

The Food Safety Consortium Newsletter



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Bacteriophage: Poultry's Welcome Virus

To knock out the bacteria, bring on the viruses.

It's an idea that might alarm people who are conditioned to believe that viruses have no redeeming qualities. But Billy Hargis and his Food Safety Consortium research team at the University of Arkansas would remind them that these particular viruses can make poultry a safer commodity for consumers.

The credit goes to bacteriophages, a specific kingdom of viruses that only infects bacteria and that cannot infect plants, animals or humans.

"If you lick your lips, you're probably eating several hundred bacteriophages that are on your skin right now. They're pretty ubiquitous," said Hargis, director of the UA Poultry Health Research Laboratory.

Bacteriophages, which are obtained



University of Arkansas graduate student Chris Pixley takes time-lapsed micrographs to see how bacteriophages kill a colony of *Salmonella*.

from natural sources and cloned for use against bacteria, have been used in

experiments to kill *Salmonella* bacteria in poultry. Hargis' team used a couple of approaches. One was to rinse broiler and turkey carcasses with bacteriophage isolates. Two bacteriophage isolates were found to destroy eight *Salmonella* isolates on poultry.

Hargis' group also developed another method. They administered bacteriophages orally to poults to use the poults as a biological filter. They recovered the bacteriophages from the poults' feces, then the recovered bacteriophages were administered to a second group of poults, a procedure which reduced the levels of *Salmonella* that the poults were carrying.

"We found in our early experiments that most of the bacteriophages, when we administered them to baby poultry, died or disappeared as they passed

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Cull Sows Tip the Scales but Stay Clean

Want pepperoni on your pizza? Or how about some bratwurst off the grill? If you enjoy either of them, thank the cull sow.

Cull sows provide pork processors the meat for pepperoni, bratwurst and other specialty sausages. They are also big — an average market weight hog is 275 pounds, but the cull sow weighs 400 pounds.

Cull sows are processed in separate plants because of their size, and that process has brought up a food safety question in recent years: does the slower process of slaughtering cull sows foster

contamination of the cull sows by *Listeria monocytogenes*?

Food Safety Consortium researchers at Iowa State University and the National Animal Disease Center found out that the system has been working because cull sow processors have been following the necessary precautions. The tests show that cull sows have even less contamination than

their market weight counterparts.

"We felt that since the cull sow is around for a longer period of time that she had a greater chance of becoming contaminated, so we went ahead and did the survey," said Irene

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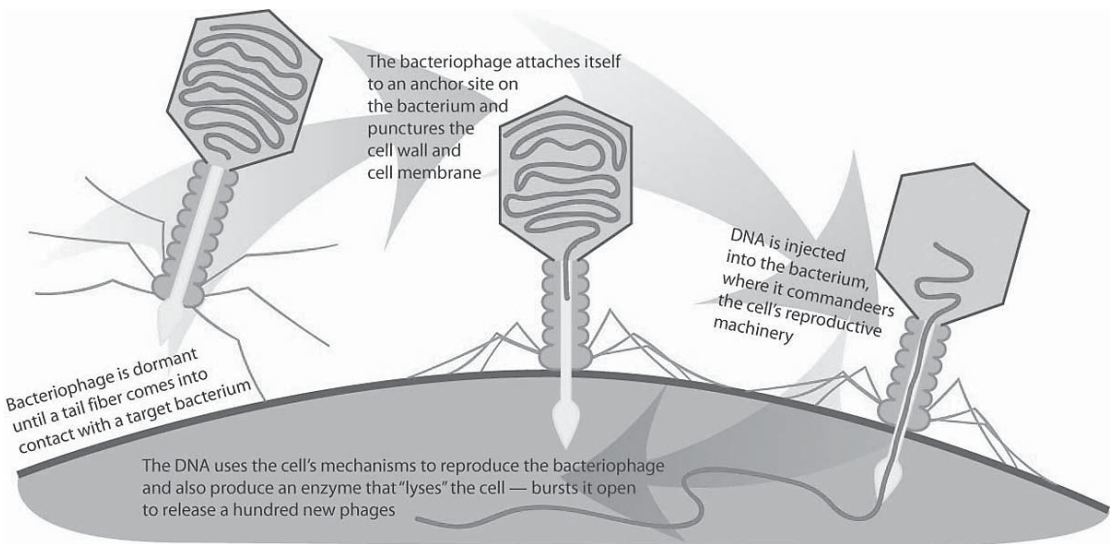
Cull sows produce baby hogs before moving on to processing in two or three years.

Bacteriophage... continued

through the part of the gastrointestinal tract that's similar to the human stomach — it's called the proventriculus," Hargis said. Its low acidity was killing most of the bacteriophages.

But some bacteriophages were surviving, so the answer seemed to be in overwhelming the gastrointestinal tract with numbers. Hargis' group took the bacteriophage populations, grew their numbers and administered them to baby poultry to see what would survive.

The plan worked. The large numbers of bacteriophage were passed through the poultry, separated and re-amplified to pass through them again. The mutations of bacteriophage managed to survive conditions in the poultry's guts well enough to be effective in reducing *Salmonella* by significant numbers.



Bacteriophage managed to survive conditions well enough to be effective in reducing Salmonella.

"As the bacteriophage travels down the gut, when it gets to an appropriate point in the gut where that organism can grow, it actually amplifies the phage," Hargis explained. "And then you can achieve incredibly high numbers of bacteriophage in the lower part of the gut. Once you've got the phage there you just feed them the bacteria so that the bacteriophage population is constantly being fed new hosts. Any bad guys that happen to be in the environment are in trouble."

Pending further development of the patent pending technology jointly owned by the university and the U.S. Department of Agriculture, the research has positive implications for a poultry industry in search of reliable ways of fighting *Salmonella* contamination. Poultry producers have long used antibiotics against pathogens, but many bacteria have developed resistance to antibiotics. The use of naturally occurring bacteriophages could be a more potent and reliable weapon for producers seeking to maintain healthy birds. ■

Cull Sows... continued

Wesley, the NADC microbiologist who was a member of the research team.

Cull sows are around longer than market weight hogs because the sows' job is to produce baby hogs before moving on to be processed after two or three years. Market weight hogs are generally slaughtered at about one year old and account for about 95 percent of all pork slaughtered each year.

The difference in processing procedures made the scientists wonder if the cull sows might be at further risk of contamination. Most pork processing plants slaughter market weight hogs at the rate of 1,000 an hour. Cull sows, owing to their bulk, move through processing at the much slower rate of 500 a day.

The research showed that the lesser amounts of water used on the cull sows apparently contributed to their lower contamination rate. "You have a difference in line speeds and things are moving through a bit more slowly for cull sows," Wesley said. "In market weight hogs' plants, there is more water and humidity."

Cull sows at the abattoir are also kept in pens in smaller numbers than their market-weight counterparts, which helps prevent potential contamination.

Results from the study showed that

The difference in processing procedures made the scientists wonder if the cull sows might be at further risk of contamination.

compared with the younger market weight hogs, cull sows overall had a less frequent rate of contamination from *Listeria monocytogenes*. Findings of the pathogen in the pork product

suggested that any significant contamination was happening during processing.

"We wanted to figure out if the cull sow had *Listeria monocytogenes*, compare the recovery from the cull sow and then see," Wesley said. "If there had been more, then we would say there was a problem. So we concluded that these cull sows were clean." ■

Food Safety Caucus Forms in Congress

A bipartisan Congressional Food Safety Caucus formed in the House of Representatives in April. Nineteen representatives organized the caucus, including four members of the House Agriculture Appropriations Subcommittee. Those four are Reps. Rosa DeLauro, D-Conn.; Marcy Kaptur, D-Ohio; Tom Latham, R-Iowa, and Jo Emerson, R-Mo.

The caucus will hold regular educational briefings on topics such as bio-engineered foods, risk-based management of food safety, the contamination of foods and protecting the food supply from bioterrorism.

“My hope for this caucus is that we take the action needed to bring common sense, uniformity and consistency to food safety inspections so that we can

better protect consumers and our nation’s agricultural economy,” said Latham. “I look forward to working with my colleagues on a bipartisan basis to advance proposals that guarantee America’s consumers the safest possible food products for their families.”

The goals of the caucus are to:

- Educate the public and Congress on current and emerging food safety issues;
- Communicate to start a productive dialogue about the ability of the current system to secure the food supply;
- Coordinate and facilitate communication between members of Congress, consumers, food safety agencies and the private sector; and
- Enhance the various legislative efforts toward improving the safety of the food supply.

“Food safety is not an issue of the past, and it is not a partisan issue,” said DeLauro. “It is about protecting families. We need to do all we can to reduce the incidence of foodborne illness, and more than ever, we need to be ever-vigilant in protecting our food supply from a bioterrorist attack. This caucus is about ensuring the safety of our families and children.”

Latham has previously worked with DeLauro to sponsor legislation that would consolidate the nation’s food safety responsibilities under one federal agency. The bill, more commonly referred to as the Safe Food Act, is expected to be re-introduced into the House of Representatives in the near future. ■

Prevention Strategies Vital to Counter Bioterror Threats

The devastating impacts on other nations’ farming economies brought by infectious animal and plant diseases provide a glimpse of what effects a bioterrorist attack on the U.S. food chain would have.

Norman Steele, a senior biologist with Science Applications International Corp., said it was vital to recognize that there could be no single overreaching approach. “The issues important to New Hampshire livestock agriculture are not important in New Mexico,” he said.

Steele delivered his remarks in July in Phoenix at a symposium on animal agriculture issues coordinated by the Federation of Animal Science Societies. Steele listed some consequences of a bioterrorist attack on agricultural production and the food chain. These include massive trade disruption, the closure of international markets, the collapse of consumer confidence, business closures and the loss of jobs.

The Defense Department defines the

threat to the food chain as asymmetric, Steele said, which means it is “a vulnerability not appreciated by the target.” Terrorists could capitalize on the nation’s limited preparation against such threats, he said.

The biotechnology revolution has provided terrorists a new set of tools to facilitate their activities.

Meanwhile, the emergence of health threats such as SARS has shown that contagious

diseases are difficult to control in an internationalized society.

The emergence of infectious diseases is “an example of nature behaving like a bioterrorist,” Steele said.

Pointing to the emergence of foot-and-mouth disease in the United Kingdom in the spring of 2001, Steele explained that the greater cost to the

economy was not in agriculture but in tourism. In the U.S., it is a matter of when, not if, something similar happens.

“I don’t for a second believe that this is outside the realm of possibility,” Steele said. “Through USDA we have surveillance measures in place, but we were also lucky we didn’t get it when it struck U.K.”

Steele called for a robust series of vulnerability assessments and threat analyses. Effective deterrent strategies, prevention

strategies, domestic presentation drills and further research need to be put in place. He said this would require open discussion, debate and planning in the private agribusiness sector and in state agricultural experiment stations. The topic should not be restricted only to USDA, he said. ■

The emergence of infectious diseases is “an example of nature behaving like a bioterrorist.”

Report from the Coordinator



Gregory J. Weidemann

Science triumphs again for food safety. We speak in those terms frequently in university research circles, and it's always good to hear our government counterparts in food safety on the same line of thinking.

The latest example is a report from the National Academy of Sciences that concluded performance standards are useful for food processors in measuring their process control. The NAS suggested the development of a comprehensive plan to harmonize disease surveillance data and microbial prevalence data. It also called for adopting science-based strategies for development of food safety criteria.

Congress commissioned the NAS report more than two years ago and mandated it to provide recommendations for the government's two agencies involved in food safety, the U.S. Department of Agriculture Food Safety and Inspection Service and the Health and Human Services Department's Food and Drug Administration.

FSIS, whose regulatory authority over

meat and poultry processing dovetails with the Food Safety Consortium's areas of research focus, is enthusiastic about the NAS report. Elsa Murano, the USDA undersecretary for food safety, said FSIS agrees with NAS "that development of food safety criteria, including performance standards, must be based on science and linked to public health goals."

The NAS urges USDA to conduct baseline studies of *Salmonella*, *E. coli* O157:H7 and other pathogens. The *Salmonella* study would help FSIS determine whether current *Salmonella* standards should be revised. Other NAS recommendations include expanding *E. coli* O157:H7 testing to include beef trim, conducting additional research into the ecology of *E. coli* O157:H7 and reviewing the FSIS approval process for intervention at appropriate control points in meat and poultry processing.

Food safety scientists in university settings will follow these developments with interest and will study any new findings from FSIS. The triad of food safety research groups exists so that

different perspectives will be available. Government researchers explore questions to find evidence that is useful in rulemaking and safeguarding national interests. Industry researchers seek information that will be of proprietary use in their product development. University researchers examine basic questions that may take longer to resolve but that will be useful to government and industry researchers over the long term.

Each phase of the system works as part of the bigger picture, which is designed to work for all of us. That's why those of us in one part of this research triad are vitally interested in the work of our fellow scientists in another section. ■

UN Official Declares Food Safety a Right

Food safety is not a luxury of the rich, but a right of all people, a top United Nations official told representatives in June from 169 countries gathered in Rome to consider the adoption of new standards to safeguard the health of consumers worldwide, while improving global agricultural trade opportunities.

Jacques Diouf, UN Food and Agriculture Organization (FAO) director-general, in remarks delivered by his deputy, David Harcharik, said the increase in volume and variety of foods inevitably creates a demand for

standards that ensure fair trade practices across all countries and regions of the world.

"Increased foreign investment in food manufacturing industries and food distribution and retail industries also creates situations where harmonized food standards are desired among the regions in the world," he added.

Harcharik delivered his remarks at the opening of the 26th session of the Codex Alimentarius Commission.

FAO and the UN World Health Organization (WHO) established the Commission in 1962 to set safety

standards and ensure fair practices in food trade.

"We have to recognize that food can never be defined as completely safe," WHO Director-General Gro Brundtland said in video-taped remarks to the meeting. "The risks can be reduced through routine food safety work that must be carried out every day. This means countless men and women working diligently to protect human health throughout the food chain." ■

Consumers Finding Safety in Irradiated Foods

The introduction of beef treated with irradiation into Kansas supermarkets last fall is another sign that consumers want the added safety in their food, a Kansas State University food scientist said.

Irradiated beef “seems to be permeating much more of the country,” said Karen Penner, a food safety specialist at KSU. “It’s an industry decision saying, ‘We want to provide consumers with the safest ground beef product possible.’”

In October, Hy-Vee, Inc., began stocking supermarkets in Kansas City and Lawrence with irradiated beef, alongside non-irradiated products. Company spokesperson Ruth Mitchell believes this is the first time any Kansas supermarket retailer has carried fresh ground beef that has been irradiated. Hy-Vee – listed among the country’s top 15 supermarket retailers – is now offering irradiated fresh ground beef at 188 stores in seven Midwest states.

Hy-Vee’s move in Kansas is part of a trend developing across the country. Sean Fox, a KSU agricultural economist with the Food Safety Consortium who studies consumer perceptions of new products, said that such national chains as Price Chopper, Lowe’s, Wegman’s and others are now offering fresh, irradiated beef and chicken in many states.

As a food safety step, irradiation has been approved by the U.S. Food and Drug Administration for poultry, beef and other foods. The U.S. Department of Agriculture also has approved the treatment for fresh meats and poultry.

The meat being sold at Hy-Vee stores is treated with electron-beam

irradiation, a process that produces energy similar to that from a home electrical outlet. Another approach available to the industry now uses low levels of Cobalt 60, a radioactive isotope. The FDA says both processes are safe.

Irradiation is widely used to sterilize many non-food products, including toothbrushes, home-use adhesive bandage strips, surgical tools and more – although at doses much higher than used for food. Irradiation has been eliminating insects in wheat and wheat flour since 1963 and increasing the safety of common kitchen spices since 1983.

“When the treatment is used on products available in retail markets, each package must be labeled to indicate that [it has been treated with irradiation],” Penner said. “On the other hand, food items that are irradiated and then used as ingredients in other products do not need to be labeled.”

When buying beef in grocery stores, consumers “still have an option,” Penner

said. “They can choose to buy the irradiated or the non-irradiated product.”

In sensory tests, consumers who compared irradiated with non-irradiated grilled ground beef could not tell the

difference between the samples.

“They didn’t prefer one over the other,” KSU graduate student Lori Hamilton said. Irradiation at the low level used did not cause any significant change in the color, texture or nutritional quality of the beef.

In Minnesota, Dairy Queen is

banking on studies such as Hamilton’s. The fast-food chain sells only irradiated hamburgers in more than 60 restaurants in that state and is actively promoting them with tray liners, table “tents” and numerous signs in each store.

Another national chain, Schwann’s Foods, has been selling irradiated frozen beef patties since May 2000.

“[The food industry] is doing so much more than was being done even five or 10 years ago to prevent outbreaks of foodborne illness,” said Penner, who has worked in food science for more than 30 years. “Some foodborne organisms are very harmful and can cause long-term debilitation or death. I think the meat industry has been very proactive in trying to provide safe products.”

Article courtesy of KSU Research and Extension News. ■



When buying beef in grocery stores, consumers can choose to buy the irradiated or the non-irradiated product.

Taking the 'High Ground' to Improve Public Health

These are excerpts of remarks prepared for delivery by Dr. Garry McKee, Administrator, Food Safety and Inspection Service, before the Association of Public Health Laboratories (APHL) and CDC's Annual PulseNet Update Meeting, San Antonio, Texas, April 30, 2003.

In the days long before satellites, GPS, and CNN, a scout on reconnaissance would benefit his army's headquarters if he took the high ground. From the high ground, he could quickly detect movements by the opposing force, and even if this force was so far off in the distance he could still determine its size and whether it was cavalry, infantry, or a supply train by the color it emitted in the horizon. This first detection gave his army the ability to respond quickly.

Likewise, PulseNet offers FSIS and all other participating partners the "high ground" in our efforts to combat outbreaks. The key word here is "detect" because PulseNet, with its DNA fingerprinting on bacteria gives us the ability to detect and ascertain very quickly the exact strain of bacteria causing the source of foodborne illness.

This is a great strategic advantage that FSIS appreciates, especially as we work toward fulfilling the vision that I have laid out for the agency – to evolve into a premier public health agency that is a model for other public health institutions.

To achieve this vision, we need to implement three functions that a model public agency uses to protect public health. The first function is assessment, which simply means identifying public health problems. The second function is policy development, which determines what actions and resources are needed to solve

the problems. And the third function is assurance, which means making sure the job gets done.

I'm sure many of you are aware of these three functions, and that PulseNet is a vital component of the assessment function. The fact that laboratories in the PulseNet system use the DNA "fingerprinting" method, or Pulsed-Field Gel Electrophoresis (PFGE), to identify strains of bacteria is a significant boost — when combined with epidemiology — to enable us to rapidly detect and control outbreaks of foodborne illness.

Using the three steps of a model public health agency as a template, I'll explain the importance of PulseNet's role in the assessment of the listeriosis outbreak in the Northeast last fall. This was an unprecedented joint investigation with the CDC and other federal and state agencies, but the challenging part of our examination was identifying a food commodity that might have been consumed weeks or months before outbreak victims were contacted and interviewed. The epidemiological study

implicated sliced turkey deli meat purchased at a deli counter, but specific brand information was not available.

Then, our traceback efforts established a list of possible manufacturers of the turkey deli meat possibly associated with the illness. In the effort to pin down the source of the contaminated turkey deli meat, we analyzed both product and environmental samples taken at several turkey deli meat manufacturers. FSIS



Garry McKee

laboratories immediately performed the DNA fingerprinting on the isolates found, and the PulseNet administration promptly assessed the patterns submitted. The key to determining the most likely source of the adulterated turkey deli meat was the matching of the food and environmental isolate patterns with the outbreak's DNA

fingerprinting pattern. This analysis was the key factor in identifying two manufacturers as the most likely producers of the contaminated turkey deli meat. Both facilities voluntarily suspended operations and recalled nearly 28 million pounds of product.

From this investigation, we learned that some establishments were not adequately addressing the potential for *Listeria* contamination of ready-to-eat product. Therefore, for the policy development stage, we issued an interim *Listeria* directive last December, which outlined additional steps to be taken by our inspectors to ensure that establishments are preventing *Listeria* contamination. And finally, for the assurance function, we are making sure that our testing program, now intensified as a result of the directive, consists of increased product, food surface contact testing, and environmental testing inside the plant.

As you see, PulseNet gave us the "high ground" advantage to detect and respond rapidly in finding the source of the outbreak from a unique perspective. Thus, we were able to take quick and immediate action as a model public health agency to develop policy and assure that the chances of this problem arising again are minimized. ...

PulseNet gave us the 'high ground' advantage to detect and respond rapidly in finding the source of an outbreak.

How PulseNet Has Benefited FSIS

PulseNet has clearly benefited FSIS in a number of ways. For example, it helps us to define the magnitude or scope of product recalls so that we may alert consumers that a specific product or products may pose a health risk.

Many of you are aware of several large recalls of FSIS-regulated products in 2002, specifically ground beef and the turkey deli meat, which I mentioned earlier. The evidence provided by PulseNet as confirmed “matches” were considered to be key pieces of evidence when such recall decisions were made. Some were alarmed at the size of last year’s recalls; however, the strength of the DNA fingerprinting evidence and epidemiological, trace back and in-plant investigative findings allowed FSIS and industry to protect consumers from potentially contaminated or adulterated product.

Through our assessments of microbiological sampling programs, we periodically identify establishments that have recurring positive microbiological findings in product or the processing environment. We closely monitor these facilities to assure that they are taking appropriate actions per federal statutes and regulations, since we are concerned about the possibility that products manufactured in such settings put consumers at increased risk of foodborne illness. We periodically query epidemiologists and PulseNet to see whether there are any existing, unexplained illness clusters that could potentially be linked to an establishment and its product.

FSIS’ Strategies for Responding to Foodborne Outbreaks and Prevention

Whether faced with intentional or unintentional contamination of the food supply, our strategy for responding to foodborne outbreaks is proactive. During outbreak investigations, FSIS places the highest priority in submitting PFGE patterns to PulseNet for specimens of interest.

Due to this proactive approach, when appropriate, FSIS will move forward and work with an establishment to remove a product from the marketplace, even before CDC, state, and local

epidemiologists and lab technicians formally implicate the product. Our reasoning behind this approach is that we believe that trace-back and trace-forward activities, product and environmental testing, PFGE analysis and in-plant assessments performed early in an outbreak investigation certainly are decisive factors when ruling in, or ruling out, a specific food commodity.

The clear and successful identification of a potentially adulterated product with subsequent alerts to consumers is key to the prevention of further illnesses. ...

As we pursue fulfilling our vision of becoming a world-class public health agency, we continue to work closely with our partners at the federal, state, and local levels to ensure the strongest food safety net possible.

I look forward to continue working together with you in the months and years to come on our joint goal of protecting public health. I know the utilization of PulseNet will take all of us to the “higher ground” we seek to attain to accomplish our objectives. ■

Papers & Presentations

Judith Sabah, James Marsden and Daniel Fung, Kansas State, prepared an abstract for the Institute of Food Technologists annual meeting on “Evaluation of the Minimal Inhibitory Level of a Commercial Solution of Sodium Citrate Buffered at Three pHs (4.4, 5.0, 5.6) on *Clostridium perfringens* Growth in Cooked Vacuum Packaged Restructured Roast Beef During an 18-Hour Alternative Cooling Procedure.” **Sabah, V.K. Juneja and Fung** also submitted the abstract “Effect of Spices and Organic Acids on the Growth of *Clostridium perfringens* From Spore Inocula During Cooling of Sous-Vide Cooked Ground Beef Products.”

R.J. Danler, Elizabeth Boyle, Curtis Kastner, Harshavardhan Thippareddi, Daniel Fung and Randall Phebus, Kansas State, published “Effects of Chilling Rate on Outgrowth of *Clostridium perfringens* Spores in Vacuum Packaged Cooked Beef and Pork” in the *Journal of Food Protection*, 66 (3): 501-503.

Harshavardhan Thippareddi, V.K. Juneja, Randall Phebus, James Marsden and Curtis Kastner, Kansas State, published “Control of *Clostridium perfringens* Germination and Outgrowth by Buffered Sodium Citrate During Chilling of Roast Beef and Injected Pork” in the *Journal of Food Protection*, 66 (3): 376-381.

D.L. (Hank) Harris, Iowa State, presented a paper on “Reduction of Human Foodborne *Salmonella* in Swine” in May at the Fourth International Symposium on Pig Production in Mexico City. Harris also received grants for projects from these organizations: “*Salmonella* Monitoring and Reduction Immediately Prior to Slaughter” from the U.S. Department of Agriculture Integrated Research, Education and Extension Competitive Grants Program for Food Safety; “Vaccination to Prevent Acute Infection by *Salmonella* in Transport and Lairage Prior to Slaughter” from the National Park Board; and “Gnobioc Pig Model for Development of Probiotics” and “Bacteriophage and Enzybiotic Development for Reduction of *Salmonella* in Swine,” both from the Biotechnology Research and Development Corp.

Matthew Erdman, S.D. Wedel and D. L. (Hank) Harris, Iowa State, published “Genotypic and Phenotypic Comparison of Swine *Salmonella* Isolates From Farm and Abattoir” in the *Journal of Swine Health and Production*, 11 (4): 169-172. **Erdman and Harris** also published “Evaluation of the 1-2 Test for Detecting *Salmonella* in Swine Feces” in the *Journal of Food Protection*, 66 (3): 518-521. ■

Food Safety Digest

by Dave Edmark

Salmonella testing in raw meat and poultry products in 2002 shows that the pathogen's presence has decreased since the previous year and since federally mandated Hazard Analysis and Critical Control Points systems were implemented in the processing plants a few years ago. The U.S. Department of Agriculture Food Safety and Inspection Service released results of its survey this spring.

The baseline year for determining the level of *Salmonella* in plants varies according to the size of the plant. The rule was mandated over time, beginning with large plants in 1998, extending to small plants in 1999 and finishing with very small plants in 2000.

During 2002 across processing plants of all sizes, 11.5 percent of broilers that were sampled tested positive for *Salmonella*, down from 11.9 percent in 2001 and down from 20 percent in the respective plants' baseline year. The level of positive samples for other commodities were:

- Market hogs — 3.2 percent in 2002, 3.8 percent in 2001 and 8.7 percent in the baseline year.
- Cows and bulls — 1.7 percent in 2002, 2.4 percent in 2001 and 2.7 percent in the baseline year.

■ Steers and heifers — 0.3 percent in 2002, 0.6 percent in 2001 and 1.0 percent in the baseline year.

■ Ground beef — 2.6 percent in 2002, 2.8 percent in 2001 and 7.5 percent in the baseline year.

■ Ground chicken — 29.1 percent in 2002, 19.5 percent in 2001 and 44.6 percent in the baseline year.

■ Ground turkey — 17.9 percent in 2002, 26.2 percent in 2001 and 49.9 percent in the baseline year.

Ground chicken was the only commodity in which *Salmonella* prevalence increased from 2001 to 2002. FSIS attributed that rise to an increase in small processing plants.

FSIS said the testing program is designed to track performance in plants rather than to estimate the nationwide prevalence of *Salmonella* in products. Different establishments are sampled from year to year.

■ ■ ■

Research repeatedly has shown the effectiveness of irradiation in killing pathogens in meat and poultry. Irradiation also kills pathogens in eggs, but it also leaves quality problems.

Richard G. Hunter, president of Food Technology Services in Mulberry, Fla., told the Midwest Poultry Federation this spring that in-shell irradiation damages eggs' quality attributes such as yolks.

The agribusiness newspaper *Feedstuffs* reported that Hunter said some nursing homes and other potential customers had asked his company about irradiating eggs so they would be able to safely serve

soft-boiled or poached eggs. Tests showed that irradiation caused changes in the egg white and yolk that would make it difficult to break the egg and leave the yolk intact. He advised egg producers to provide consumers information about these changes if they choose to pursue irradiation. He said large-scale users in food service and manufacturing would be the best potential market for irradiated eggs.

■ ■ ■

During a speech in May to the First World Congress on Irradiation, Undersecretary for Food Safety Elsa Murano told the delegates "irradiation offers us an important tool in our fight against foodborne illness. But it is just that — another tool, not the only tool available." Irradiation education programs must make clear the following points, she said:

■ "FSIS inspects all meat and poultry products, including those that are irradiated, and these plants cannot use irradiation to substitute for good sanitation and process control.

■ "Second, consumers need to know that while irradiation reduces the level of pathogens, it generally does not make meat or poultry products sterile. The process does not replace proper cooking or food handling practices by producers, retailers, and consumers." ■

The Food Safety Consortium Newsletter

is a production of the three member schools of the consortium: University of Arkansas, Iowa State University and Kansas State University. Your comments are welcome.

David Edmark, Editor
110 Agriculture Building
University of Arkansas
Fayetteville, AR 72701-1201
Voice: 479-575-5647
FAX: 479-575-7531
E-mail: fsc@cavern.uark.edu
World Wide Web:
<http://www.uark.edu/depts/fsc>

The Food Safety Consortium

110 Agriculture Building
University of Arkansas
Fayetteville, AR 72701-1201

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