ISU, NAMA, and AACC International Hold Open Discussion on Food Safety

On January 31, 2018, 35 representatives from industry, academia, and trade organizations gathered at the Iowa State University Economic Development Core Facility, ISU Research Park, to have an open dialogue on food safety in grain milling. The specific issues discussed were bulk grains, traceability, and potential risks that need to be addressed to prevent or mitigate pathogen concerns in the food supply chain.

The session was jointly sponsored by the Iowa Grain Quality Initiative of ISU Extension and Outreach, the North American Millers Association (NAMA) Technical Committee, and the AACC International Food Safety, Quality, & Regulatory Committee (FSQRC). The objectives of the meeting were to

1) Review the recent history of pathogen contamination in raw field crops/grains.
2) Identify sources and potential control actions for the future.
3) Identify actions that would improve tracking of bulk grains or products through the supply and utilization chain.

The recent history of pathogen contamination and associated recalls was summarized. For most food products, safety is built in via a kill step. However, consumers sometimes eat the certain flour-based products in a raw state, e.g., cookie dough, cake batter ice cream, or flour in spice blends used in dips. This consumer behavior represents a unique challenge to the industry.

The industry has begun to utilize warning labels and provide consumer education concerning the fact that flour is not a product intended to be consumed in a raw state without a kill step. The U.S. Food and Drug Administration (FDA) and Centers for Disease Control and Prevention have partnered in this education effort through publications and advisories to consumers and restaurants. At issue is the fact that the source of pathogens has not been clearly identified, making "stopping the source" a challenge.

James Dickson

James Dickson (ISU Meat Science Department) discussed Shiga toxin-producing *Escherichia coli*, especially those species found in field crops. Dickson discussed the types of *E. coli* involved: specifically, *E. coli* O157:H7 and the "Big 6" (026, 0111, 0203, 0121, O45, and O145). Testing can be done on food products, but without large-scale contamination, the sample plan is not effective. Prevention of contamination and treatment for potential contamination are possible approaches. Heat treatment of flour has been effective (as outlined in an article by Ardent Mills). The spice industry has utilized steam, gas (ethelene or propylene oxide), and irradiation. There is not yet a consensus on the best path forward. For example, heat treatment is effective against *E. coli* pathogens but may impact functional quality.

Small group discussions were held to identify key questions and research and actions that could be taken by the industry to improve preventive controls. Key gaps identified include

- Identification of the source of pathogenic organisms in grains. Is it a food safety issue? Bakers have kill steps; it is only a safety issue when grains are consumed in a raw state. Flour is not intended for consumption in a raw state.
- Clarify whether pathogenic organisms in grain are regulatory issues. The 2010 Food Safety Modernization Act (FSMA) requires identification of hazards as part of FSMA-compliant food safety plans.
- What is the route of entry of the pathogen into the supply chain? To date, specific sources of entry have not been identified. Does this occur in the field or at the elevator, mill, or food processor?
- What is the cost of traceability? Currently, outside of specific IP practices, the industry cannot trace bulk grain or flour back to the field. Is the cost of improving traceability greater than the cost of treatment or mitigation?
- Education is needed for all stakeholders.
- Can other industries (e.g., the produce industry) provide potential solutions?
- Collaboration by the industry could be used to develop a collection of best practices to reduce risks.

Charles Hurburgh

The afternoon discussion focused on bulk grain traceability. Charles Hurburgh (ISU agricultural engineer) led an initial review of current knowledge and efforts or projects related to bulk grain traceability. Currently, the FDA recognizes there are limits to the traceability of bulk grains. Traceability is not currently part of FSMA; however, it is 1 of 10 pending regulations. Hurburgh acknowledged the potential accuracy and the challenges involved.

Inherent to current bulk grain practices is blending of grain or flour to meet quality and functional performance specifications. Blending creates a significant food safety challenge because grain from one field can be spread over many batches of flour.

Small groups assembled to talk about concerns related to bulk grain traceability. Key observations included

1) There is a need for common terminology.
2) Bin flow models and grain flow models would enable better understanding of the cross-blending of grains.
3) Better tools are needed, such as integrated traceability software solutions: common software to allow flour or grain to be traced from point to point in the supply chain—a handoff of the history. Digital data handoffs can only work if there are well-defined, accepted terminology and protocols.
4) Breaks in the process are critical. Verification must be built in for bins that go empty. This necessitates a mechanism and time to allow clean out.
5) Are there existing best practices that can be employed? Can other industries or global regions provide insight (e.g., dairy industry or European bulk grain processors)?

Training on bulk grains and milling processed is needed for the FDA. Industry collaboration could create a model food safety plan for use in preventative control qualified individual training programs targeted specifically to grain and grain milling.

Opportunities for research and industry collaboration were identified. The next steps are for those present at this discussion and other interested parties to consider possible ways to catalyze development of traceability plans, as well as to identify prevention protocols and effective treatments that would increase food safety.

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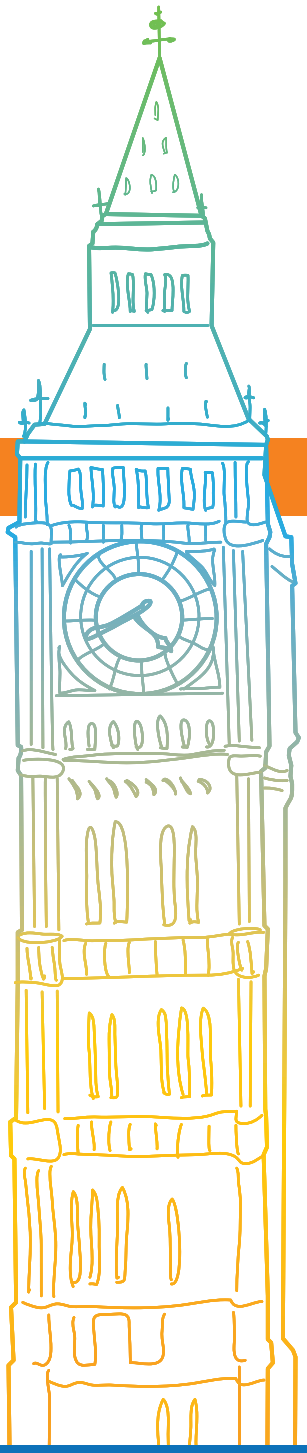

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