

ISU NAMA AACC Food Safety Open Discussion



On January 31, 2018, 35 interested industry, academia and trade organization representatives 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 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 Task Force. The location host was the Center for Industrial Research and Service of ISU Economic Development.

The objectives of the meeting were:

1. Review 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 product through the supply and utilization chain.

Recent history of pathogen contamination and associated recalls was summarized. For most food products, safety is built in via a kill step. For some flour-based products, consumers sometimes eat the product in a raw state, e.g., cookie dough, cake batter ice cream, 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 to provide consumer education that flour is not a product intended to be consumed in a raw state without a kill step. The Food and Drug Administration (FDA) and Centers for Disease Control and Prevention (CDC) have partnered in this education via publication 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.

Dr. James Dickson of ISU Meat Science Department discussed Shiga Toxin producing Escherichia Coli (STEC), especially those found from field crops. Dr. Dickson discussed the types of E. Coli. Specifically, E. coli O157:H7 and the Big 6: O26, O111, O203, O121, 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 best path forward. For example, heat treatment is effective against the pathogens but may impact functional quality.



Small group discussions were held to identify key questions, research and actions that could be taken by the industry to lead to improved preventive controls. Key gaps included:

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



The afternoon discussion was focused on bulk grain traceability. Dr. Charles Hurburgh, ISU Agricultural Engineer led an initial review of current knowledge and efforts/projects related to bulk grain traceability. Currently the FDA recognizes limits to the traceability of bulk grains. At present traceability is not part of FSMA, it is 1 of 10 pending regulations. Dr. Hurburgh acknowledged the potential accuracy and challenges. Inherent to current bulk grain practices is blending of grain/flour in order to meet quality and functional performance specifications. Blending creates a significant challenge as grain from a field of wheat can be spread over many batches of flour.

Small groups assembled to talk about concerns with regards to bulk grain traceability. Key observations:

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/grain from point to point in the supply chain to be traced, a hand-off of the history. Digital data handoffs can only work with well-defined, accepted terminology and protocols.
4. Breaks in the process are critical. Verification must be built in for bins going empty. This necessitates a mechanism and time needed 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 is needed for FDA on bulk grains and milling process. Industry collaboration could create a model food safety plan for use in Preventative Control Qualified Individual (PCQI) training programs targeted specifically to grain and grain milling. Opportunities for research and industry collaboration were identified. Next steps are for those present 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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