

**Microbial Food Safety Research Unit
Special Projects Team at ERRC**

Synopsis



Up to 500 packages of frankfurters were sampled each day to determine whether Listeria were present.

Background/Objectives

The first project the ERRC Special Projects Team tackled was to determine the prevalence of *Listeria monocytogenes* contamination of frankfurters. This project was recently completed and the results are critical to the risk models being developed by the USDA and other Federal agencies to address the problem of *Listeria* in ready-to-eat (RTE) meats.

Foodborne *Listeria* infections are a serious worldwide threat to the health of consumers and a significant economic burden to the food industry. Although the bacterium is not the leading cause of foodborne illness, infections by *L. monocytogenes* cause more devastating illnesses, and have higher death-rates per infection, than infections by any other foodborne pathogen. As such, there is a "zero tolerance" regulatory posture for this pathogen in the U.S. for RTE foods. A draft risk assessment of the relative threat to public health from foodborne *Listeria* among selected categories of RTE foods was performed by the U.S. Food and Drug Administration and USDA Food Safety and Inspection Service (FSIS). On a per serving basis, non-reheated frankfurters have the highest predicted relative risk for causing listeriosis. Since 20 billion frankfurters are consumed annually in the U.S., studies are critically needed to develop strategies that decrease the relative-risk of listeriosis due to consumption of frankfurters and other RTE products.

The objectives of this study were to develop more effective methods to recover and control *Listeria monocytogenes* and to determine the prevalence and types of this bacterium in vacuum-sealed frankfurters obtained from 12 commercial manufacturers between August of 2000 and July of 2002.

There were a number of significant findings from the USDA Frankfurter Study. Notably, the USDA-ARS package rinse method, developed to facilitate this study, was six times more effective at recovering *Listeria* from frankfurter packages than the currently approved USDA-FSIS method. Using the ARS method, analyses of the 32,800 one-pound packages indicated that 543 or 1.6% (range = 0 to 16% for the 12 plants) tested positive for *L. monocytogenes*. However, one plant in the study contributed 437 of 543 positive packages, or 80% of the positive packages. The *Listeria* recovery rate did not change appreciably over three months of refrigerated storage, there was no appreciable difference in recovery rate of the pathogen due to storage at either 4 or 10°C, and seasonality of production had no influence on recovery rate. DNA "fingerprinting" of the isolates revealed that about 90% of the 1102 isolates tested displayed "profile A." In some instances, however, it was possible to recover more than one *L. monocytogenes* type from a given package/plant. Another component of the study validated the efficacy of incorporating the food-grade preservative potassium lactate into the product to control *L. monocytogenes*. Levels as low as 2% were effective at preventing outgrowth of the pathogen during 90 days of refrigerated storage. Ongoing risk assessments are using the results from the various components of this study to better understand the hazards of and ways to control *L. monocytogenes* in RTE meats.



Human Human fingerprint *Listeria* *Listeria* DNA Fingerprint

Humans are identified by their fingerprints, similarly bacteria can be identified by their genetic "fingerprints."

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Fun Facts About Hot Dogs

Americans consumed more than 20 billion hot dogs in 2001.

On the Fourth of July, Americans enjoy about 150 million hot dogs!

More than 26 million hot dogs are eaten in major league ballparks each year.

Hot Dogs in other languages: Spanish- Perrito Caliente, Italian- Caldo Cane, French- Chien Chaud, German- Heisser Hund or Wurst, Portugese - Cachorro Quento.



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Americans will eat
7 billion hot dogs
this summer. Laid
end-to-end, those
hot dogs would
stretch...



from earth
to the moon
nearly 3 times!



Source: National Hot Dog
& Sausage Council



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The Microbial Food Safety Research Unit

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Results of the USDA-ARS Frankfurter Study are detailed in:

Recovery Rate of *Listeria monocytogenes* from Commercially Prepared Frankfurters during Extended Refrigerated Storage. (2003) F. M. Wallace, J. E. Call, A. C. S. Porto, G. J. Cocoma, The ERRC Special Projects Team, and J. B. Luchansky, *Journal of Food Protection* vol. 66 pages 584–591.

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Other contributors to the USDA-ARS Frankfurter Study included - James Lindsay and Caird Rexroad (USDA-ARS-NPS, Beltsville, MD), Alan Oser and Lisa Yoder (Hatfield Quality Meats, Hatfield, PA), Randall Huffman and James Hodges (American Meat Institute, Arlington, VA), Victor Cooke, Carl Custer, Walter Hill, Karen Hulebak, Loren Lange, Gerri Ransom, Denise Riordan, and Kaye Wachsmuth (USDA-FSIS, Washington, DC), Dane Bernard, Yuhuan Chen, Dave Gombas and Jenny Scott (National Food Processors Association, Washington, DC), Alice Johnson (National Turkey Federation, Washington, DC), Lance Bolton (Qualicon, Wilmington, DE), and John Phillips and Wilda Martinez (USDA/ARS/NAA, Wyndmoor, PA).

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