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Edible Coatings of Whey Help Keep Pathogens Away

Ready-to-eat meats are popular with consumers. But after the initial food processing, they are also vulnerable to recontamination by pathogenic bacteria. A solution turns out to be an application of an antimicrobial-incorporated edible film coating that will fend off the pathogens.

"We have used film coatings with raw and cooked ready-to-eat meat products," said Navam Hettiarachchy, a food science professor in the University of Arkansas System's Division of Agriculture who led the research for the Food Safety Consortium. "We have also included red meat in our studies as well. In all these products, we have observed a protective effect of antimicrobial-incorporated edible films against the pathogens."

The researchers used a whey protein film coating as a vehicle for the antimicrobials. The actual barrier to pathogens was provided by various combinations of grape seed extract, the nisin (a peptide, protein fragment), malic acid and EDTA, which is a ring-forming compound of metal ion known as a chelator.

The tests showed effective results in controlling the growth and recontamination of *Listeria monocytogenes, Salmonella* Typhimurium and *E. coli* O157:H7 on ready-to-eat meat products. Hettiarachchy's team tried different combinations of the antimicrobials and found some variances in levels of effectiveness. For example, in experiments on turkey frankfurters, a combination of nisin, malic acid and EDTA was more effective against *E. coli* O157:H7 when grape seed extract was not part of the mix than when it was included.

Navam Hettiarachchy

"In most of the cases we focused on the type of meat products," Hettiarachchy said. "The types of proteins, lipids and other compo-

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Streaming, Podcasting Add to Educational Offerings on ISU Web Site

Consumers, food service workers and educators can always bring themselves up to date on food safety information at conferences held frequently around the nation. But they don't necessarily need to wait that long or spend the money. Iowa State University's food safety Web site has plenty of details and downloads to take care of much of their needs.

"In addition to providing science-based information directly to consumers, the food safety materials on the Web site have been used for many different types of education programs," said Catherine Strohbehn, a hotel, restaurant and institution management Extension specialist at ISU who supervises the site. "Educators and organizations indicate they are using the site to teach groups such as WIC (women, infants, children) recipients, food service managers and employees, primary and secondary students and health care providers."

> *"We're trying also to target consumers, teenagers and those young adults who may be more inclined to use podcasting."*

Maintenance and production of the site — at http://www.iowafoodsafety.org — is supported by funds from the Food Safety Consortium.

A prime example of the site's enhanced offerings lately is its use of podcasting and streaming video technology to make available presentations for food service personnel. ISU had recently developed a couple of videos targeted for schools and assisted-living facilities. Strohbehn and Tamara Kuhn, Web designer on the food safety project, oversaw the conversion of segments of the videos into the stream-

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Edible Coatings of Whey… *continued*

nents will vary in each meat product. The protective effect is based on the type of antimicrobials and the product matrix, and the film acts as a vehicle to deliver antimicrobials." She said the film containing antimicrobials was effective for reducing pathogens on raw chicken, ready-to-eat chicken and red meat, and the degree of effectiveness was dependent on the product.

The key to the workings of edible film on meat is the ability to sustain the release of antimicrobials against the pathogens. The antimicrobials are held in the film matrix by weak forces, not by chemical bonding.

"The antimicrobials can be released immediately or the release can be delayed from the film matrix based upon the affinity of antimicrobials to various amino acids and others that are present in the film," Hettiarachchy said. "A greater affinity of antimicrobials to the film matrix will facilitate sustained release of antimicrobials and will extend the shelf life of the product."

Tests showed effective results in controlling the growth and recontamination pathogens on ready-to-eat meat products.

Some industrial interest is already being shown in the edible film. Hettiarachchy said there are prospects of its commercialization and some companies are looking in to its use for coating fruits, vegetables and even flowers. ■

Streaming, Podcasting… *continued*

ing videos now online.

The three videos online, each about 10 minutes, cover time and temperature aspects of safe cooking and handling, cleaning and sanitizing, and employee health and hygiene issues such as hand washing. They can be downloaded as MP4 files from the Web site's home page.

"The audience is those who work in food services," Strohbehn explained. "But on our Web site we operate on the premise many consumers take jobs in food service enterprises and retail food services. So by communicating to consumers the importance of hand washing, we're trying also to target consumers, teenagers and those young adults who may be more inclined to use podcasting or other methods of information."

The Web team continues to seek improvements in the videos. Students in two classes in hotel, restaurant and institution management critiqued the videos and suggested that the content should be less of a documentary and training format, Strohbehn said. The students did particularly like the ready availability of the material.

For those who may not have a few minutes to watch a video, another option on the site is the set of interactive modules that offer presentations on temperature monitoring, hand washing, cross contamination issues and cleaning and sanitizing. A viewer simply clicks on the image that leads to a series of other images with instructions on each one before advancing to the next one. The images are animated to illustrate the appropriate ways of performing tasks such as washing hands or scrubbing plates.

Catherine Strohbehn

Tamara Kuhn

Strohbehn and Kuhn also have a less technical but easily accessible way to get out the word about food safety: bookmarks. Information on an ISU Extension bookmark explains the six major control points — purchasing, storing, hand washing, cooking, serving and handling leftovers — and promotes the Web site address on the other side in prominent type. The point on hand washing was a recent addition to the redesigned bookmark.

"That really has been an emphasis for consumers as well as for the industry," Strohbehn said. "There are consumers who have been brought up without knowing proper personal hygiene. The National Restaurant Association reports that more than four of 10 adult Americans have worked in fast food or some type of restaurant facility at some point in their lives. There's a need to communicate this basic hygiene information. It's useful for consumers but also has a carryover effect on the industry." ■

Pushing the Borders Back to Safeguard Food

Food safety threats know no borders. Justin Kastner understands this and encourages his research team to use different academic disciplines to understand how best to address these threats.

Kastner looks at the interrelated issues in his role as a coordinator of Frontier, an interdisciplinary program for the historical studies of food security, border security and trade policy at Kansas State University. Kastner, an assistant professor in KSU's diagnostic medicine/pathobiology department, works in tandem with Jason Ackleson, an assistant professor of government at New Mexico State University.

"We're combining disciplines such as food safety and security, political science, history, as well as international political economy, a discipline that helps us understand how nations trade and cooperate with one another," Kastner said. "Our approach is admittedly unconventional but we believe we are helping to paint a better picture of the complexities of food safety, food security and trade."

The Frontier project, which involves some students funded by the Food Safety Consortium, reviews issues such as World Trade Organization (WTO) agreements, trade disputes related to food safety and animal disease, international trade concepts and export policies. It maintains a multimedia, podcasting Web site at http://frontier.k-state.edu.

> *"We are helping to paint a better picture of the complexities of food safety, food security and trade."*

In the Frontier program, Kastner and Ackleson pursue joint research such as immigration's role in U.S. food security, a project in cooperation with the Immigration Policy Center in Washington. They have also explored U.S.-Canadian relations in food safety and security and border security.

Kastner's undergraduate and graduate students delve into topics that tie into each other. "They are looking at geographical information systems and how, from a food biosecurity standpoint, we can promote such concepts as regionalization and compartmentalization in trade," he said. "Large countries, such as the U.S. and Canada, stand to benefit by applying these concepts as they can limit countrywide consequences of food safety or biosecurity problems."

For example, if an animal disease or source of foodborne illness can be isolated to a particular geographic location (regionalization), then WTO agreements can be used to certify to foreign governments that the source of the problem has been pinpointed.

"If there's an isolated case of BSE and we can isolate that to a specific feed supply chain and demonstrate that it's isolated, that gives us a stronger argument in the international trade arena," Kastner said. "That's good for international trade relations because even if we have biosecurity breaches, by demonstrably isolating these problems we can keep trade alive."

Kastner also collaborates on academic programs with Abbey Nutsch, an assistant professor food safety and security at KSU. "We developed a food safety and security internship program primarily for undergraduate students who are seeking out multidisciplinary research and writing projects," Kastner said. A food science undergraduate headed for medical school examined issues of avian and human influenza and rural Kansas' preparedness for the diseases. Another student studied the differences in U.S. and European food safety policies regarding raw milk cheeses.

Justin Kastner

One new aspect of North American trade relations is the Security and Prosperity Partnership (SPP), a 2005 agreement among the U.S., Canada and Mexico. Kastner said its theme is that the continent as a whole should be thinking about security as a way to find solutions to common problems.

"The SPP's approach says, 'Let's try to push the border back.' So instead of everything happening as an inspection between the U.S. and Canada or the U.S. and Mexico, North America can try to make it so that its regulatory systems are more harmonized in the first place. After all, you can't inspect everything," he said. "From a prosperity standpoint we are very dependent on trade within North America. So there is a need to emphasize both security and trade. Border security, food security and trade policy are dynamic issues." ■

Accords, Private Standards Key to World Food Safety

Americans going to China for next year's Olympics may be wondering what the Beijing government will do to tighten up food safety rules following increasing reports of problems with safeguarding the nation's food supply. It's a fair expectation of the Chinese government, but the quicker solution may turn out to be the motivation behind private business maintaining a reputable product brand.

"If we have supplier contracts for grocers buying food in China, they're going to expect a higher standard for protection of brand," explained Michael T. Roberts, a University of Arkansas adjunct professor of law who specializes in food issues at the Venable Law Firm in Washington. Depending on private standards for a solution may be quicker than anything that China can do internally to tighten up its regulation, Roberts said.

Roberts, in an address to faculty and students at the UA Division of Agriculture food science department, noted that China has announced a five-year initiative to improve its food safety system, but the rest of the world may not be so patient. The U.S. enacted its first food safety law in 1906.

"Are we going to allow developing countries 101 years to get it right?" Roberts asked. "I suspect the answer is no. It takes time, but it's unlikely that we can spare it in today's global food system."

"Are we going to allow developing countries 101 years to get it right? I suspect the answer is no."

China does have an extensive food regulatory system, with 12 separate government agencies responsible for various aspects. The nation has seven administrative statutes governing food safety with ministries to enforce them. Despite the system's apparent complexity and sophistication, problems arise. The Food and Drug Administration reported that China ranked third in incidents of imported food being rejected at the U.S. border, Roberts said, behind India and Mexico.

Part of the problem is that Chinese food companies generally prefer to pay a fine associated with a food safety violation instead of paying the higher cost of investing in a state-of-the-art food processing facility, Roberts said.

Michael T. Roberts

"In the U.S., Europe and Western developed countries, the fines for breaking food regulatory standards are nominal," he said. "If the FDA issues a fine, we're talking about $10,000 or $50,000, sometimes more than that. But that's not what motivates food companies to be compliant. It's branding. If food companies in the U.S. and Europe have a food safety problem and it gets out to the public, that's going to affect the bottom line because people aren't going to buy your product. It hurts our brand. It's that consumer-driven expectation that your product is going to be safe."

International law is developing further to cover food safety issues with regulatory agreements among countries, such as those in the World Trade Organization. The WTO facilitated a pact among its member nations called the Agreement on Sanitary and Phytosanitary Measure, which governs international trade of food products and their safety.

"This agreement basically means the countries that belong to the WTO agree that their vital sanitary measures will be based on international standards," Roberts said. "Traditions and attitudes are not acceptable rationales for food safety determinations."

To participate in such an international agreement, nations effectively agree to give up some of their sovereignty. The question becomes how much they give up, Roberts said.

Scientists develop standards set by similar international agreements. Roberts said they allow private companies to depend upon predictability as to what other countries will do, thus harmonizing and facilitating world trade.

If international agreements between governments aren't sufficient to accommodate specific food safety issues, private law can step in. Roberts noted that many multinational food companies rely on private international law by writing private standards into supply contracts.

"Large grocery stores that have contracts with suppliers are imposing their will through contracts that sometimes cross countries. Private standards reflect this emergence of the retailer. The retailer has suddenly caught its sense of its own power in the food supply system. Retailers are interested in selling food to consumers. Hence, a retailer is going to give recognition to consumer preferences," Roberts explained.

Sometimes, Roberts noted, the catch is that consumer preferences aren't based on science. American officials, for example, would argue that European preferences against genetically modified food are not based on science. "It runs contrary to what all these public institutions are trying to accomplish with a science-based approach." ■

Kansas State Establishes Center for Animal Identification Technologies

Scientists at Kansas State University have long been involved in many facets of livestock research, but now they taking their work a giant step further.

The establishment of the KSU Center for Animal Identification will allow researchers to build on the work K-State has already begun in evaluating identification systems such as radio frequency to trace animal movement, said KSU animal science professor Dale Blasi. He will work with other KSU faculty and students to carry out the center's work.

"Our mission is to discover, develop and evaluate livestock identification technologies that might have economic value to livestock producers in Kansas and the United States," Blasi said.

The issue is particularly critical in Kansas, where the beef industry generated $6.25 billion in cash receipts and ranked first in the United States in commercial cattle processed in 2006, according to the Kansas Agricultural Statistics Service.

Blasi has headed the university's Animal Identification Knowledge Laboratory since it was established in 2003. Underpinned by USDA funding, KSU established the lab to provide unbiased evaluation of animal identification technologies being considered by livestock industries. The new center is a logical way to expand on the lab's efforts, he said.

The center will be based in K-State's Department of Animal Sciences and Industry, where Blasi is a beef cattle specialist with K-State Research and Extension. Much of the work will be done at the university's Beef Stocker Unit, where there is ready access to large numbers of livestock in typical livestock management situations.

The importance of the need to be able to trace an individual animal's movements has become increasingly apparent during the past five years, he said. The foot-and-mouth disease outbreak in 2001 that rocked Britain's livestock industry marked one of many high profile events that raised consumers' consciousness about tracing animal movements. Since then, cases of bovine spongiform encephalopathy (BSE) in Canada and the United States further reinforced the notion that the United States needed a way to be able to track an animal's movement from the beginning of its life to the end.

In April 2004, the U.S. Department of Agriculture announced a plan to implement a National Animal Identification System (NAIS), which will allow for rapid identification, containment, and eradication of potential foreign animal diseases. That USDA action, in turn, sparked the development of new electronic and biometric animal identification technologies, which made the need for unbiased evaluation and dissemination of results on those technologies crucial, Blasi said.

"The livestock industry and its various sectors and federal and state animal health officials would find it very difficult to move forward with a national animal ID program without the K-State Animal ID Center," said Nancy Robinson, vice president of government and industry affairs with the Livestock Marketing Association. The LMA is an organization of livestock marketing firms that provides industry information, insurance and legislative and regulatory services to its members. ■

Rapid Methods Workshop Set for June 13-20

Kansas State University will host the 28th International Workshop and Symposium on Rapid Methods and Automation in Microbiology on June 13-20, 2008, in Manhattan, Kan. Activities will take place at the Clarion Hotel and at the KSU campus.

A mini-symposium is included June 13 and 14 for those unable to attend the full week of programs.

Daniel Fung, KSU professor of food science, is the conference director and is assisted by Beth Ann Crozier-Dodson. Program registration information will be posted on the conference Web site at http://www.dce.ksu.edu/conf/rapidmethods or can be obtained by contacting Debbie Hagenmaier at debbieh@ksu.edu.

Consumers' Practices Depend on Perceptions

Most people know how to practice safe food behavior, and they do so when they think about it. That's the catch. Much of the time they're not thinking about it.

"They think about it when they perceive a risk," said Alan Levy, a consumer studies scientist for the federal Food and Drug Administration Center for Food Safety and Nutrition. "And typically when they perceive a risk they take corrective actions. But they don't necessarily perceive a risk in many ordinary situations."

Levy made his remarks in July during a presentation at the annual meeting of the Institute of Food Technologists in Chicago.

Part of the challenge in designing effective food safety education messages for the public is to know what consumers' awareness levels are concerning good food safety practices. Many surveys of individuals' food safety practices are self-reported, which calls into question the reliability of responses.

"We know, for example, that if you actually observe people in their household, the quality of their food preparation practices is much poorer than when they report about that in the survey," Levy said.

The consumer being observed for a survey may be making several food-handling mistakes. But if the consumer does not perceive a risk, that person will not engage in safe practices.

"They may not perceive a risk if they're confident that they're in control," Levy explained. "People who know something seem to have a false sense of confidence. Consumers might have quite mistaken ideas about which practice they should engage in."

Levy continued by noting the implication for effective food safety education is that it must challenge complacency, particularly among the educated middle class. "They need to be less complacent about their food safety practices," he said. "Practice specific information. An ideal kind of message would be, 'Do you do it this way? Actually, you should do it this way.'"

It turns out that a food safety crisis can improve individuals' practices. Levy pointed to the outbreak of *E. coli* O157:H7 on lettuce in several states in September 2006. That episode led to a serious drop in consumers' perceptions of the safety of food from supermarkets. He predicted that the result could be consumers would pay closer attention to their own food safety practices in the home. ■

Report Says More Inspections Won't Stop Food Contamination

Eliminating outbreaks of foodborne illness is possible but it won't happen by increasing inspections alone, say food safety experts in a June report from the American Society for Quality.

"The problem is that we can't inspect the defect out of the product," says Steve Wilson, chief quality officer for the U.S. Commerce Department and ASQ board member. That's because more than half of reported foodborne outbreaks cannot be attributed to any specific microorganism by current diagnostic methods, according to the Centers for Disease Control (CDC). "Since we each can't have our own food tasters — like the medieval nobles did — our best option is to take more proactive steps in earlier stages of food production," notes Wilson. Other experts agree.

Key trends are pushing the industry toward a more preventative approach to food safety, according to John Surak, a food safety consultant and member of ASQ's Food, Drug and Cosmetic Division who works with major food manufacturers around the U.S.

"Consolidation of food processing to fewer plants with increased output has guaranteed that if you're going to have a glitch, it's going to be a big one," says Surak. "More health-conscious consumers demanding ready-to-eat fresh fruits and veggies year-round also increase pressure for the industry to look at new ways to grow, harvest and process safe produce."

What preventative steps can the industry take to reduce risks? Participating in good quality practices is one solution, according to Janet Raddatz, vice president of quality and food safety systems at Sargento Foods. Sargento uses good manufacturing practices and Hazard Analysis and Critical Control Point, a quality system that controls potential physical, chemical and microbial hazards in food production.

"We've voluntarily applied these systems because they make good sense," says Raddatz. "FDA isn't requiring anyone to do it — we're policing ourselves."

ASQ's quality report identifies other high-impact actions that experts say can make a major difference:

- Reinforce maintenance procedures;
- Emphasize consumer education;
- Strengthen regulatory agencies in high-risk areas;
- Increased diligence by food companies; and
- More *effective* inspection — not more inspection. ■

Researchers Develop Sensor for *E. Coli,* Prostate Cancer

Raj Mutharasan, professor of chemical engineering at Drexel University, has developed a millimeter-size cantilever biosensor that can detect cells and proteins in trace samples, in only minutes.

The university said the sensor could have wide applications in medical diagnostic testing (prostate cancer), detecting contamination in food products (*E. coli* bacteria) and monitoring for biothreat agents (anthrax). In medical testing, the sensor can be used to analyze the four most widely tested fluids: blood, urine, sputum and spinal fluid.

Existing conventional tests require 24 hours and a trip to a laboratory to boost the concentration of microbes in a sample to produce findings. The accurate, hand-held sensor Mutharasan has developed over the past six years can yield findings in about 10 minutes.

No direct test for minute amounts of proteins exists on the market. A study published in the April 1, 2007, issue of *Analytical Chemistry* using Mutharasan's sensor detected *E. coli* in ground beef at some of the lowest concentrations ever reported.

Results of a preliminary study using the device to detect noninvasively a prostate cancer biomarker in 15 minutes were recently presented by David Maraldo, a doctoral student in chemical engineering who worked with Mutharasan on the sensor, at the 96th annual meeting of the United States and Canadian Academy of Pathology.

Kishan Rijal, a doctoral student in chemical engineering, and Gossett Campbell, who received his doctoral degree in chemical engineering from Drexel in 2006, helped develop the sensor. Fernando U. Garcia, professor of pathology in the Drexel University College of Medicine, provided urine specimens to Mutharasan in testing for prostate cancer.

Mutharasan recently expanded the sensor's applications to food toxins and biomarkers. ■

Papers & Presentations

Daniel Fung, Kansas State, was the keynote speaker for the International Conference for Food Safety and Quality in November in San Francisco. Fung was also the keynote speaker and lecturer at the VI Spanish Rapid Methods and Automation in Food Microbiology at the Universitat Autonoma de Barcelona in Spain, where he also serves as a distinguished professor.

Fung was quoted in a Sept. 14 article of the *San Diego Business Journal* about food contamination threats at next year's Olympics in Beijing. Fung, addressing concerns about bacterial contamination, said, "One thing that would really, really save the day is to have two bottles of hand sanitizers. If everyone used those things all the time, you'd greatly reduce *E. coli* and norovirus."

Curtis Kastner, Kansas State, delivered a presentation on KSU'S "Distance Education Initiatives" and "Food Safety and Security" in April at the National Center for Food Protection and Defense in East Lansing, Mich.

Curtis Kastner, Justin Kastner and **Jerry Jaax**, Kansas State, delivered a presentation on "Biosecurity at K-State: Ebola, Mad Cow Disease, Anthrax, Food Security and More" at Community Readiness Communication: Accurate Messages in Times of Crisis in November at KSU.

J. Scott Smith, Kansas State, reported the following presentations:

- Puangsombat, K., F. Ameri and J.S. Smith. 2007. Effect of rosemary extracts on inhibition of heterocyclic amines formation in cooked beef patties. Institute of Food Technologists Annual Meeting and Food Expo, Chicago, July 28-31, 2007, 193-22.
- Hijaz, F., J.S. Smith and C. Kastner. 2007. Assessing meat quality after an ammonia leak: a case study. Institute of Food Technologists Annual Meeting and Food Expo, Chicago, July 28-31, 2007, 193-17.
- Altwegg, K.A., and J.S. Smith. 2006. Prevalence of mycotoxins in Kansas field corn, AOAC International Annual Meeting, Sept. 17-21, 2006, Minneapolis.

Smith also reported the following publications:

- Hijaz, F., J.S. Smith and C.L. Kastner. 2007. Evaluation of various ammonia assays for testing of contaminated muscle food products. Journal of Food Science, 72: C253-257.
- Tsen, S.Y., F. Ameri and J.S. Smith. 2006. Effects of rosemary extracts on the reduction of heterocyclic amines in beef patties. Journal of Food Science, 71: C496-C473.
- Gadgil, P., and J. S. Smith. 2006. Metabolism by rats of 2-dodecylcyclobutanone, a radiolytic compound present in irradiated beef. Journal of Agriculture and food Chemistry, 54: 4896-4900. ■

Food Safety Digest

by Dave Edmark

The subject comes up in Congress almost regularly. Legislation has again been introduced that would overhaul the nation's food safety inspection system. Rep. Rosa DeLauro, D-Conn., chair of a House subcommittee that oversees agriculture, rural development and the Food and Drug Administration, explained the proposed legislation recently to an audience at American University in Washington.

The proposed legislation is the Food Safety Modernization Act that would create a food safety administration within the Health and Human Services Department and would cover issues that the Food and Drug Administration currently handles. The FDA is part of the Health and Human Services Department. The Food Safety and Inspection Service, which regulates animal meats, is part of the U.S. Department of Agriculture.

The bill would also establish an office of commissioner of food safety and nutrition policy to be appointed by the president.

"Today, there are 15 different agencies currently responsible for administering 30 laws related to food safety," DeLauro said in an address covered by The American Observer Web site. "It is time to consolidate many of those functions and to provide a regulatory structure that takes full advantage of the great work being done at the the FDA and our state laboratories as well."

■ ■ ■

Education about irradiation can influence public opinion on the topic. A study by Natnicha Bhumiratana, Lorna K. Belden and Christine M. Bruhn for the International Association of Food Protection surveyed 300 California consumers before and after viewing an eight-minute educational video about irradiation. The survey took place after irradiation opponents had been active at a recent session of the California legislature.

After viewing the video, 60 percent said they would choose irradiated products, 40 percent said they would pay a 10 percent higher price for irradiated meat and 3 percent were opposed to irradiated food being offered.

Before participating in the survey, more than half the respondents had not heard about the legislature's attention to irradiation. The researchers said those opposed to irradiation before participating said they knew little about the subject.

■ ■ ■

The USDA Food Safety and Inspection Service is taking a closer look at its handling of meat recalls after a recall of frozen hamburger patties after reports of tainting by *E. coli* O157:H7 bacteria in September from Topps Meat Co. of Elizabeth, N.J. *The New York Times* quoted Richard Raymond, USDA undersecretary for food safety, as saying the reports of *E. coli* in meat had increased this summer after several recent years of decreasing, so FSIS doubled its sampling for *E. coli*.

The Topps recall on Sept. 25 involved 21.7 million pounds of frozen hamburger. The *Times* reported that FSIS officials acknowledged the response could have been more prompt following the first positive test results for *E. coli* on Sept. 7.

■ ■ ■

Kerri B. Harris has been named the director of the Texas A&M University Center for Food Safety. Harris is an associate professor in the animal science department. She is also president and CEO of the International Hazard Analysis and Critical Control Point Alliance, an industry group that standardizes food safety and inspection training in cooperation with USDA.

"Dr. Harris is nationally recognized as being well versed in food safety and policy issues," said Elsa Murano, Texas A&M vice chancellor of agriculture and life sciences. ■

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