

AMI Foundation News

A quarterly update on research, education and information

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Volume 6

Issue 1

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AMIF, Cattlemen's Beef Board jointly funding new carcass surface irradiation, rapid testing research

In December 2003, the AMI Foundation Steering Committee approved funding for three new projects: Beef Carcass Surface Irradiation; Comparison of Rapid Test Methods and Validation of Composite Sampling; and a review of the FSIS Risk Assessment for *Listeria monocytogenes* in Deli Meats. Total funding for these projects was \$210,600, with the first two projects receiving matching beef Checkoff funds from the Cattlemen's Beef Board.

■ **The Beef Carcass Surface Irradiation** project will explore and develop the feasibility of applying a very low dose irradiation to the surface of the chilled beef carcass, to eliminate *E. coli* O157:H7 and other pathogens prior to fabrication and further processing. A preliminary legal and regulatory review has determined that current FDA and USDA regulations permit low dose irradiation on chilled beef carcasses.

■ **The Comparison of Rapid Test Methods**, conducted by Silliker Inc.,

Special BSE Briefing

Don't miss AMIF's BSE Briefing on Feb. 3 in Washington, D.C. To register, contact Laura Quartuccio at 703-841-3648 or lquartuccio@meatami.com.

(See BSE story, page 7.)

addresses the need for validation of appropriate sampling and testing protocols to detect *E. coli* O157:H7 in raw beef products. This research will be the first comparative study to determine the limits of composite sample sizes on detecting low levels of *E. coli* O157:H7 in new rapid eight-hour test kit

cont'd. on page 5

Pre-harvest food safety, cloning, dietary issues highlight presentations at 2003 MIRC in Chicago

The Meat Industry Research Conference in Chicago last October presented new research reports on a number of key areas for meat and poultry industry scientists and quality control managers.

Here are some of the highlights:

Michael P. Doyle, Ph.D., director of the Center for Food Safety at the University of Georgia, outlined his research into methods of controlling *E. coli* O157:H7 through pre-harvest strategies in live cattle. Although research has pinpointed the promise of treating cattle drinking water, Doyle said that his data do not yet confirm the efficacy of chlorina-

tion or other disinfection strategies to prevent drinking troughs from becoming vectors for the pathogen.

"Chlorination in our study wasn't really effective, because the level of organic matter is just too great," Doyle said. "We need a better treatment modality, and we're looking at the use of acidified calcium sulfate. It creates a low pH that controls the bacteria, but we think cattle will still find it acceptable to drink."

cont'd. on page 4

Science Soundbites: A review of recent research

Can acidic sanitizers remove *E. coli* biofilms?

Researchers at the Colorado State University determined if continued acid stressing with two commonly used chemical sanitizers could enhance biofilm removal. Stainless steel “coupons” were submerged in the inoculated washings and stored for up to 14 days at 15 degrees C. Survival of *E. coli* O157:H7 was determined after exposure to two commercial sanitizers at 2, 7 and 14 days.

The study showed that the *E. coli* O157:H7 were more sensitive to peroxyacetic acid than to quaternary ammonium and suggest that plants should consider using acidic sanitizers to enhance biofilm removal.

Plants that apply both water and acidic washings may create a sub-lethal acid-stressing environment in runoff fluids, sensitizing biofilm cells to subsequent sanitation. *Food Protection, 2003, Vol. 66, No. 12, pp. 2258-2266, J. D. Stopforth, et al.*

Listeria inhibitors even protect irradiated RTE meat

When incorporated into fine-emulsion sausages, sodium diacetate (SDA) and potassium lactate (PL) mixtures inhibit the growth of *Listeria monocytogenes* (*L.m.*), according to a study by Sommers, et al., of USDA’s Agricultural Research Service, Eastern Regional Research Center.

Ionizing radiation can eliminate *L.m.* from RTE meats, but the addition of inhibitor ingredients decreased post-irradiation proliferation of the pathogen, the researchers reported. *L.m.* was able to proliferate when inoculated on bologna containing no inhibitors during refrigerated storage (9 degrees C).

Irradiation caused little effect on lipid oxidation and color of the control bologna

and bologna containing SDA-PL mixtures.

Food Protection, 2003, Vol. 66, No. 11, pp. 2051-2056, Christopher Sommers, et al.

(See related story on the FDA *Listeria* Risk Assessment, page 6).

E. coli in cattle more variable, more prevalent

There is greater variability in cattle shedding *E. coli* O157:H7 over time and across pens, according to the research conducted by North Dakota State University. One hundred steers, randomly assigned to 10 pens, were fed a high-concentrate finishing diet for 136 days (19 weeks). Feces from each animal were tested. However, odds of an incident case were significantly greater during what the researchers labeled the epidemic and post-epidemic periods, relative to the pre-epidemic, or outbreak, period.

Both incidence and duration of shedding peaked during the epidemic period.

Pen-level prevalence of cattle shedding *E. coli* O157:H7 was affected by both incidence and duration of shedding and could be explained by time- or pen-dependent risk factors, or both. *Food Protection 2003, Vol. 66, No. 11, pp. 1972-1977, M.L. Khaitisa, et al.*

Scientists now tracking *Salmonella* in live swine

Imagine being able to photograph a *Salmonella* infection as it moves through a live pig and show the process as patches of colors. That’s what Donald C. Lay, lead researcher at Agricultural Research Service’s Livestock Behavior Research Unit in West Lafayette, Ind. and Scott T. Willard, Mississippi State University, have proposed.

Willard is an expert in biophotonics, a new technology that uses light to mark molecular changes.

Lay and Willard have found a way to treat bacteria to emit light, making it possible to track infections in live pig up to the age of marketing. Their USDA grant is aimed at adapting the technique so cameras can see through the denser mass of live, 250-pound, adult pigs.

Lay and Willard will research ways to improve swine management by identifying animals that are more susceptible to infection and by designing techniques to prevent those swine from spreading infection to their herd mates.

Ongoing research; for more information go to www.ars.usda.gov

New assay detects animal protein in ruminant feeds

The ban on use of meat and bone meal in ruminant feed, due to bovine spongiform encephalopathy, has prompted investigation into the possibility of detecting animal tissues in feedstuffs. Now, a rapid, sensitive PCR assay developed in Europe can be used for routine detection of such proteins in livestock feed formulations.

The PCR assay was applied to five samples of meat and blood meals of different species and subjected to severe rendering treatments. The presence of vertebral tissues, protein derived from rendered animal by-products, was detected in all samples. *Food Protection, 2003, Vol. 66, No. 12, pp. 2307-2312, M.T. Bottero, et al.*

Listeria monocytogenes Research Projects

<u>Project #</u>	<u>Investigator</u>	<u>Institution</u>	<u>Project Title</u>
01-201	Michael Doyle	University of Georgia	Recovery, Development and Validation of Appropriate Surrogate Microorganisms in Meat and Poultry Emulsions for In-plant Critical Control Point Validation Studies
01-206	Michael Doyle	University of Georgia	The Role of Aerosols in Transmission of Microorganisms (including <i>Listeria</i>) to Ready-to-Eat Meat/Poultry Products
01-208	Ferencz Denes	University of Wisconsin-Madison	Plasma-Enhanced Disinfection of Surfaces, Air, and Water in Ready-to-Eat (RTE) Meat and Poultry Processing Environments
02-201	ILSI Steering Committee	International Life Sciences Institute	Expert Scientific Review Panel on <i>Listeria monocytogenes</i> in Foods
02-222	Eric Johnson and Kathleen Glass	University of Wisconsin-Madison	Intervention Strategies: Control of <i>Listeria monocytogenes</i> in Processed Meat and Poultry by Combinations of Antimicrobials
02-226	Bradley Marks, Alden Booren and Elliot Ryser	Michigan State University	Verifying and Improving the Utilization of Microbial Pathogen Computer Models for Validating Thermal Processes in the Meat Industry
*03-600	Barbara Petersen and Lelia Barraj	Exponent, Inc.	FSIS Risk Assessment for <i>Listeria monocytogenes</i> in Deli Meats
01-222	Robert Vinopal, Richard Jadamec	University of Connecticut	Development of Ion Mobility Spectrometry (IMS) Applications for <i>Listeria</i> Detection and Monitoring In-Plant Food Processing Plants

E. coli O157:H7 Research Projects

<u>Project #</u>	<u>Investigator</u>	<u>Institution</u>	<u>Project Title</u>
01-100	Alison O'Brien	Uniformed Services University of the Health Sciences	<i>E. coli</i> O157:H7 Intimin Expressed by Transgenic Plant Cells as a Candidate Oral Vaccine for Cattle
01-106	Michael Doyle	University of Georgia	Methods to Control <i>E. coli</i> O157:H7 in Drinking water for Cattle
01-109	Chobi DebRoy	Pennsylvania State University	Competitive Exclusion of <i>Escherichia coli</i> O157 using Non Pathogenic Colicin Producing <i>Escherichia coli</i> Strains
01-121	Charles Kaspar	University of Wisconsin	The Use of Egg Yolk Anti-O157:H7 Immunoglobulin to Clear <i>E. coli</i> O157:H7 from the Intestinal Tracts of Cattle
02-123	Mindy Brashears ¹ Michael Galyean ¹ Guy Loneragan ² , Spring Younts Dahl ¹	¹ Texas Tech University, ² West Texas A&M University	Reduction of <i>E. coli</i> O157:H7 in Beef Feedlot Cattle using Varying Doses of a Direct-Fed Microbial
*03-601	To be determined	To be determined	Beef Carcass Surface Irradiation
*03-602	Ann Marie McNamara	Silliker Laboratories	Comparison of Rapid Test Methods and Validation of Composite Sampling for Detection of <i>Escherichia coli</i> O157:H7 in Raw Beef Trims and Raw Ground Beef

* Denotes newly approved projects as detailed on page 1 of AMI Foundation News.

(MIRC) from page 1

Alison O'Brien, Ph.D., chair, department of microbiology & immunology, Uniformed Services University of the Health Sciences, reported on research on a plant-based vaccine against intimin, an outer membrane protein of *E. coli* O157:H7 required for colonization of the pathogen in young calves. O'Brien said that early data indicate significantly reduced duration of fecal *E. coli* O157:H7 shedding in limited, small-animal trials. The intimin vaccine, however, needs to undergo further testing to confirm its efficacy in calves.

Guy Loneragan, Ph.D., assistant professor, beef cattle health and management, West Texas A&M University, reported that research on developing an oral vaccine for *E. coli* O157:H7 remains uncertain.

"At this point, the studies show no proven benefit [from vaccination] in controlling *E. coli* O157:H7," Loneragan said. "We're not sure why, but we know that more research is needed."

Loneragan did note that oral doses of the antibiotic neomycin showed remarkable reductions in fecal shedding of *E. coli* O157:H7, but noted that such usage would require FDA approval.

"Basically, no single live animal intervention eradicates [this pathogen]," he said. "What we do know is that the optimum strategy for control remains a multiple hurdle concept throughout the entire beef chain."

USDA's dietary dilemma: Since the last revision of USDA and the Department of Health and Human Services' *Dietary Guidelines for Americans* in 2000, media stories about the so-called "crisis" of obesity have increased from less than 200 to more than 1,300 annually, according to Eric Hentges, Ph.D., executive director of USDA's Center for Nutrition Policy and Promotion.

"There is a lot of controversy over how much of a problem we really have as a nation with obesity," Hentges told the MIRC audience. "We know that our problem in providing nutritional advice is that overeating is really a behav-

ioral problem. We have to encourage the adoption of sensible food choices and appropriate calorie intake. But we also have to make sure we maintain public confidence in the value of the Dietary Guidelines and the Food Guide Pyramid. That's really our challenge during this revision in 2004."

The impact of cloning: In a special luncheon address, Steven Stice, Ph.D., professor and Georgia Research Alliance Eminent Scholar at the University of Georgia, outlined the challenges of implementing cloning technology in food production.

Stice, who has conducted more than 14 years of animal cloning research and received the first U.S. patents on cloning animals and cattle embryonic stem cells distinguished between "cloning," or genetic duplication — producing what amounts to identical twins — and "genetic engineering," which involves adding new traits to an organism. Stice said that contrary to what critics contend, cloning is not a threat to so-called "genetic diversity."

"Most [livestock] experts see cloning as a technique to preserve the exceptional meat-producing qualities of specific animals," Stice said. "That will help ensure preservation of the genetics of those unique animals."

Most importantly, Stice addressed the meat safety issue, discussed in detail in FDA's October 2003 Draft Risk Assessment of Animal Cloning, in a direct and forceful way.

"Cloning won't be used as an alternative to traditional food animal reproduction," Stice predicted, "due to costs and complexities. So the question is the safety of meat from the offspring of cloned animals. There is no controversy on that subject. All studies suggest that meat from cloned offspring is perfectly safe."

Once suspect, NIH now says nitrite offers health benefits

Nitrite, a curing agent in processed meats, may actually offer positive health benefits, such as improved blood flow, according to scientists at the National Institutes of Health (NIH). The study indicates that the increase in oxygen in the blood resulting from nitrite may be a potential new treatment for high blood pressure, heart attacks, sickle cell disease and leg vascular problems.

The study demonstrated that when hemoglobin releases its oxygen in organs with low oxygen levels or high metabo-

lism, it can then convert nitrite into nitric oxide, which dilates blood vessels. Nitrite levels have been shown to be low in patients with high blood pressure.

Dr. Mark Gladwin and co-author Dr. Richard Cannon III in the Cardiovascular Branch of the National Heart, Lung, and Blood Institute, studied 18 healthy volunteers. After being infused with sodium nitrite, blood flow increased by 175 percent in those volunteers.

December 2003, Nature Medicine.

Latest USDA data shows significant decline in *Salmonella*

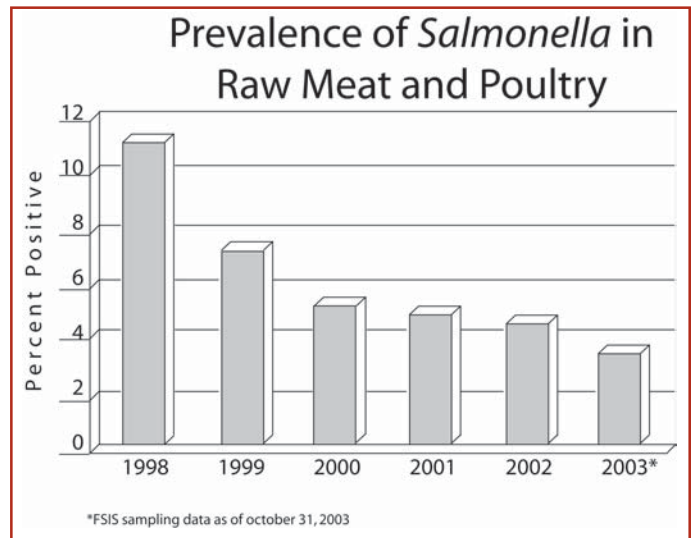
The Food Safety and Inspection Service (FSIS) reported a significant decline in the rate of *Salmonella* detected on meat and poultry products, according to recent survey data.

Data collected and analyzed between Jan. 1 and Oct. 31, 2003, by FSIS revealed the rate of *Salmonella* in raw meat and poultry has declined 62 percent over the past six years and by 16 percent compared with 2002.

Of the random samples collected and analyzed between Jan. 1 and Oct. 31, 2003, by FSIS, 3.6 percent tested positive for *Salmonella*, compared with 4.29 percent in 2002, 5.03 percent in 2001, 5.31 percent in 2000, 7.26 percent in 1999 and 10.65 percent in 1998.

USDA recently announced data showing similar reductions in *E. coli* O157:H7 in ground beef and *Listeria monocytogenes* in ready-to-eat meat and poultry products.

“We are pleased at the confirmation that our industry has made great strides in enhancing food safety,” said AMI President and CEO J. Patrick Boyle. “These latest data reflect reduced microbial contamination on both fresh and processed products, making the U.S. meat and poultry supply even safer.”



(AMIF, Cattlemen's) USDA creates agenda for food-safety research from page 1

formats. The effect of increased enrichment incubation times will be evaluated to compensate for loss of detection sensitivity in larger composite sample sizes. The projected duration for this project is five months.

■ Barbara Petersen and Leila Barraj of Exponent, Inc will conduct a review of the **FSIS Risk Assessment of *Listeria monocytogenes* in Deli Meats**. This project will review the May 2003 risk assessment model and examine the model assumptions and model construction to determine appropriateness, identify the algorithms used and determine what level of detail is available on the actual algorithms, data treatment and assumptions.

For a complete listing of the ongoing research projects funded by AMIF, see page 3.

USDA Secretary Ann M. Veneman announced a unified research agenda with the goal of improving the efficiency and effectiveness of food-safety programs. The newly compiled agenda is one of several key initiatives USDA is implementing to enhance food safety and food inspection systems.

The unified agenda, which aims to prioritize research needs and maximize available resources, targets research projects that would:

■ Investigate the ecology, epidemiology, virulence and genetic characteristics of *E. coli* O157:H7, *Salmonella*, *Listeria monocytogenes* and other foodborne pathogens to better identify targeted control measures.

■ Develop effective on-farm, feedlot, transportation, handling and other pre-processing intervention strategies to reduce the incidence and levels of antibiotic resistant microorganisms and key foodborne pathogens in meat,

poultry, eggs and fresh produce.

■ Develop, validate and transfer the technology offering new and improved processing methods to reduce or eliminate key foodborne pathogens in meat, poultry, fresh produce, seafood and ready-to-eat foods.

■ Develop rapid, sensitive detection methods for abnormal prions to prevent the possible spread of transmissible spongiform encephalopathies.

The complete USDA unified food safety research agenda is accessible by logging onto www.reeusda.gov/ree/.

The meat, poultry and egg research priorities are available at www.fsis.usda.gov.

FDA *Listeria* Risk Assessment: Keep RTE foods cold to reduce listeriosis

The recent Food and Drug Administration *Listeria* Risk Assessment emphasized that controlling *Listeria monocytogenes* (*L.m.*) in ready-to-eat foods depends on two key strategies: Keep refrigerated foods at 40 degrees F or colder and consume perishable, precooked or RTE foods as soon as possible.

The October 2003 risk assessment, published by FDA and the Department of Health and Human Services in conjunction with FSIS, noted that those two practices alone could reduce the risk of *Listeria*-related illnesses or outbreaks by more than 50 percent.

“Manufacturers, retailers and consumers alike can all take simple actions to drastically reduce the risk of listeriosis,” FDA Commissioner Mark B. McClellan said. “Food manufacturers should build on their progress to reformulate and monitor susceptible foods to prevent significant levels of *Listeria*.”

The assessment followed October 2003 FSIS data indicating a 25 percent

decline in positive *L.m.* samples since 2002 and a 70 percent decline compared with (the) years prior to implementation of Hazard Analysis and Critical Control Points. The Center for Disease Control’s Food Net program recorded more than

baseline data for selected RTE products. The agency may also initiate food contact surface testing in retail delis.

At an FDA, FSIS and CDC public meeting on Dec. 5, 2003, AMI suggested that FDA consider product reformulation with antimicrobials when refining the risk assessment model and recommended separating deli meats by products sliced in plant versus products sliced at retail, to better reflect the impact of reformulation and differences in risk levels.

The complete risk assessment is available on the FDA Web site at www.cfsan.fda.gov

Measuring the impact of listeriosis

FDA’s key public health factors:

- Amounts, frequency of RTE food consumption
- Frequency and levels of *L.m.*
- Food’s potential to support *L.m.* growth during refrigeration
- Refrigeration storage temperature
- Duration of refrigerated storage before consumption

a 40 percent decrease in the incidence of foodborne listeriosis since 1998. As part of its *L.m.* action plan, the FSIS will conduct random sampling of certain RTE products categories in 2004 and will quantify all positives to develop

Log on and Learn

Have you been to AMIF Web site lately?

Visit www.amif.org to access the AMI Foundation’s online library and the latest education events. Looking for facts, figures and quotes? Read articles on the latest studies and research pertinent to our industry. The site also has archived previous issues of the Foundation newsletters.

Check resources such as:

- Fact sheets on scientific topics
- The ever-popular Process Lethality Determination spreadsheet
- Did You Know? feature for entertaining scientific trivia

Log on and click the Contact Us link and share your suggestions and comments.

The screenshot shows the AMI Foundation website interface. At the top, there is a navigation menu with links for HOME, WHAT IS THE AMI FOUNDATION?, RESEARCH, PRESS RELEASES, LIBRARY, and CONTACT US. Below the navigation, there are several content sections:

- FACTS & FIGURES EDUCATION:** Includes a link to a "LETHALITY SPREADSHEET".
- Did You Know? Trivia:** A red box with the text: "Between 1988 and 1992, CDC estimated that salmonella was responsible for 70 percent of the food-borne bacterial outbreaks in the United States!"
- AMI Foundation's Huffman Appointed to Center for Food Industry Excellence Advisory Panel (10/02/03):** A news article mentioning Randy Huffman, Ph.D., as the new member of the industry advisory board for the International Center for Food Industry Excellence at Texas Tech University.
- FSIS Seminar Paints 'Cautiously Optimistic' Picture of Pre-Harvest Food Safety R&D (09/24/03):** A news article discussing progress in implementing food safety measures at packing plants.
- Downward Trend of E. coli O157:H7 Indicates Success of Multi-Hurdle Food Safety Strategy, AMI Says (09/23/03):** A news article reporting a drop in E. coli O157:H7 positive samples in ground beef.
- USDA Calls for Public Comments on Technical Support Data for Food Guide Pyramid (09/10/03):** A news article about proposed revisions to the daily food intake patterns.

On the right side of the screenshot, there is a "LATEST NEWS" sidebar with a "NEWS INDEX" showing dates from October 2003 to January 2004, and a link to "AMIF NEWSLETTER".

AMI media outreach is strong in light of new BSE regulations

Minutes after USDA Secretary Ann Veneman announced new measures in response to the nation's single case of bovine spongiform encephalopathy (BSE) on December 30, AMI's senior staff organized a national teleconference to respond to media inquiries about their impact.

"It is understandable, and in fact prudent, for USDA to review our nation's regulatory firewalls that protect against BSE," AMI President J. Patrick Boyle told a national audience of reporters and editors. "Although these extraordinary new measures are very aggressive and indeed go well beyond international standards, we recognize that they were developed in an effort to protect our cattle herd and to reinforce consumer confidence in beef safety."

Since Dec. 23, AMI has hosted several media availabilities and will continue throughout the ongoing USDA investigation. The purpose of this effort is to clarify media misconceptions and ensure the inclusion of the beef industry's voice.

AMIF senior staff have made numerous media appearances including NBC

Nightly News, the Today Show, MSNBC, ESPN, NPR and Fox News Network. In addition, AMIF staff have conducted hundreds of media interviews with dozens of newspapers and radio stations.

In her statement, Veneman reiterated that the risk of BSE spreading within the United States is low, again citing Harvard University's BSE Risk Assessment studies, and pledged that "sound science will be our guide" as the agency moves forward with its new rules.

USDA made the following revisions:

- A ban on non-ambulatory livestock for human consumption.
- A ban on specified risk materials.
- Immediate implementation of a national animal ID system.
- New regulations on advanced meat recovery.
- Mandatory test-and-hold for carcasses tested for BSE.
- Ban on air injection stunning, which the industry voluntarily phased out more than five years ago.
- Ban on mechanically separated meat.

Veneman also announced the appointment of a scientific panel to review USDA's response to the BSE case, its ongoing investigation surrounding the index cow and the agency's BSE surveillance system. This panel will be similar to that established by Canada and would include those international experts who advised the Canadian government earlier this year.

Don't miss AMIF's BSE Briefing on Feb. 3 in Washington, D.C. To register, contact Laura Quartuccio at 703-841-3648 or lquartuccio@meatami.com.

International Meat Animal Welfare Research Conference

A new, scientific symposium on animal welfare, to be held on Feb. 17 in Kansas City, Mo., is now open for registration. This conference is aimed at scientists and veterinarians in academia and industry. Posters will be presented on a variety of topics.

Online registration is now available (deadline for registration is Feb 17). AMI Foundation and Federation of Animal Science Societies members are eligible for a special reduced rate of \$125; non-member registration is \$225.

The keynote address will be given by Jeff Armstrong, Ph.D., Dean, Michigan State University College of Agriculture & Natural Resources. Agenda details, registration and hotel information can be viewed

online at www.MeatAMI.com. Click on AMI Meetings and the IMAWRC link.

To make hotel reservations, please call the Hyatt Regency Crown Center directly by January 26, 2004. After this date, rooms will be on a space and rate available basis. Please mention AMI to receive the special group rate of \$125 single or \$135 double occupancy. Hotel reservations must be cancelled 24 hours prior to day of arrival to receive a full refund.

The conference will be held at:
Hyatt Regency Crown Center
Kansas City, Mo.
816-421-1234

AMIF-sponsored conferences and educational events

BSE Briefing

When: Feb. 3, 2004
Where: Fairmont Hotel
 2401 M Street, NW, Washington, D.C.
 202-429-2400
What: Get answers to your questions and factual information that will help you respond to the challenges facing the meat industry. Agenda will include a review of actions taken by industry and government and updates on international trade. The implications to human health and consumer and media responses will also be explored.
Contact: To register, contact Laura Quartuccio at 703-841-3648 or lquartuccio@meatami.com.

International Meat Animal Welfare Research Conference

When: Feb. 17, 2004
Where: Hyatt Regency Crown Center
 2345 McGee St., Kansas City, Mo.
 816-421-1234
What: A new, educational opportunity for animal scientists, veterinarians and academicians to hear about the latest research in animal handling and welfare; there will also be a poster session.
Contact: To register, contact Katie Brannan at 703-841-3621 or kbrannan@meatami.com

Animal Care and Handling

When: Feb. 18-19, 2004
Where: Hyatt Regency Crown Center
 2345 McGee St., Kansas City, Mo.
 816-421-1234
What: A mix of trend information and ideas for implementing change and improvement at the plant level. There will be a half-day general session followed by four, concurrent sessions for in-depth instruction.
Contact: To register, contact Katie Brannan at 703-841-3621 or kbrannan@meatami.com

Annual Meat Conference

When: March 14-16, 2004
Where: Gaylord Opryland Hotel
 2800 Opryland Drive, Nashville, Tenn.
 615-889-1000
What: Learn about today's trends, techniques and tactics. Using practical information from case studies and industry research, speakers will cover such topics as The ABCs of Branding; The Skinny on Diet Fads & Nutrition; rofiting

from Ethnic Diversity; The Dynamics of Case Ready.
Contact: To register, contact Marie DeLucia at 703-841-3620 or mdelucia@meatami.com.

Best Practices for Beef Processing

When: April 6-7, 2004
Where: Westin Crowne Center
 1 Pershing Rd., Kansas City, Mo.
 816-474-4400
What: Based on the ground-breaking Beef Best Practices documents developed for all segments of the beef industry, this conference features hands-on, small group workshops to help attendees zero in on key strategies and protocol that will accelerate implementation of strategies, training and foodsafety tactics aimed at achieving optimum foodsafety and product quality throughout processing.
Contact: To register, contact Laura Quartuccio at 703-841-3648 or lquartuccio@meatami.com

Worker Safety, Health & Human Resources

When: April 18-20, 2004
Where: Hyatt Regency Phoenix at Civic Plaza
 122 North Second St., Phoenix, Ariz.
 602-252-1234
What: Leading experts in worker safety will provide authoritative, practical instruction. Conference also features the AMI/ National Safety Council Worker Safety Awards Program dinner.
Contact: To register, contact Anne Nuttal at 703-841-3630 or anuttal@meatami.com.

For speakers and awards, contact Marie DeLucia at 703-841-3620 or mdelucia@meatami.com.

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