Essential Tools to Manage Grain and Flour Quality and Food Safety

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IAOM SE Asia Regional Conference and Exposition
Jakarta, October 7, 2019
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Wheat Supply Chain

- Grain and Flour Quality
- Tools to Manage - Standards
- Food Safety
Wheat Imports in SE Asia

South-East Asia wheat import origins share, 2014

- **Canada**: 1.65 million tonnes
- **Russia**: 0.34 million tonnes
- **Ukraine**: 0.97 million tonnes
- **EU**: 0.43 million tonnes
- **USA**: 3.78 million tonnes
- **Australia**: 7.5 million tonnes

Image Source: Rabobank
Wheat Imports in Indonesia - 6.1% Total Wheat

https://www.trademap.org/
Wheat Imports in Asia

Indonesia

Malaysia

Philippines

Taiwan

https://www.trademap.org/
• Specifications
• Food Quality
• Food Safety

→ Standards
Wheat Supply Chain
• Grain and Flour Quality
• Tools to Manage - Standards
• Food Safety
# What is Grain and Flour Quality?

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<th>Physical Grain</th>
<th>Flour</th>
<th>Dough Rheology</th>
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<td>Flour Extraction</td>
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<td>Protein</td>
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Elements of Quality Program - the Toolbox

- Maintaining Performance
- Sampling
- Training
- SOPs
- Standard Methods
- Data Analysis Management
- GLPs
- Proficiency Rating Program
- Check Samples
Inspecting the Sample

What is in the sample?

How much sample have you received?
Is it representative of the lot?
Elements of Quality Program - the Toolbox

- Sampling
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- GLPs
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- Data Analysis Management
- Check Samples
- Maintaining Performance
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.
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
Elements of Quality Program - the Toolbox

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

- 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
- Use latest version of Standard

ISO/IEC 17025:2017, General requirements for the competence of testing and calibration laboratories
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What's New?

Solvent Retention Capacity Profile - Automated Measurement

Gelatinization Temperature of Milled Rice Flour

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
AACC Proficiency Rating Program

Focus on Grains / Grain-based Foods
• Subscribers - monthly, bimonthly, quarterly
• Homogenous Sample
• Fixed Analytes
• Regular Participation
• Training
• New Products - Reference Samples
AACC Check Samples

- Flour Analysis - hard, soft, semolina - proximates etc
- Food and Feed Safety - microbiology, mycotoxins
- Food and Feed Labeling - sugars, fats, DF, GF, vitamins and minerals
- Physical Testing - Rheology
Check Samples and Proficiency Rating Program

201 AACCI Wheat Flour - HW1

Laboratory Test Result Summary

201 AACCI Wheat Flour - HW1

Summary of Z-Score
201 AACCI Wheat Flour - HW1

ISO 13528:2015

• Results reviewed
• Managed in test lab
• Comparison other labs
• Problem resolution
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Key Food Safety and Security Issues?

Foodborne illness most important food safety issue - caused by

Pathogens - *E coli*, salmonella, yeasts and molds
Mycotoxins - in cereals and grains, pulses, vegetables and oilseeds
Chemical Contamination

- Heavy metals (from soil) - lead, cadmium in grains and vegetables
- Illegal use - veterinary drugs in livestock
- Illegal use - pesticides in grains, vegetables and tea

Allergens - peanuts, milk, tree nuts, seafood, eggs

Food Adulteration - economically motivated

Sugar water in honey, horse meat in sausages, melamine in infant formula powder

Food Confusion - misinformation, chemicals, product labels

Need to understand

- Measure (quantify)
- Manage
- Communicate
Danger zone

FDA posts expanded flour recall; no word on whether Aldi is mill’s only customer

By Coral Beach on May 28, 2019

In an expanded recall notice for flour sold by Aldi, the grocery chain’s supplier is reminding consumers that the baking staple is made from raw grain and therefore inherently dangerous.
American food supply - one of safest in the world

Federal government estimates 48 million cases of foodborne illness each year
- 1 in 6 sick
- Approx. 128,000 hospitalizations
- 3,000 deaths

USA - Food Safety Effects Everyone

People infected with the outbreak strains of *E. coli O121* or O26, by state of residence, as of July 25, 2016 (n=46)

Raw flour consumed
USA - Food Safety Effects Everyone

DON Occurrence in Grains: A North American Perspective


Questions?

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

Analytical Resources

- AACC Approved Methods of Analysis - recognized international standards
- Moisture, protein, dietary fiber, gluten-free, shelf-life
- AACC Check Samples and Proficiency Rating Programs
- Technical Committees
- Professional and Student memberships

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