- Many Interactions
 - Government
 - Academia
 - Industry
 - NGOs

The screenshot displays the Codex Alimentarius website. The header is orange with the text "CODEX ALIMENTARIUS" and "INTERNATIONAL FOOD STANDARDS". It includes logos for the Food and Agriculture Organization of the United Nations and the World Health Organization, along with a Google Custom Search bar. A navigation menu contains links: Home, WFSD, About Codex, Codex Texts, Themes, Committees, Meetings, Resources, Publications, News and Events, and Login. Below the menu is a map of the world with a central red circle labeled "WTO". Colored arrows (black, orange, red) point from various regions to the WTO circle, representing trade flows. Icons of a document, a boat, a tractor, and wheat are placed around the map. Below the map, the text reads: "ePing: a tool to discover changes in trading partners' product requirements". At the bottom, a banner states: "Protecting health, facilitating trade". On the right side, a "Standards" section lists popular and latest standards, including "CODEX STAN 193-1995 General Standard for Contaminants and Toxins in Food and Feed", "CAC/RCP 1-1969 General Principles of Food Hygiene", "CODEX STAN 1-1985 General Standard for the Labelling of Prepackaged Foods", "CAC/GL 2-1985 Guidelines on Nutrition Labelling", and "CAC/MRL 2 Maximum Residue Limits (MRLs) and Risk Management Recommendations (RMRs) for Residues of Veterinary Drugs in Foods".

Protecting Health, facilitating trade

DON Occurrence in Grains: A North American Perspective

<http://www.aaccnet.org/initiatives/Documents/CFW-60-1-0032-EP.pdf> (2015)



Relevant Food Safety Standards - Laws

International Standards Organisations - CXS 193

CXS 193-1995

33

DEOXYNIVALENOL (DON)

| | |
|-------------------------------|---|
| Reference to JECFA: | 56 (2001), 72 (2010) |
| Toxicological guidance value: | Group PMTDI 0.001 mg/kg bw (2010, for DON and its acetylated derivatives) Group ARfD 0.008 mg/kg bw (2010, for DON and its acetylated derivatives) |
| Contaminant definition: | Deoxynivalenol |
| Synonyms: | Vomitoxin; Abbreviation, DON |
| Related code of practice: | Code of Practice for the Prevention and Reduction of Mycotoxin Contamination in Cereals (CXC 51-2003) |

| Commodity/Product Name | Maximum Level (ML) µg/kg | Portion of the Commodity/Product to which the ML applies | Notes/Remarks |
|---|--------------------------|--|---|
| Cereal-based foods for infants and young children | 200 | ML applies to the commodity on a dry matter basis. | All cereal-based foods intended for infants (up to 12 months) and young children (12 to 36 months) |
| Flour, meal, semolina and flakes derived from wheat, maize or barley | 1 000 | | |
| Cereal grains (wheat, maize and barley) destined for further processing | 2 000 | | "Destined for further processing" means intended to undergo an additional processing/treatment that has proven to reduce levels of DON before being used as an ingredient in foodstuffs, otherwise processed or offered for human consumption. Codex members may define the processes that have been shown to reduce levels |

Relevant Food Safety Standards - Laws

International Standards Organisations - CXS 193

CXS 193-1995

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| | Maximum Level µg/kg |
|---|---------------------|
| Infants young children | 200 |
| Flour, meal, and flakes derived from wheat, maize or barley | 1000 |
| Cereal grains destined for further processing | 2000 |

Grain Quality = Food Quality



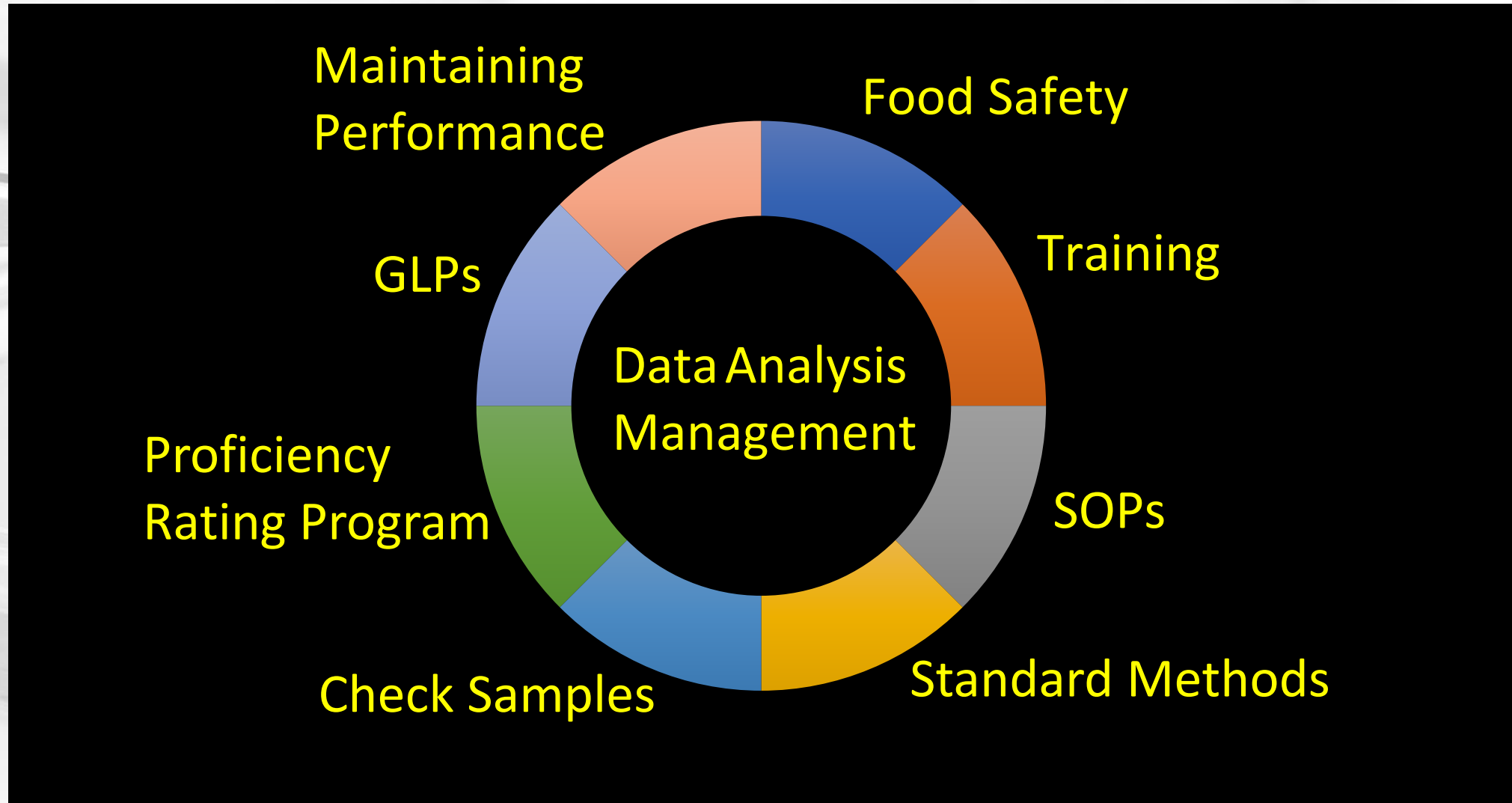
Tools to Manage

- Standards - Approved Methods
- Check Samples
- Proficiency Rating Programs

Wheat Quality → Grain → Flour → Dough

| Grain | Flour | Dough |
|--------------------------|---|--------------|
| Test Weight | Flour Extraction | Farinograph |
| Thousand Kernel Weight | Protein | Extensigraph |
| Grain Hardness | Diastatic Activity and/or Starch Damage | RVA |
| Protein | Flour Purity (Color grade and Ash) | Alveograph |
| Ash | Yellowness | Amylograph |
| Falling Number | Brightness | |
| Screenings | Flour Pasting | |
| LMA Laboratory Screening | | |

Elements of Quality Program



GLP: Good Laboratory Practice

- GLP a set of principles that provide a framework within which laboratory analyses are planned performed, monitored, reported and archived.
- GLP is sometimes confused with the standards of laboratory safety like wearing safety goggles.



ISO/IEC 17025:2005, General requirements for the competence of testing and calibration laboratories

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ISO/IEC 17025:2017, General requirements for the competence of testing and calibration laboratories

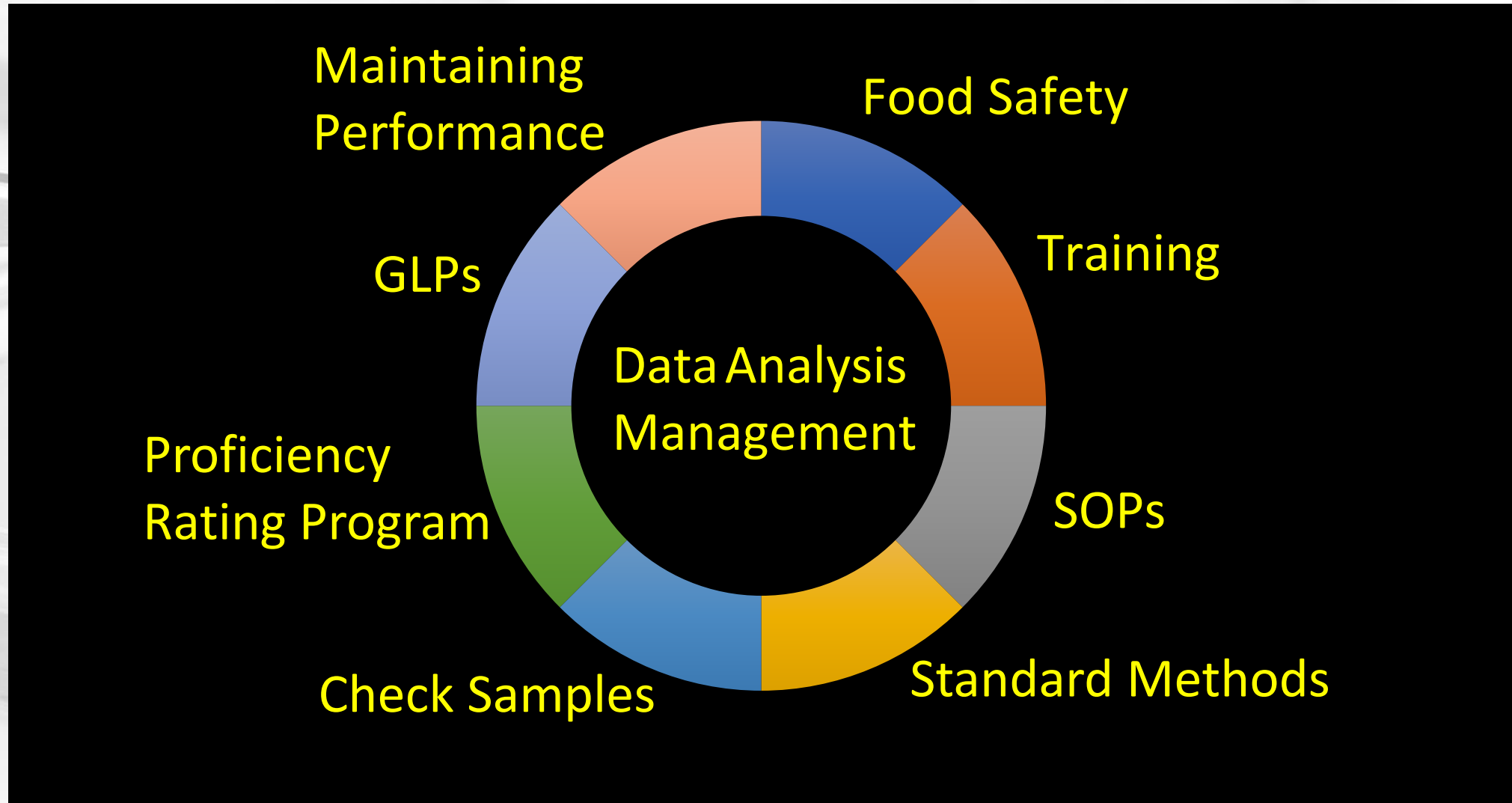
ISO/IEC 17025:2017

- Use most recent version of all standards
- Sampling included - designed to find and correct problems
- Risk assessment - results being wrong (to laboratory, customers etc.)
- Resourcing, Process (flow in laboratory), Laboratory and Management Quality Control
- Account for digital management - records, equipment operation



ISO/IEC 17025:2017, General requirements for the competence of testing and calibration laboratories

Elements of Quality Program



Who Approves Method Standards?

Method Harmonization through International Scientific Organizations

- AACC Intl
- AOAC
- AOCS
- ISO



Produce Official Methods - National, Regional and International



Who Uses Method Standards?

- Governments



FOOD SAFETY AND STANDARDS
AUTHORITY OF INDIA

Inspiring Trust, Assuring Safe & Nutritious Food

Ministry of Health and Family Welfare, Government of India

Official Methods - National, Regional

- Industry
- Universities
- Trade



Approved Methods



Approved Methods of Analysis • 11th Edition

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[Check Sample Program](#)
[Harmonized Methods](#)



What's New?

[Guidelines for Shelf-Life Testing of Food and Ingredients for Key Quality Attributes](#)

[Guidelines for Making Japanese Ramen Noodles](#)

[Measurement of Crumb Structure of Baked Products by C-Cell](#)

[Water-Holding Capacity of Pulse Flours and Protein Materials](#)

[Gluten in Corn Flour and Corn-Based Products by Qualitative R5 Analysis](#)

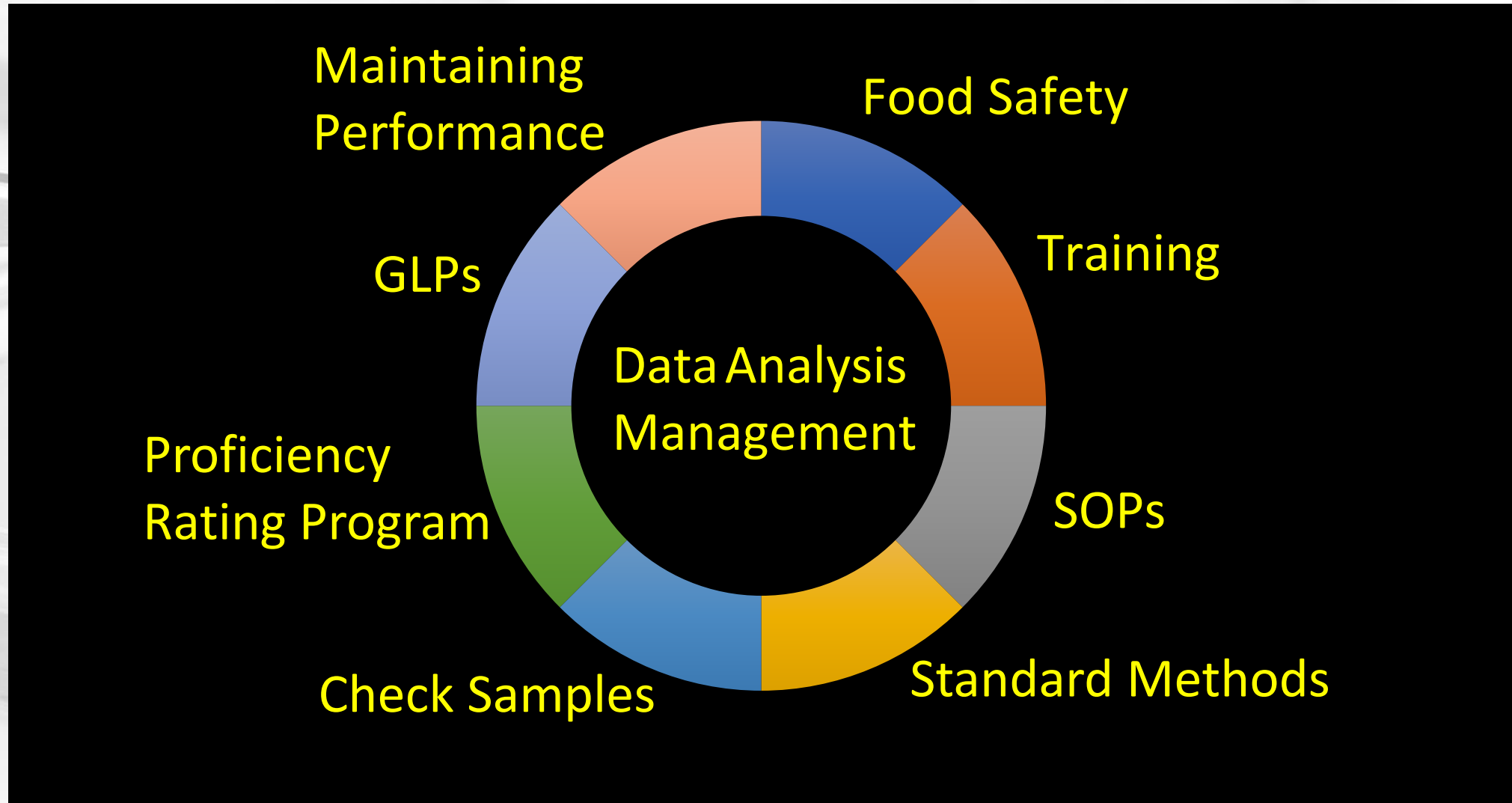
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Elements of Quality Program



Check Samples and Proficiency Rating Program

AACC Series - Focus on Grains / Cereal Products

- Subscribers
- Homogenous Sample
- Fixed Analytes
- Regular Participation
- Training
- New Products - reference samples



Check Samples and Proficiency Rating Program

AACC Series - Focus on Grains / Cereal Products

- Flour - hard, soft, semolina
- Food and Feed Safety - Microbiology, Mycotoxins
- Food and Feed Labeling - sugars, fats, GF, DF, vitamins and minerals
- Physical Testing - Rheology



Check Samples and Proficiency Rating Program

201 AACCI Wheat Flour - HW1



Laboratory Test Result Summary

201

Summary of Z-Scores

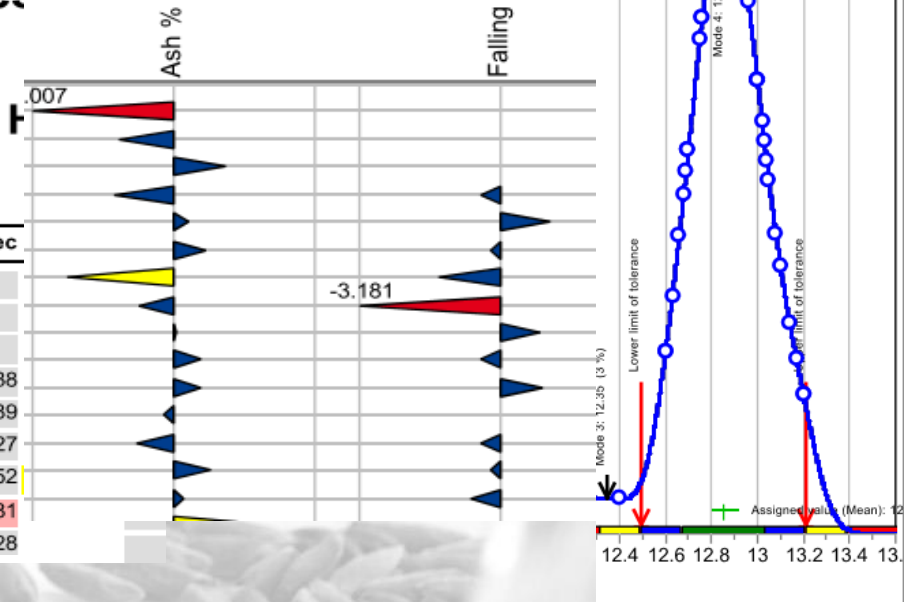
2018

201 AACCI Wheat

201 AACCI Wheat Flour - HW1

ISO 13528:2015(en)

| Analyst | Moisture % Method Codes | Protein (N X 5.7) % Method Codes | Ash % | Falling Number sec |
|---------|-------------------------|----------------------------------|--------|--------------------|
| 39 | 13.97 C7 | 12.79 C7 | 0.008 | -0.365 |
| 96 | 13.86 A1 | 12.70 B3 | -0.485 | -0.868 |
| 659 | 13.52 A2 | 12.91 B3 | -2.011 | 0.305 |
| 768 | 14.20 A2 | 13.04 B3 | 1.040 | 1.030 |
| 839 | 14.12 A1 | 12.93 B3 | 0.681 | 0.416 |
| 936 | 14.18 A1 | 12.86 B7 | 0.950 | 0.025 |
| 1131 | 13.92 A3 | 13.00 B7 | -0.216 | 0.807 |
| 1233 | 13.30 A1 | 12.95 B3 | -2.998 | 0.528 |
| | | | -0.620 | 0.249 |



- Results reviewed
- Managed in test lab
- Comparison other labs
- Problem resolution



Questions?

annebridges001@earthlink.net

Educational Opportunities - publications, journals
Annual Meeting, webinars, workshops, and more

Analytical Resources

- ❖ Approved Methods of Analysis - recognized international standards
- ❖ Moisture, dietary fiber, gluten-free, shelf-life, non-gmo
- ❖ Laboratory Quality Tools
- ❖ Check Samples and Proficiency Rating Programs
- ❖ Technical Committees

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