USDA Food Safety and Inspection Service
U.S. DEPARTMENT OF AGRICULTURE

Salmonella Outbreaks Linked to Italian-Style Meats

Outbreak Investigation After Action Review

Highlights

- The Food Safety and Inspection Service (FSIS), the Centers for Disease Control and Prevention (CDC) and public health partners investigated two *Salmonella* outbreaks involving ready-to-eat (RTE), fermented, dried, Italian-style meat products. The products were produced using multiple interventions (e.g., fermentation and drying) to control *Salmonella* and other bacteria that can make people sick.
- Retailers voluntarily removed implicated products from their shelves. Also, retailers promptly provided a list of foods purchased by ill people to public health officials. One retail chain had a customer loyalty program that was used to gather purchase information. Another retailer, without a loyalty program, provided purchase histories using limited credit card information that ill people shared with public health officials. This information helped to identify and confirm the common food consumed prior to people becoming sick and was used to trace the products back to the producing establishments.
- FSIS is working with research partners to identify ways to improve the safety of these products, including a project assessing proper drying times needed for various diameters of sausages.

Outbreaks at a Glance

	Outbreak 1	Outbreak 2
Illnesses	40	34
States included	17	10
Hospitalizations	12	7
Deaths	0	0

Response at a Glance

Recall or Public Health Alert	Yes	Yes

Process Improvements

- FSIS is developing a guideline for establishments related to validating lethality treatments for RTE products that achieve lethality using multiple steps.
- FSIS is working with the National Advisory Committee on Meat and Poultry Inspection (NACMPI) to determine how to address research gaps related to shelf stable, RTE fermented, salt-cured or dried products that rely on multiple hurdles for lethality and how FSIS can better verify the safety of these products.

What Happened?

Outbreak 1

From August through September 2021, public health officials, CDC and FSIS investigated an outbreak of 40 *Salmonella* illnesses (14 serotype Infantis and 26 serotype Typhimurium) linked to RTE antipasto Italian-style meats manufactured in an FSIS-regulated establishment. Interviews with ill people and review of food purchase information confirmed that the uncured antipasto Italian-style meat product was a food consumed that was in common among the ill people. CDC issued a Food Safety Alert to notify the public about the outbreak. The retailer who sold the Italian-style meat trays voluntarily removed any remaining product from store shelves. FSIS traced the antipasto products to the FSIS-regulated establishment where they were produced. As a result of strong epidemiologic and traceback evidence, the establishment voluntarily recalled the affected uncured antipasto products available in commerce. FSIS conducted assessments at the establishment and identified factors that may have contributed to the outbreak, including the use of a reduced salt formulation and lack of validated scientific support to achieve a 5-log reduction in *Salmonella*.

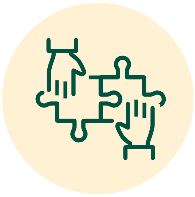
Outbreak 2

From October through December 2021, public health officials, CDC and FSIS investigated an outbreak of 34 *Salmonella* I 4,[5],12:i:- illnesses linked to RTE Italian-style salami sticks produced at another FSIS-regulated establishment. Nearly all cases reported eating salami sticks prior to illness onset and most reported the same Italian-style salami stick brand. Public health partners notified the public about the outbreak, retailers voluntarily removed the product from the shelves and the producing establishment voluntarily stopped producing these products. Public health partners and FSIS tested product samples during the investigation; two salami stick samples collected by the California Department of Public Health were positive for *Salmonella* Derby. However, these positive samples were not related genetically to the outbreak strain or any other clinical or non-clinical isolates. FSIS traced ill people's salami stick purchases to the producing establishment. As a result of the positive samples and the strong epidemiologic and traceback evidence, the establishment voluntarily recalled the affected salami stick products available in commerce. FSIS conducted assessments at the establishment and determined that there was not sufficient evidence to support the fermentation and drying interventions to adequately control *Salmonella*.

What we Learned from These Outbreaks

Research

Fermented and dried ready-to-eat (RTE) meat products must be free of pathogens such as *Salmonella* and *Listeria monocytogenes*. A 5-log reduction of *Salmonella* and other pathogens during processing is recommended to ensure the finished product is pathogen-free. Multi-hurdle approaches (i.e., lethality achieved using multiple steps) are used for many RTE products to eliminate pathogens, particularly when production processes do not include cooking. Unlike cooking, other common production steps, including fermentation to a low pH, and drying, do not generally achieve a 5-log reduction and additional hurdles may be needed. FSIS assessments found that while processing controls including meeting 'degree hours' parameters (for *Staphylococcus* aureus control), following a minimum number of drying days (for *Trichinella* elimination), and achieving a final water activity level (for shelf stability) were all met by the outbreak establishments, these were not validated to achieve a 5-log reduction in *Salmonella*. Research demonstrates that small diameter products may require longer drying times to achieve significant reductions in *Salmonella*. Understanding the contributing factors for survival of pathogens during production can help manufacturers produce safe product. FSIS lists a research priority associated with these products on the FSIS Food Safety Research Priorities and Studies webpage.



Collaboration with Retailers

During these outbreak investigations, ill people shared loyalty program and limited credit card information with public health officials who worked closely with retailers to obtain their food purchase histories. This information helped to identify the food making people sick and to prevent additional illnesses.

Close coordination between public health partners and retailers is valuable to quickly obtain records of foods purchased by ill people, an essential step in narrowing down the common food consumed. We can achieve shared food safety goals by establishing and maintaining relationships *before* an outbreak occurs.

What Can You do to Prevent or Solve the Next Outbreak?

Industry	Public Health Partners	Consumers
Establishments that produce fermented and dried meat products that use multi-hurdle approaches to achieve lethality should ensure that they have sufficient scientific support that the process will result in a 5-log reduction of *Salmonella*. If an establishment produces different diameter products but only has a study performed with one diameter, it must determine the impact of differences from the study to the actual process (e.g., drying time) to make sure the process is still effective in achieving the target 5-log reduction.	Continue to build relationships with retailers to promote timely and effective response when requesting food purchase information associated with ill people in the outbreak. Consider adding questions about fermented and dried meat products to routine illness questionnaires.	Subscribe here to get email updates from FSIS about food safety, including actions consumers can take when specific products are linked to illness outbreaks.

Helpful Links

Outbreak 1

- FSIS Recall 030-2021, August 27, 2021
- CDC Food Safety Alert, October 26, 2021

Outbreak 2

- FSIS Recall 042-2021, November 10, 2021
- FSIS Public Health Alert, October 29, 2021
- CDC Food Safety Alert, December 8, 2021

- Minnesota Department of Health News Release, October 22, 2021

General

- 2020 National Advisory Committee on Meat and Poultry Inspection (NACMPI) Reports, Subcommittee 1: Validation of Ready-to-Eat (RTE) Shelf-Stable Multi-hurdle Lethality Treatments
- FSIS Food Safety Research Priorities and Studies
- Report a Problem with Food | Food Safety and Inspection Service (usda.gov)
- Find more information about FSIS' response to foodborne outbreaks on the FSIS Outbreak Page
- Association of Food and Drug Officials (AFDO) Webpage: Leveraging Good Purchase History to Solve Foodborne Outbreaks
- You Can Help Solve Foodborne Outbreaks
- DeSouza, J.D., Ahmed, R., Strange, P., Barbut, S., and Balamurugan, S. 2018. Effect of caliber size and fat level on the inactivation of *E. coli* O157:H7 in dry fermented sausages. Internal Journal of Food Microbiology. 266: 167-172.