



Hanging Pathogens Out to Dry

Getting the Word Out on Food Safety with SafeFood Rapid Response and Information Network

Pat Kendall, Cooperative Extension specialist and professor of food science and human nutrition (pictured, left), has always been interested in health and food, but her research on food safety has also made her very familiar with the language of pathogens and viruses. *Escherichia coli* (*E. coli*) O157:H7, *Listeria monocytogenes*, *Salmonella enteritidis*, *Salmonella typhimurium*, and Norwalk virus (norovirus) are all essential words in her vocabulary. Fortunately, Kendall doesn't expect everyone to be able to pronounce these pathogens, but she does want everyone to know how to avoid an illness from them.

Food safety is a major problem in the United States. Although it's estimated that only one in 10 food-borne illnesses is documented, Centers for Disease Control and Prevention (CDC) statistics indicate that 76 million people in the United States are adversely affected by food-borne pathogens in any year, resulting in 325,000 hospitalizations and 5,000 deaths. These illnesses are particularly dangerous to the elderly, young children, and those with compromised immune systems.

Food-borne illnesses can be linked to contaminated beef, poultry, seafood, eggs, and produce. "Outbreaks associated with meat may get more publicity because of large recalls, but produce-related outbreaks almost match the number of illnesses linked to contaminated beef, poultry, seafood, and eggs," Kendall says. In fact, in 2000, there were 3,981 reported illnesses associated with contaminated produce and 4,025 linked to the other foods mentioned.

Pathogens appear in surprising places, like home-dried foods. For years, it was assumed that the low moisture content in dried foods precluded the growth of microbes, but research has shown that *E. coli* O157:H7 and *Salmonella* can survive basic drying methods. Kendall, along with professor of animal sciences John Sofos (pictured, right) and Ph.D. candidate Patricia DiPersio, has developed some procedures for safely drying foods. They appear in a new Extension publication entitled *Drying Foods: Dehydrating Fruits, Vegetables, Leathers, and Jerkies*.

"The recommendations in the publication concern how foods that are about to be dried can be pre-treated to enhance the destruction of pathogens," Kendall says. The research team tried various pre-treatment methods including blanching, immersing in salt solutions, and immersing in acidic solutions. By examining the vegetables, fruit, and jerkies about a month after they had been dried, Kendall and other investigators came to several conclusions. For both fruits and vegetables, pre-treating them with an acidic solution enhances the destruction of potentially harmful microorganisms during dehydration. For vegetables, water blanching in a solution that contains ½ teaspoon of citric acid per quart of water is recommended to increase pathogen death and improve general quality. A vinegar dip or ascorbic acid treatment should be used on meat prior to marinating for jerky. Safely drying foods involves pre-treatment, sufficiently heating the food to draw out moisture, exposing the food to dry air to absorb moisture, and allowing for proper air circulation to carry off moisture. These processes provide multiple hurdles that together enhance microbe destruction.

Produce-related outbreaks nearly match the number of all other contaminated food illnesses combined.

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Knowledge to Go Places



Publications are only one way Kendall gets the word out on food safety. She also writes a weekly column that appears in 22 newspapers, co-edits the *SafeFood News* online newsletter, oversees a subscription-only listserv that sends out food alerts, and provides training for Extension agents, master food preservers, and the Women, Infants, and Children (WIC) program. She has also been instrumental in developing a Web-based, multimedia continuing education program for nurses, dietitians, and Extension agents on food safety issues for high-risk audiences.

Kendall's message may become even more imperative. "We didn't worry about Norwalk virus three years ago," Kendall says, referring to a pathogen that recently sickened diners at a Fort Collins steakhouse and that has generated news stories concerning outbreaks on cruise ships and care facilities. "The symptoms of Norwalk, vomiting and diarrhea, aren't particularly long-lasting, but an infected person can still be a carrier of the virus even three days after the symptoms disappear." This prolonged infectious period, Kendall explains, can be particularly problematic in a restaurant situation, in which the employer wants to keep

the restaurant staffed, the employee wants to earn a paycheck, and outbreaks potentially can spread to a far greater number of people than is possible in a home kitchen situation.

Norwalk virus may seem particularly dangerous because it can land on any surface, but even a microbe like *E. coli*, whose original source may be in the gut of an animal, can easily cross-contaminate non-meat items without proper sanitary practices. "Furthermore, there is evidence that several strains of pathogens are becoming more virulent," Kendall warns. "Microbes like *E. coli* O157:H7 are learning to survive in severe environments."

Fortunately, Kendall and Sofos are committed to researching food-related health risks. Simple practices like hand washing, washing all produce with cold water before eating, keeping things refrigerated, and cleaning cutting boards, utensils, and refrigerators can significantly help protect health.

– Leslie Patterson

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SafeFood: From Farm to Fork

Are free-range chickens safer to eat? At what temperature should a refrigerator be kept? Is there any truth in the five-second rule? Some fascinating and fun questions are asked and answered by *SafeFood News* (<http://www.colostate.edu/Orgs/safefood/NEWSLTR/menunews.html>), the online newsletter produced quarterly by Colorado State University Cooperative Extension.

SafeFood News is part of the SafeFood Rapid Response and Information Network, a Web site designed to help consumers and producers make informed decisions by providing objective, research-based information about food production and safety issues. In an entertaining, down-to-earth style, the newsletter explores topics ranging from Food and Drug Administration warnings to urban legends surrounding food.

The Fall 2004 newsletter described an investigation in which a Georgia researcher discovered that 25 percent of the 100 free-range chickens he examined tested positive for Salmonella, matching the rate of conventionally raised chickens. An article in the Winter 2004 issue on food storage said that refrigerator temperature should be between 35 and 40 degrees Fahrenheit. And in Spring 2004, research was described on the five-second rule – a piece of folklore that holds that if something is dropped on the floor it is still safe to eat if it is retrieved within five seconds. In this case, a high schooler doing an apprenticeship at Hans Blaschek's University of Illinois laboratory, examined cookies and gummy bears dropped on tiled floors. Under a high-power microscope, she discovered that food could become contaminated with only five seconds of contact with inoculated tiles.