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NEWS

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AMI Foundation Initiates New Research, Jointly Funds Project With NCBA

Follow-up Research to Optimize and Verify Effects of Direct Fed Microbials on E. coli O157:H7

The AMI Foundation and the National Cattlemen's Beef Association are collaborating on a follow-up study to an AMIF/Texas Tech University research that found two strains of lactobacilli, bacteria commonly used to make yogurt, fed to cattle can substantially decrease the incidence of cattle shedding enteric *E. coli* O157:H7.

"This research project marks a milestone in industry collaboration on research to find a solution to ongoing challenges in eliminating *E. coli* O157:H7," said AMI Foundation

President Jim Hodges. "We hope this leads to additional collaboration on promising new technologies."

The AMI Executive Committee voted in January to provide funding for half of the project's expenses. NCBA will fund its half of the project with monies from the Cattlemen's Beef Board and the beef checkoff program. The executive committee also agreed to fund three other projects.

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Data Gaps Exist in FSIS Draft *Listeria* Risk Assessment, AMI Says in Comments

The draft Food Safety and Inspection Service (FSIS) *Listeria* Risk Assessment model illustrates many deficiencies in the data available for an accurate and useful risk assessment, AMI said in comments to the Agency last month. Several of these data gaps must be filled before the draft risk assessment can be considered a useful tool, the Institute said.

FSIS released its draft risk assessment for *Listeria monocytogenes* in ready-to-eat (RTE) meat and poultry products in February. The initial release included information on the in-plant model used to develop the draft risk assessment. The draft risk assessment was the subject of a Feb. 26 public meeting in Washington, DC, where more specific risk assessment

results were presented and made available.

Using the model, FSIS discovered that a combination of testing, sanitation and interventions yielded greater benefits

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*Science Soundbites***Study Reveals Site of *E. coli* O157:H7 Colonization**

A published article in the March 2003 issue of *Infection and Immunity* provides convincing new evidence that the site of colonization of *E. coli* O157:H7 in the bovine gastrointestinal tract is heavily localized in the last 2 to 5 cm of the rectum. The article is titled "Lymphoid Follicle-Dense Mucosa at the Terminal Rectum Is the Principle Site of Colonization of Enterohemorrhagic *Escherichia coli* O157:H7 in the Bovine Host."

This finding may have significant implications for researchers working to discover solutions for control of the organism. The site of localization lends itself to a relatively easy sampling site to detect if an animal is currently shedding *E. coli* O157:H7 and also may lead to potent intervention strategies.

The entire report can be found in the March 2003 issue of *Infection and Immunity* (p. 1505-1512), which is published by the American Society for Microbiology.

Meat Not Linked to Breast Cancer Risk, Study Reveals

New research shows that women who consume animal proteins, such as red meat, are no more likely to develop breast cancer than women who choose not to eat such foods, Boston researchers report.

The new study, which looked at nearly 90,000 women, also found that it made no difference whether women ate rare or well-done meat, according to the report published in January in the online issue of the *International Journal of Cancer*.

The new results are based on the Nurse's Health Study, which included 121,700 female nurses ages 30 to 55 years old. To learn about diet and cancer, researcher Dr. Michelle Holmes and her colleagues looked at data from nearly 90,000 women who did not have cancer at the beginning of the study. At several points during the 18-year study the women were surveyed about their eating habits.

When Holmes and her colleagues compared the dietary habits of women who developed breast cancer to those who stayed healthy, the researchers found no association between any kind of meat consumption and increased cancer risk.

CAST Provides Comprehensive Report on Mycotoxins

The Council for Agricultural Science and Technology (CAST) has released a scientific task force report titled *Mycotoxins: Risks in Plant, Animal and Human Systems*. The new report provides policymakers with the most complete current information on mycotoxins, along with recommendations for minimizing their risks to plants, animals and humans.

The report is the collaborative effort of 38 international scientists and covers the mycotoxin-producing fungi; mycotoxin control in crops, foods and feeds; mycotoxin-causing diseases in humans and animals; mycotoxin testing, control and international regulations; economics; and research and policy recommendations.

To obtain a copy of the 200-page report, visit <http://www.cast-science.org/>.

Researchers Develop Test to Detect BSE in Animal's Nasal Tissue

Italian researchers are developing a test to detect bovine spongiform encephalopathy (BSE) that can be performed on live animals in the initial stages of the disease, Italian state television reports.

A team from Verona and Padova found that the prion - an abnormal protein - which causes BSE can be found not only in the brain, but also in the nose of infected animals, Italian television reported.

Current tests to detect the disease must be done during an autopsy or by surgically removing samples of central nervous system tissues. The new test can reportedly be carried out on live animals in the initial stages of the fatal brain disease, with swift and accurate results.

The test would speed up the diagnosis, cut down costs, and avoid unnecessary slaughter of cattle, the report said. The discovery came to light when the team, which was studying the brain of nine patients who died from the human variant of BSE, found a large quantity of prionic protein in the olfactory cortex - the part of the brain dealing with smell information. The clue led the scientists to search for the prion in the cattle's nose.

Draft *Listeria* Risk Assessment

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than any one strategy alone. The risk assessment also demonstrated that the use of intervention steps, such as post-packaging pasteurization or the introduction of growth inhibitors, showed dramatic public health benefits, FSIS said.

“While it is forward-thinking to use science-based risk assessments to inform the development of regulatory policy, in this case, we feel the agency needs to continue to fill in those gaps to improve science-based regulations,” said Randy Huffman, Ph.D., AMIF vice president of scientific affairs.

AMI’s comments identified several areas for improvement in the Agency’s draft risk assessment:

- The draft risk assessment’s model assumes that *L. monocytogenes* contamination comes from a niche or harborage site in the plant without considering the possibility of contamination from sporadic positives or contamination arising at retail.
- The draft risk assessment does not consider the operational parameters such as risk reduction through interventions, the effectiveness of corrective actions and sanitation, and the sampling and testing program in the plant.
- The draft risk assessment makes unrealistic estimates of the efficacy of sanitation and corrective actions critical to the ongoing control of *Listeria* in processing environments.
- The draft risk assessment does not provide all references cited in the document, nor has all current, relevant scientific literature been integrated into the document.
- The draft risk assessment fails to provide adequate support for the assumptions, variability and uncertainty for the model parameters. In some cases, the document appears to use unrelated and inappropriate data as bases for its mathematical calculations.
- The draft risk assessment needs to describe in greater detail the limitations of

microbiological sampling and testing programs given the low prevalence and random distribution of *Listeria* on food contact surfaces and in RTE meat and poultry products.

- The draft risk assessment should provide more consideration to the numerous intervention technologies in use to help control *Listeria*, especially where *L. monocytogenes* is not a hazard that is reasonably likely to occur because of control procedures in the Sanitation SOPs or other programs.
- The draft risk assessment should be released for “use and experimentation” by interested stakeholders, which would provide an opportunity for further “hands-on” analysis.

AMI also expressed concern that the model focuses on deli meat but the risk management questions, the findings and, presumably, the application of these are for all RTE meat and poultry products.

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AMI Foundation/NCBA

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The follow-up study, titled "Reduction of *E. coli* O157:H7 in Beef Feedlot Cattle Using Varying Doses of a Direct-Fed Microbial," will evaluate the effects of three different doses of the Lactobacilli strain NPC 747 on the prevalence of *E. coli* O157:H7 in the feces and on the hides of cattle throughout the feeding period.

The study, which began this month, will aid in the development of an effective and economically feasible intervention strategy to reduce the prevalence of *E. coli* O157:H7 in feedlot cattle. The initial research of Texas Tech University researcher Mindy Brashears, Ph.D., in this area revealed that cattle fed on a diet of so called "good bacteria" or *Lactobacillus acidophilus* showed a 50 percent reduction in the incidence of cattle shedding *E. coli* O157:H7.

Researchers from Texas Tech University and West Texas A&M University will conduct the study. The team will include Brashears, Michael Galyean, Ph.D., Guy Loneragan, Ph.D., and Spring Younts Dahl, Ph.D. Researchers contend that the study is the logical and necessary progression from the previous research and is designed to evaluate the effects of feeding NPC 747 at lower dose levels throughout the feeding period on the prevalence of *E. coli* O157:H7.

The expected outcome of this research is to further optimize this pre-harvest strategy to improve the economic viability, while ensuring effectiveness of the strategy on reduction of the prevalence of *E. coli* O157:H7 in feedlot cattle.

AMI also is funding the following new research projects:

Verifying and Improving the Utilization of Microbial Pathogen Computer Models for Validating Thermal Processes in the Meat Industry: This project will be undertaken by researchers at Michigan State University over a two year period at a total cost of \$79,921. Researchers will evaluate and improve methods and tools used by the meat and poultry industry to ensure that thermal processes are meeting the USDA-FSIS lethality performance standards for ready-to-eat (RTE) products.

Intervention Strategies: Control of *Listeria monocytogenes* in Processed Meat & Poultry by Combinations of Antimicrobials: This project will be undertaken by researchers at the University of Wisconsin-Madison over a two year period at a total cost of \$59,358. Researchers will identify several combinations of food-grade ingredients that will inactivate *L. monocytogenes* and verify the listeriocidal activities of the most effective combinations on ready-to-eat precooked, sliced turkey and wieners.

Expert Scientific Review Panel on *Listeria monocytogenes* in Foods: AMIF has provided \$50,000 for the International Life Science Institute (ILSI) to conduct a scientific review of the data relevant to establishing food safety objectives for *L. monocytogenes* in foods. ILSI also will make an assessment on the sufficiency of such data for setting food safety objectives.

AMI Foundation Sponsoring *Listeria* Workshop in June

The AMI Foundation (AMIF) is sponsoring its popular "Implementing *Listeria* Intervention and Control" workshop in June.

The *Listeria* workshop is scheduled for June 4 – 5, 2003, at the Hyatt Harborside in Boston. The two-day course is designed to help participants examine the issues surrounding *Listeria* control and testing and to provide experience in developing and implementing a *Listeria* control program in ready-to-eat (RTE) meat and poultry establishments.

The importance of this issue is underscored by recent actions taken by the U.S. Department of Agriculture. On Dec. 12, 2002, USDA's Food Safety and Inspection Service (FSIS) made final its administrative

directive 10,240.3 that outlines additional steps FSIS inspectors will take to determine if establishments producing RTE products are taking the necessary steps to prevent contamination with *Listeria monocytogenes*. Also, FSIS now requires that plants producing specific types of RTE products implement an environmental testing program.

The workshop will address sanitation GMPs, sanitary design, microbial intervention technology, microbiological sampling, data analysis and investigation and corrective actions. The workshop also will include a technology fair where attendees can meet directly with suppliers.

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Ongoing Research - *Listeria monocytogenes*

<u>Investigator</u>	<u>Institution</u>	<u>Project Title</u>
Harshavardhan Thippareddi	Kansas State University	Control of <i>Listeria monocytogenes</i> in Ready-to-Eat Meats Using Cetyl Pyridinium Chloride (CPC) and Shelf Life Extension of RTE Meats Treated with CPC
Jeffrey Kornacki	University of Georgia	Recovery, Development and Validation of Appropriate Surrogate Microorganisms in Meat and Poultry Emulsions for In-plant Critical Control Point Validation Studies
Jeffrey Kornacki	University of Georgia	The Role of Aerosols in Transmission of Microorganisms (including <i>Listeria</i>) to Ready-to-Eat Meat/Poultry Products
Ferencz Denes	University of Wisconsin -Madison	Plasma-Enhanced Disinfection of Surfaces, Air And Water in Ready-To-Eat (RTE) Meat and Poultry Processing Environments
Robert Vinopal, Dick Jadamec	University of Connecticut	Development of Ion Mobility Spectrometry (IMS) Applications for <i>Listeria</i> Detection and Monitoring In-Plant Food Processing Plants

Ongoing Research - *E. coli* O157:H7

<u>Investigator</u>	<u>Institution</u>	<u>Project Title</u>
Andrew Benson	University of Nebraska	Distribution of Virulent and Avirulent Subclones of <i>E. coli</i> O157:H7 in the U.S.
Dale Hancock	Washington State University	Evaluation of Efficacy of a Bacteriophage System in Preventing or Modulating <i>E. coli</i> O157:H7 Infection of Cattle
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
Michael Doyle	University of Georgia	Methods to Control <i>E. coli</i> O157:H7 in Drinking Water for Cattle
Chobi DebRoy	Pennsylvania State University	Competitive Exclusion of <i>Escherichia coli</i> O157 using Non Pathogenic Colicin Producing <i>Escherichia coli</i> Strains
Charles Kaspar	University of Wisconsin - Madison	The Use of Egg Yolk Anti-O157:H7 Immunoglobulin to Clear <i>E. coli</i> O157:H7 from the Intestinal Tracts of Cattle

To view status reports for these projects, visit www.amif.org.

Equipment Sanitation Top Priority for *Listeria* Control, White Paper Concludes

The possibility of *Listeria monocytogenes* being transferred via air and serving as a vehicle for direct product contamination appears to be highly unlikely, according to a white paper prepared by members of the AMI Scientific Affairs Advisory Committee.

The Scientific Affairs Advisory Committee commissioned a subcommittee of experts with experience in ready-to-eat (RTE) processing facilities to do an exhaustive review of published literature and to summarize data from various in-plant case studies to address the issue of airborne *Listeria*. The committee's findings suggest that air is an unlikely source of *Listeria* contamination and that food safety resources should be focused on the aggressive location and remediation of harborage niches in equipment.

The white paper acknowledges some research that supports the theory that *L. monocytogenes* is an airborne risk for product contamination. Some studies indicate that *L. monocytogenes* can be aerosolized for finite periods of time in response to high-pressure spraying, high-velocity airflow or other physical disturbances. However, there is also a large body of data supporting

that, with appropriate controls in place, the risk for contamination of exposed product or product contact surfaces is minimal. Also, two case studies reported that positive results on one processing line do not translate necessarily into positive results on adjacent lines or on products.

The risk for product contamination can be adequately controlled by the application of prerequisite programs that negate the effects of air flow disturbances and find and eliminate growth niches in equipment that could possibly be inoculated by the aerosolized organisms, the committee concluded. Elimination of these sources of contamination provides the most effective use of resources, the committee said.

Subcommittee members include Michael Bradley, Ph.D., The Lundy Packing Company; Tim Freier, Cargill, Inc.; Randy Huffman, Ph.D., American Meat Institute Foundation; Andy Milkowski, Ph.D., Kraft Foods, Inc.; Jon Shehane, Bryan Foods; and John Weisgerber, Kraft Foods, Inc.

University of Nebraska Study Provides Clues on the Genetic Differences Among *E. coli* O157:H7 Strains

Preliminary data from an AMI Foundation funded project indicates that a genomic based assay may assist researchers in revealing genetic differences in subtypes of *E. coli* O157:H7 strains. Ultimately, this study may help researchers and the industry understand which lineages of *E. coli* O157:H7 are most likely to cause illness in humans.

The study, conducted by Andrew Benson, Ph.D., at the University of Nebraska at Lincoln, was designed to develop a more efficient test method to help determine which *E. coli* O157:H7 strains produce illness in humans. The AMI Foundation funded the project to help develop a research tool to improve knowledge of *E. coli* O157:H7 in this emerging field of study. The project is titled "Distribution of Virulent and Antivirulent Subclones of *E. coli* O157:H7 in the U.S."

"The Foundation funded the research in the hopes that it will improve our knowledge of the ecology of *E. coli* O157:H7 and the mechanisms involved in causing human disease. Ultimately, the findings from this research may lead to more targeted design

of intervention methods aimed at the *E. coli* O157:H7 strains more likely to cause human illness," said Randall Huffman, Ph.D., AMIF vice president of scientific affairs.

The project outline was to use Octomer Based Genome Sequencing (OBGS) at high density to identify lineage-specific polymorphisms (LSPs). All class I LSPs (conserved in all strains of a lineage) are being cloned and sequenced along with a large number of class II and class III (lineage-specific but non-conserved). Candidate LSPs that contain short, stable mutations, were then tested as markers by designing specific primers upstream and downstream of the mutation. Several of these markers have been multiplexed together in to a single test that can rapidly define which lineage and clade a given O157:H7 strain belongs to.

The project is part of a larger O157:H7 comparative genomics project supported by USDA's Cooperative State Research, Education, and Extension Service and LiCor, Inc.

NAS Report Reflects Industry Belief in Policy Development Based on Public Health

A National Academy of Sciences (NAS) report reflects a position the meat and poultry industry has held for years - that U.S. food safety standards should be more clearly linked to public health outcomes, said AMI President J. Patrick Boyle. The NAS report, titled "Scientific Criteria to Ensure Safe Food," was released April 24.

"It is the industry's view that the U.S. food regulatory system should be based upon an assessment of the risks posed by all foods and that resources should be applied where they can make the most difference in reducing risk," Boyle said.

Congress commissioned the report in early 2001 to provide recommendations for FSIS and FDA on the role and appropriate use of performance standards and other scientific criteria for improving food safety.

In the report, NAS indicated that performance standards are a useful "score card" for measuring process control by food processors and recommended that efforts be made to link such scientific criteria to improvements in public health. AMI believes that performance standards are indeed useful tools or "score cards" so long as they are developed based upon science and comprehensive data and so long as they will truly enhance public health outcomes as measured by appropriate epidemiological surveillance data, Boyle said.

The report makes several general recommendations. Among these are the development of a comprehensive plan to harmonize disease surveillance and microbial prevalence data, and the adoption of science-based strategies in developing food safety criteria. The NAS report outlines various specific measures for the USDA to undertake, most of which were already considered and are being implemented by FSIS including baseline surveys; reevaluating current *Salmonella* performance standards; expanding testing of *E. coli* O157:H7; researching the ecology of *E. coli* O157:H7; and focusing intervention at all stages of production.

The report also recommends that Congress grant authorities to regulatory agencies to establish, implement and enforce food safety criteria, including performance standards.

The report is available to purchase at the Institute of Medicine's web site at www.iom.edu under the Recent Reports section.

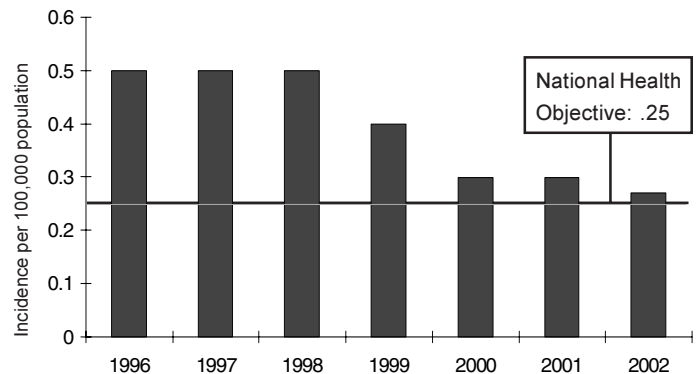
Foodborne Illness, Pathogens in Products Decline

New data released this month indicates downward trends in both the incidence of foodborne illness and of pathogens on raw meat and poultry products.

New foodborne illness data released April 18, 2003, indicate a sustained decrease in several major bacterial foodborne illnesses, according to the CDC. The data, collected as part of the CDC's FoodNet surveillance network in nine U.S. sites, indicate sustained progress is being made to meet the national health objectives for illnesses caused by *Listeria* and *Campylobacter*. While cases of *E. coli* O157:H7 have increased slightly from 2001 to 2002, overall, *E. coli* O157:H7 cases have trended downward since FoodNet was launched in 1996. *Salmonella* infections also have shown year-to-year variations with a slight increase in 2002 over 2001.

The report is available at <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5215a4.htm>.

Incidence of Foodborne Illness 1996-2002: *Listeria**



* Preliminary FoodNet Data on the Incidence of Foodborne Illnesses — Selected Sites, United States, 2002

Also, data released on April 17, 2003, indicates that the prevalence of *Salmonella* in raw meat and poultry continues to decline even as the number of regulatory samples taken by FSIS increased more than 25 percent last year.

The percentage of samples testing positive for *Salmonella* across all commodities dropped from 5 percent to 4.3 percent. FSIS collects and analyzes *Salmonella* samples in seven categories: broilers; market hogs; cows/bulls; steer/heifer; ground beef;

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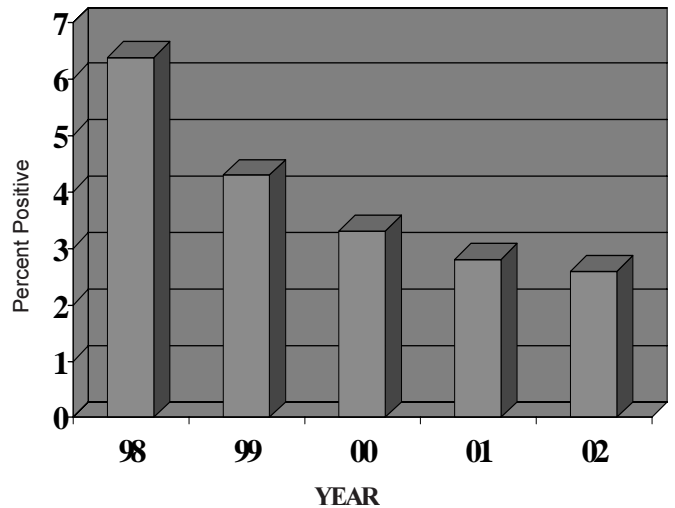
Foodborne Illness, Pathogen

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ground chicken; and ground turkey. In every category, *Salmonella* prevalence levels continue to register well below baselines set prior to the implementation of the Pathogen Reduction/Hazard Analysis and Critical Control Points (PR/HACCP) system, according to the Agency. Six of the seven categories showed improvement between 2001 and 2002, with only ground chicken showing an increase in positive test results. In 2002, FSIS took 58,085 *Salmonella* samples compared to 45,941 *Salmonella* samples in 2001.

USDA Under Secretary for Food Safety Elsa Murano, Ph.D., said that the trend evident in regulatory sampling “will hopefully translate into fewer cases of Salmonellosis due to meat and poultry. To view FSIS press release, visit <http://www.usda.gov/news/releases/2003/04/0127.htm>.

*Salmonella**



* FSIS results of ground beef analyzed for *Salmonella*

Listeria Workshop in June

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Participants also will have the opportunity to work through on-the-job product sampling scenarios in small groups with workshop speakers and AMI regulatory and scientific affairs staff on hand to answer questions and help solve problems. Breakout sessions will allow participants to deal with different *Listeria* related scenarios in small groups.

Registration is limited to 60 participants for each workshop to ensure a quality learning experience.

To register for the workshop, visit <http://www.meatami.com>. Direct questions regarding the workshop to Katie Brannan at 703-841-3621 or kbrannan@meatami.com.

Animal Handling Videos Available in Spanish

Spanish versions of the AMI Foundation’s popular “Good Animal Handling Practices for Beef Processors” and “Good Animal Handling Practices for Pork Processors” are now available.

The 13-minute video features Temple Grandin, Ph.D., assistant professor of animal science at Colorado State University, as the primary instructor.

The Spanish versions of the video are available for \$55 including shipping and handling. To order, visit <http://www.AMIF.org> to download an order form, which may be faxed to AMIF at 703/527-0938. Orders must be prepaid by check or credit card.

Questions should be directed to AMI Staff Assistant, Education and Convention, Laura Quartuccio, 703/841-3648, lquartuccio@meatami.com.

Upcoming AMIF Events

June 4-5, 2003
Implementing *Listeria* Intervention and Control Workshop
Hyatt Harborside, Boston, MA

October 27 - 28, 2003
Meat Industry Research Conference
Palmer House Hilton, Chicago, IL

October 29 - November 1, 2003
2003 International Meat, Poultry and Seafood Convention and Exposition (as part of the Worldwide Food Expo)
McCormick Place, Chicago, IL