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ARTICLES

468  An Integrated Assay for Rapid Detection of Escherichia coli O157:H7 on Beef Samples
     John Willford and Lawrence D. Goodridge

473  Listeria Prevention Practices for Small Cheese Operations
     Lisbeth Meunier-Goddik, Floyd W. Bodyfelt and John Robert Coelho, Jr.

ASSOCIATION NEWS

461  Sustaining Members
464  Lone Star Perspective from Your President
466  Commentary from the Executive Director
484  New Members

DEPARTMENTS

487  News
491  Industry Products
546  Coming Events
547  Advertising Index

EXTRAS

IAFP 2008

500  Award Winners
501  Committee Meetings
502  Ivan Parkin Lecture
503  John H. Silliker Lecture
504  Preliminary Program
535  Networking Opportunities
536  General Information
537  Registration Form
538  Workshops
540  Exhibitors
544  Special Contributors and Sponsors
548  Journal of Food Protection Table of Contents
550  Audiovisual Library Order Form
551  Booklet Order Form
552  Membership Application

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Manuscripts: Correspondence regarding manuscripts should be addressed to Donna A. Bahun, Production Editor, International Association for Food Protection.

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Why do we love end-product testing so much? We scientists are a logically thinking group, so I guess it just seems to be the logical thing to do. Maybe that is not the reason, however. It apparently doesn’t take a Ph.D. to come to that conclusion. Even most consumers, unfamiliar with microbiology, will tell you that if you want to know if food is contaminated, just test it. Unfortunately, as we all know, microbiological sampling of food to detect presence of low levels of pathogens is often unsuccessful. Most bacterial pathogens are not homogeneously distributed in our food, so it is difficult to represent the overall level of contamination through the collection of a microbiological sample. In addition, the enteric pathogens that many of us spend our careers fighting, like *Escherichia coli* O157:H7, are most often present in very low numbers in raw foods of animal origin, when there at all. To detect them takes examination of an extremely large number of sample units from a lot, and even then, probability works against us in any associated attempt to ensure food safety. So are low numbers significant? Depends on the pathogens, but for enteric pathogens, presence at almost any level should be of concern. We cannot expect to test food and detect the presence of pathogens unless the contamination level is fairly high and we just happen to be lucky enough to hit a contaminated sample unit. Do you feel lucky?

Back in the 1980s, a group of food microbiologists was tasked with writing microbiological criteria with the goal of ensuring the safety of food. They published their findings in a report entitled *An Evaluation of the Role of Microbiological Criteria in Foods and Food Ingredients*. After much research and lengthy discussion, the group determined that microbiological criteria were insufficient for ensuring safety, primarily for the reasons discussed above. Assuring the safety of food from production through consumption is a complicated process requiring an organized, deliberate approach to preventing and controlling potential hazards rather than detecting them. The authors of the report realized that process control and prevention was the answer, not microbiological criteria, and recommended that the Hazard Analysis Critical Control Point (HACCP) System be adopted to ensure food safety. That system is now widely accepted as the most effective and logical way to produce the safest food possible. Microbiological testing is an active and important part of a functioning HACCP plan, but it is most likely to be effectively used in verification of said plan. Included in verification activities is validation, defined by the National Advisory Committee on Microbiological Criteria for Food as the “element of verification focused on collecting and evaluating scientific and technical information to determine whether the HACCP plan, when properly implemented, will effectively control the defined hazards.” Before a HACCP plan can function with any level of assurance, it must be determined that all hazards have been identified and that the plan to control them is scientifically sound and will be effective. Validation, both of individual CCPs as well as the entire HACCP plan, is integral to determining the soundness of a HACCP plan, and it often requires a significant amount of microbiological testing.

Let’s talk about raw products for a minute, specifically red meat. Microbiological testing can play a unique role in HACCP plan activities. However, in the production of red meat, it is generally agreed that detection of foodborne pathogens...
is not an effective tool for monitoring CCPs within a slaughter/processing HACCP plan. In addition, pathogens are often absent from a carcass and, when present, their uneven distribution makes it difficult to obtain a truly representative sample. In contrast, microbiological testing can be applied within a HACCP plan to validate and verify the effectiveness of carcass decontamination procedures. It is important to note that ongoing verification activities are more accurately conducted to verify the effectiveness of the process that will control hazards rather than to verify the safety of the food product. That is, you want to know whether the control procedures are working, whether there are actually pathogens present or not.

So why does the red meat industry spend a “gazillion” dollars sampling their end products for enteric pathogens every year? To ensure safety? I hope that is not what they are thinking, although I often get that impression from hearing comments that testing is the “last line of defense.” Sorry, testing is not an intervention. We have known for decades that testing will not ensure safety. I know consumers think testing is the best safety precaution, but as scientists, we know better.

Now don’t get me wrong – I am not saying that we should not test food. I am simply saying that we need to test smarter. We need to spend our resources validating our critical control points to make sure they actually do what we say they do. We need to use testing to demonstrate the effectiveness of our HACCP plans and process control. We need to challenge our process control in innovative ways and make sure we are controlling the identified hazards. While validation and verification of HACCP systems may initially seem intimidating, careful thought and planning can make the process logical, reasonable and extremely helpful. Many tools are available to assist, such as rapid and sensitive microbiological tests, extensive publication of research results in the scientific literature and numerous HACCP experts. The human tendency is to find a single tool that works and use it to excess; however, successful validation and verification will most likely be attained through the efficient utilization of as many tools as possible. Continuous, regular challenging of the validity of a HACCP system through verification will only serve to strengthen confidence in the ability of the process to control hazards.

So, I know exactly what some of you are thinking. If product testing is not the answer, why is it we sometimes detect the presence of a pathogen like E. coli O157:H7 in ground beef and thereby prevent its entry into the food supply? Isn’t that worthwhile? Step back, and view the situation with a broader perspective. Do you really think we are catching all of the lots of ground beef with low levels of O157:H7 that way? It is more likely that we are just randomly detecting the low-level presence of that pathogen through the haphazard selection of a contaminated sample unit. Other lots of ground beef with low levels of contamination probably proceed through to the consumer undetected. But we already knew that, right? That’s why we tell consumers to cook to 160°F. And how much time and money did we spend on negative samples to find that one positive? It sure would have been helpful to use those resources for validation of process control. Keep in mind, I am not trying to single out the red meat industry, it is just that I am most familiar with that process, and I don’t believe that we have sufficiently validated existing CCPs. I also believe that we could be further down that road except that, in our attempt to meet the demands of regulatory agencies and expectations of a well-meaning but misinformed consumer, we have wasted an enormous amount of time and money testing end products when we could have been improving process control.

Here is the question I believe we should all be asking: If we occasionally detect the presence of enteric pathogens in ground beef, why are we not concerned that our process control could be better? Obviously, the critical control points that we have in place for slaughter/processing are not sufficient to prevent the presence of enteric pathogens in a raw product (if that is even possible), so our testing simply confirms what we already know. We can’t possibly be testing to ensure food safety, can we? If that is the case, it is a shame, because we have known that doesn’t work for a long time now. We need to put our resources, both intellectual and monetary, to work solving problems, not just continually detecting that we still have them. And that is what Advancing Food Safety Worldwide is all about.

As always, please feel welcome to comment on any of my columns. I always enjoy hearing from you (gacuff@tamu.edu).
IAFP 2008 is just a few short weeks away now! Have you registered and made your hotel reservations? We have had great interest in the program this year along with excellent support from our exhibitors and sponsors. Many people come together to make the IAFP Annual Meetings a great success and this year is no exception. Planning begins many years in advance, with the majority of the work taking place in the period six to ten months prior.

Our presenters, both oral and poster presenters, have prepared to deliver the latest scientific research results for your benefit in learning from their experience. Exhibitors have invested heavily, both in time and financially to position their company and products to attract your attention. The Ohio Association of Food and Environmental Sanitarians has done a wonderful job of preparing for your arrival in Columbus; so all systems are in place and ready to go!

Many people have asked, “Why Columbus?” We say, “We have an active Ohio Affiliate who wanted us to come to their state!” When looking at three cities in Ohio, we selected Columbus because it fit the needs of our Annual Meeting better than the others. You are going to be surprised by Columbus – there are many restaurants, shops and night-time entertainment areas, all within easy walking distance of the convention site. Besides, Columbus is centrally located in the USA and easy to reach for those driving to the meeting. Columbus also has great airline traffic and connections from all the international hub airports.

What can you expect from IAFP 2008? You can expect to interact with the leading food safety professionals from North America and the world! You can expect to learn the most recent procedures and methods in food science. You can expect to discover the latest technological developments in equipment and products in the IAFP Exhibit Hall. And, you can also expect to enjoy the company of food safety professionals who are interested in the same thing you are keeping the food supply safe from contamination, thereby protecting the public’s health.

The IAFP Annual Meeting has grown steadily in size and stature. It is now recognized as the leading food safety conference because of the extremely focused topic where we concentrate our efforts. We are interested in all factors leading to a safe food supply, from a science and food safety perspective. We are interested in a safe system of delivering food for public consumption, whether at home, in a restaurant or a café, where the public can eat this food without fear of illness. This system covers the entire spectrum from raw material, to processing (if any) to distribution, storage, cooking, cooling and health issues related to food handling and consumption. Each of these areas are scientifically evaluated and discussed through more than 500 presentations over the three-day conference.

Our preview coverage of IAFP 2008 begins on page 499. The preliminary program can be found on page 504 showing session titles, presentation titles and speaker names. In this month’s issue of Food Protection Trends, we also included a list of exhibitors (page 540) and our sponsors (page 544). We encourage you to thank sponsors and exhibitors, even if you are unable to attend IAFP 2008. The sponsors and exhibitors truly make a huge difference for everyone who attends our meetings! Without their support, many things would be much different at our Annual Meetings.
Sponsors support refreshment breaks, lunches and after-session receptions each day in the Exhibit Hall. This in addition to our conference bags, name badges, and receptions including the Welcome Reception, Opening Night Reception and the President’s Reception. Sponsors help us in countless ways and make it easy for attendees to have time and the right setting for networking with colleagues.

We hope you already have your hotel reservation, your airline ticket and have registered for IAFP 2008. If not, there is still time to act! We look forward to seeing you in Columbus next month.

CALL FOR SYMPOSIA
IAFP 2009
July 12–15, 2009
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Grapevine, Texas

The Program Committee invites International Association for Food Protection Members and other interested individuals to submit a symposium proposal for presentation during IAFP 2009, July 12–15, 2009 in Grapevine, Texas.

Symposia proposals may be submitted to the Association office no later than July 25, 2008 or be submitted to the IAFP registration desk at IAFP 2008 by Tuesday, August 5, 2008 at 10:00 a.m. If preferred, ideas may be presented in person to the Program Committee on Wednesday, August 6, 2008 at 7:00 a.m. (proposals must first be submitted in writing by Tuesday, August 5, 2008 at 10:00 a.m.).

For additional information, contact: Tamara Ford, Phone: 800.369.6337; 515.276.3344; E-mail: tford@foodprotection.org, or go to www.foodprotection.org.
An Integrated Assay for Rapid Detection of *Escherichia coli* O157:H7 on Beef Samples

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SUMMARY

The Phast Swab is a vertically integrated assay for rapid detection of *Escherichia coli* O157:H7. A sampling device, an *E. coli* O157:H7 reporter bacteriophage carrying the lacZ gene, bacterial growth medium, *E. coli* O157:H7-specific immunomagnetic beads and a β-galactosidase substrate (colorimetric or luminescent) are contained within a Snap Valve™ device. To conduct the assay, a sample to be tested is swabbed, and the swab is returned to the Snap Valve™ device; an eight-hour enrichment follows. Any *E. coli* O157:H7 cells are isolated and concentrated by immunomagnetic separation, and the reporter bacteriophage is added to the test compartment, where it infects any viable *E. coli* O157:H7 present in the sample, forcing the bacteria to make large amounts of β-galactosidase. Following the infection process (approximately 1 h), the cap of the Phast Swab is broken, releasing the substrate, which reacts with the β-galactosidase to produce a colorimetric signal (read visually) or a luminescent signal (read with a hand-held luminometer). The Phast Swab was evaluated for its ability to detect *E. coli* O157:H7 on 100 cm² portions of beef. The assay was capable of detecting 10⁵ CFU/100 cm² of *E. coli* O157:H7 within 12 hours when a colorimetric substrate was used, and 10⁴ CFU/100 cm² within 10 hours with the use of a luminescent substrate. The nature of this detection method is such that it effectively detects *E. coli* O157:H7 in a simple and rapid manner, with minimal need for instrumentation to interpret the test result.

INTRODUCTION

*Escherichia coli* O157:H7 continues to be an important agent of foodborne illness, causing an estimated 70,000 illnesses, 2,000 hospitalizations, and 60 deaths annually in the United States (9). Fecally contaminated food and water are the sources of *E. coli* O157:H7 infections in humans (4). Cattle and other ruminants have been established as natural reservoirs for *E. coli* O157:H7, and these food production animals continue to play a role in the epidemiology of human infections (7).

During 2007, there was a spike in *E. coli* O157:H7-related beef recalls. For example, approximately 30.1 million pounds of ground beef were recalled, and the implicated ground beef collectively resulted in at least 55 cases of *E. coli* O157:H7 illness (3). It is clear that there remains an acute need for the development of easy-to-use, robust, and sensitive detection methods for this pathogen. Also, although many methods have been developed to detect *E. coli* O157:H7 in food and water, most of the tests are not designed to be conducted in a field setting. The plethora of diagnostic methods that have been developed for detection of this organism
FIGURE 1. The Phast Swab. The bottom of the device contains growth media (Tryptic Soy Broth (TSB) supplemented with 0.2 M glucose) and *E. coli* O157 specific immunomagnetic (IMS) beads (Invitrogen, Carlsbad, CA). The top contains the reporter bacteriophage and the β-galactosidase substrate. A sampling tool (swab) is also contained in the device.

**Beta-galactosidase substrate**

**Reporter bacteriophage**

**Enrichment broth**

**Immunomagnetic separation beads**

include culture on solid media, immunoassays, and molecular-based (polymerase chain reaction) methods (10). Cultural methods are slow, requiring 24–48 hours for results, while immunoassays and molecular techniques are labor intensive, or time consuming, or they require extensive training of laboratory personnel. In addition, most immunoassays and molecular detection methods cannot distinguish between viable and non-viable cells. Newer detection assays ideally should be designed to detect *E. coli* O157:H7 on carcasses or beef trim, in the slaughterhouse setting.

Reporter bacteriophages (phages) represent a novel alternative for the detection of bacteria within food (5). In this method, DNA carrying a reporter gene is introduced into a target bacterium via a phage. Once the reporter gene has been introduced into the bacterium, it is expressed, thereby allowing bacterial cells to be rapidly identified. Because phages need host cells to replicate, the reporter gene will not be expressed until the phage DNA has been injected into the host. Therefore, expression of the reporter gene is indicative of the presence of the infected organism. A major advantage of using reporter phages to detect bacteria is the ability of the phages to amplify themselves, and in the process, amplify the reporter signal. Also, reporter phages can detect only viable bacteria, which is an advantage over immunological and most genetic detection methods.

A vertically integrated assay based on the concept of the reporter phage has been developed that is capable of rapid detection of *E. coli* O157:H7 (6). The assay combines a sampling device (a swab), an *E. coli* O157:H7 reporter bacteriophage carrying the *lacZ* gene, bacterial growth medium, *E. coli* O157:H7 specific immunomagnetic beads and a β-galactosidase substrate (colorimetric or luminescent) within a Snap Valve™ device (Fig. 1). Each component is contained in a separate reservoir and is therefore separated from the other components. Releasing individual components from each reservoir in a stepwise fashion allows for each component to be added to the bottom of the test device in succession, making the entire assay self contained. If a colorimetric substrate is used, the assay can be interpreted visually. Conversely, the use of a luminescent substrate allows for greater sensitivity.

In this scenario, the entire test device is placed within a handheld luminometer, which enumerates the photons produced in the luminescent reaction. This novel method has been termed the “Phast Swab” to denote the combination of reporter phage, swabs and speed into an easy-to-use test. In the present study, the Phast Swab was investigated for its ability to detect *E. coli* O157:H7 on beef samples.

**MATERIAL AND METHODS**

**Development of the Phast Swab**

The Phast Swab was developed based on the use of Snap Valve™ devices (Hygiena, Camarillo, CA) (Fig. 2). Briefly, Snap Valve™ devices (Hygiena Corporation, Camarillo, CA) were modified to carry a colorimetric β-galactosidase substrate (chlorophenol red β-D-galactopyranoside (CPRG) Roche, Indianapolis, IN) or a luminescent β-galactosidase substrate (Beta-glo, Promega, Madison, WI) in the cap of the device. The bottom of the device contained growth medium (Tryptic Soy Broth [TSB], Difco, BD, Franklin Lakes, NJ, supplemented with 0.2 M glucose) and *E. coli* O157-specific immunomagnetic separation (IMS) beads (Invitrogen, Carlsbad, CA) (Fig. 2A). A sampling device (a swab) was also included. To perform the Phast Swab method, the swab was removed, the surface of the meat was swabbed and the swab was returned to the Snap Valve™ device; an eight-hour enrichment followed. The IMS beads (with any *E. coli* O157:H7 cells attached) were then concentrated, and the growth medium was removed from the device with a disposable
FIGURE 2. Completion of the Phast Swab assay. The swab is removed, the surface to be tested is swabbed, and the swab is returned to the device; eight-hour enrichment follows (Fig. 2A). After enrichment, the IMS beads (with E. coli O157:H7 cells attached) are concentrated, and the growth media is removed (Fig. 2B). Following a wash step, the reporter phage is added (10^7 PFU/ml) and the Phast Swab is incubated at 37°C for 1.5 hours (Fig. 2C). Finally, the cap of the Phast Swab is broken, releasing the β-galactosidase (CPRG) substrate into the bottom of the device (Fig. 2D), where it will react with any β-galactosidase present. A positive test is indicated by the development of a red color; in a negative test, the color remains yellow (Fig. 2E).

FIGURE 3. Results of the colorimetric swab assay. The detection limit was an initial inoculum of 10^3 CFU/100 cm². Key: C1, cell-only negative control; C2, phage-only negative control. The initial inoculum (in CFU/100 cm²) is indicated beneath each Phast Swab. A positive test result is indicated by the development of a red (or orange) color; in a negative test, the color remains yellow.
FIGURE 4. Detection limit of the luminescent Phast Swab assay. An initial inoculum of 10^1 CFU/100 cm² gave detectable results.

Evaluation of the Phast Swab

*E. coli* O157:H7 strain 27 (a bovine isolate from our strain collection housed in the Dept. of Animal Sciences at CSU) was used to evaluate the use of the Phast Swab on meat samples (simulated carcass tissue). Stock bacterial cultures were maintained in 30% glycerol and were frozen at -70°C. An overnight culture of *E. coli* O157:H7 strain 27 was diluted by preparing a series of 10^1 dilutions in lambda buffer until the final dilution was 10^-5. To simulate carcass tissue, ten centimeter by ten centimeter portions of beef (top round, sirloin tip) were inoculated with the serial dilutions of *E. coli* O157:H7 by pipetting 1 ml of each dilution on an individual 10 x 10 cm (100 cm²) piece of meat and by spreading the dilution over the entire surface of the meat with a glass hockey stick. The concentration of each dilution was determined by plate count. The meat was allowed to dry for one hour, and then the entire surface of each meat sample was swabbed with an individual Phast Swab. The rest of the assay was performed as already described. Two negative controls were included in the assay. The controls consisted of a cell-only control (C1, Fig. 3), which entailed swabbing a meat sample inoculated with *E. coli* O157:H7 (10^6 CFU/ml) and completing the assay as already described, except that no reporter phage was added, and a phage-only control (C2, Fig. 3), which entailed swabbing an uninoculated piece of meat (i.e., meat not previously inoculated with *E. coli* O157:H7) and completing the assay as already described.

Luminescent detection

For luminescent detection, the Phast Swab was conducted as described, except that a cell-only control was included for each dilution tested. A phage-only control was also included. Each Phast Swab was read three times, and the readings were subtracted from the mean reading of the cell-only or phage-only control (whichever had the higher RLU reading). For each sample tested, a Student's t-test was performed, using a *p* value of 0.05. A test result was considered positive if it was 3 standard deviations greater than the corresponding group mean.

RESULTS AND DISCUSSION

The results of the colorimetric Phast Swab assay are shown in Fig. 3. The visual detection limit was obtained by comparing the test samples to the control samples (C1 and C2). Any sample in which a color change was observed (compared to the controls) was considered a positive test result. With an eight-hour enrichment, the detection limit was an original inoculum of 10^1 CFU/100 cm². The results of the colorimetric assay show that the Phast Swab is sensitive, easy to use, and fairly rapid. Further investigation has shown that placing the Phast Swabs in the refrigerator overnight increases the intensity of the color reaction, which helps in situations in which the color reaction is weak.

To increase the sensitivity of the assay, we investigated the use of β-galactosidase luminescent substrates. The luminescent substrates display the highest sensitivity and largest dynamic range of any class of β-galactosidase substrate, and these substrates allow the luminescent assay of β-galactosidase to become as sensitive as the assay of bioluminescent luciferase (12). The luminescent assay was based on the use of a coupled luminescent reaction. Coupled assays have been designed using modified forms of luciferin that require the action of a second enzyme to yield luminescence. In this study, a luciferin-galactosidase substrate (6-O-β-galactopyranosylluciferin) (Promega, Madison, WI) produced a detectable signal via a coupled enzyme reaction in which the substrate was first cleaved by β-galactosidase to form luciferin and galactose. The luciferin was then utilized in a firefly luciferase reaction to generate light, which was read by use of a handheld luminometer.

When the luminescent substrate was used, the initial 10^1 CFU/100 cm² inoculum was easily detectable (T(2) = 297.29, *p* < 0.005), as was the initial 10^6 CFU/100 cm² inoculum (T(2) = 5,586, *p* = 0.031) (Fig. 4). The increased sensitivity of the luminescent substrates indicated that the use of a luminescent substrate should increase the speed of the Phast Swab assay, since a shorter enrichment time would be needed for a positive result. In this study, the use of the luminescent substrate led to detection of *E. coli* O157:H7 on the beef samples within 10 hours, as opposed to 12 hours with use of the colorimetric substrate, and the limit of detection was 100-fold higher.

In previous experiments, the Phast Swab has been tested against other members of the Enterobacteriaceae, including various isolates and strains of non O157:H7 *E. coli*, *Salmonella* spp., *Shigella* spp., *E. coli* O157:H7, *Salmonella* Typhimurium, *Salmonella* Enteritidis, and *Salmonella* Saintpaul.
and Shigella dysenteriae (6). With the exception of S. dysenteriae, all bacteria produced negative test results. The inclusion of the phage-only control (the control in which an un-inoculated piece of meat was tested) allowed evaluation of the ability of the test to work in a meat sample in the presence of natural background flora. Specifically, we were interested in assessing the possibility of false positive results due to the presence of native bacteria on the meat. The results indicated that in both the colorimetric and the luminescent tests, the phage-only control remained negative (Fig. 3, C2; in the luminescent test, the background RLU were subtracted from each test). Therefore, the presence of background flora on the meat surface is unlikely to interfere with the ability of the Phast Swab to detect the presence of E. coli O157:H7.

In its current stage of development, the Phast Swab is estimated to cost approximately $4.74 per test for the colorimetric version and $5.34 per test for the luminescent version. These costs compare extremely favorably to other commercially available E. coli O157:H7 rapid tests, although only reagent costs were taken into consideration in determining the cost per test of the Phast Swab, and other manufacturing costs, such as labor, would increase the cost of production.

Reporter bacteriophages have been used to detect several foodborne pathogens, including Salmonella spp. (2), and Listeria monocytogenes (8). Recently Oda et al. (11) have used a GFP labeled bacteriophage to detect E. coli O157:H7. The method is simple and rapid, but requires the use of a fluorescent microscope to view the test result. In this study, we show that a β-galactosidase reporter phage can be combined into an integrated assay to detect viable E. coli O157:H7 efficiently and rapidly on beef samples. The Phast Swab is a novel, simple assay that can be utilized to detect the presence of low levels of E. coli O157:H7 within 10 to 12 hours. The colorimetric Phast Swab assay is easy to perform, results are available within 12 hours, and the use of a colorimetric substrate in the assay also eliminates the need for instrumentation to read the test result. The luminescent Phast Swab delivers test results in 10 hours and is easily read in a handheld luminometer. These portable luminometers are already widely used in the food industry to monitor hygiene by the ATP assay, which increases the likelihood that the luminescent Phast Swab could become widely accepted. It is conceivable that the Phast Swab assay could be used to test beef carcases, beef trim, and contact surfaces for the presence of E. coli O157:H7, as part of a carcass monitoring program for this pathogen.

ACKNOWLEDGMENTS

This research was supported by a USDA National Research Initiative grant (2005-01879), a Wyoming National Aeronautical and Space Agency Consortium Space Grant, and a Colorado Space Grant. The authors thank Dr. Neil Percy at Hygiena Corporation for supplying the Snap Valve™ devices, and Shane Thompson in the University of Wyoming Meat Laboratory for supplying the meat samples.

REFERENCES

**Listeria Prevention Practices for Small Cheese Operations**

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**SUMMARY**

The production of specialty cheeses at small dairy operations poses unique challenges due to the characteristics of the cheeses produced, the artisan aspects of production, and the on-farm location of many of these plants. It is essential to ensure that the cheeses are free of *Listeria monocytogenes* and other pathogens. Although pasteurization destroys *Listeria* in the raw milk source, it will not prevent post-pasteurization contamination. This paper focuses on raw milk treatment and prevention of post-pasteurization contamination. Artisan cheese makers must obtain milk from dairy farms that have implemented sanitation practices that lower the risk of contamination. Artisan cheese plants should be constructed with emphasis on easy-to-clean design and appropriate materials and should utilize a plant layout that controls product and personnel flows. Production must adhere to a HACCP plan with appropriate prerequisite programs. Environmental testing must be utilized to verify the effectiveness of all programs. Weaknesses in any of these components could lead to system breakdown and ultimately to production of cheeses that are unsafe. In contrast, commitment to all components of a *Listeria* prevention strategy should assure the production of cheeses that are free of *Listeria*.

**INTRODUCTION**

In 2003, the FDA published a risk assessment to examine the relative risks of serious illness and death associated with consumption of ready-to-eat foods that may be contaminated with *Listeria monocytogenes* (*LM*). Four dairy product categories were among the top ten risk groups (13). The assessment was based largely on past history of *LM* outbreaks and recalls. Cheeses have been involved in *LM*-associated recalls, some of which are summarized in Table 1. Thus cheese processors must continue to focus on strategies for preventing *LM* contamination. Traditional commercial cheese plants, producing commodity style cheeses such as cheddar and mozzarella, successfully utilize practices that prevent *LM* contamination. However, in the past few years there has been a large increase in the production of specialty cheeses such as Camembert, blue, feta, ricotta, and others. These cheeses are commonly made at small cheesemaking operations that face a number of unique challenges not encountered by large-scale processors. For example, specialty cheeses are frequently made from raw milk. Furthermore, some specialty cheeses lack the built-in safety hurdles found in hard or semi-hard ripened cheeses (17). A good example is the Mexican cheese queso fresco, which is high moisture, has a pH close to neutral, and frequently does not contain lactic acid starter culture (34). Mexican-style cheeses have been involved in a number of cheese-borne outbreaks (4, 31, 34, 43). In addition, small cheese processing operations are sometimes lo-
cated on dairy farms, which contributes a unique set of difficulties. In spite of these challenges facing specialty cheese makers, there is little information available that addresses prevention of LM contamination in a small cheese processing operation.

The objective of this paper is to outline strategies for preventing LM contamination of milk and cheese, starting with the raw milk source, design and construction of the plant, cleaning and sanitation, and the cheese-making process. Examples are included that describe current prevention strategies at a queso fresco farmstead operation. The plant has been operating for many years, following principles discussed in this paper. No LM has ever been detected in the plant environment or in finished products. Even though this paper focuses on LM prevention, most of the discussion is applicable to prevention of other potential milkborne pathogens as well.

**LISTERIA MONOCYTOGENES PREVENTION STRATEGIES**

Strategies to ensure LM free cheeses focus on three general principles:

- *destruction of LM by treatment of the raw milk*
- *prevention of post-pasteurization contamination*
- *introduction of safety hurdles into the process and cheese composition*

### Treatment of raw milk

Raw milk is a source of LM, a pathogen that has been detected in 4.6-6.5% of bulk tank milk on dairy farms (24, 50). Pasteurization destroys LM (11, 15). Non-ripened, or fresh cheeses such as queso fresco, must be made from pasteurized milk because they are consumed without lengthy ripening. However, for some specialty cheeses the pasteurization process is compensated for by requiring a minimum of 60 days ripening of the raw milk cheese at a temperature greater than 35°F (CFR 133.113) (9). The justification for replacing pasteurization with 60 days ripening is that cheese does not support the outgrowth of milkborne pathogens, so that possible pathogen count will decrease during ripening and storage (6). Some fairly recent research has questioned this rationale (7, 8, 36, 41), and it appears that LM growth or survival in cheese depends on cheese type, especially with respect to the parameters of pH, starter culture, and water activity (17, 35, 38). Furthermore, artisan cheeses may experience some day-to-day variability in composition and starter culture activity, which could influence the susceptibility to LM growth.

Heat-shocked or thermized cheese milk is milk that has been heat treated at less than the required time and temperature pasteurization combinations, which for batch pasteurization is 145°F for 30 min and for continuous pasteurization is 161°F for 15 s. The advantage of this treatment is that fewer of the endogenous milk enzymes, such as lipase, are destroyed, while pathogens are partially or completely destroyed (25, 27). Thus this treatment is a compromise that may permit better cheese quality while lowering the initial level of potential pathogens prior to 60 days ripening.

Some cheese types, such as Emmental and Comté, are produced with a cook step in which the temperature may reach 131°F for 30 min. The objectives of this cook step to control water and calcium content of the curd particles and to promote the selective survival of certain ripening bacteria. In addition, the cook step acts as a heat shock treatment that helps insure the safety of these cheeses. Because of this added safety hurdle (30), these cheeses are generally not implicated in cheeseborne recalls/outbreaks. In contrast, high moisture soft cheeses do not receive a cook step/heat treatment in the cheese vat. However, because soft cheeses are normally consumed within less than 60 days of production, it is not legal to sell...
such cheeses in the United States if they are made from raw milk.

Even though LM is destroyed by pasteurization, it is important to keep LM levels in raw milk as low as possible, because this practice lowers the risk of environmental contamination. LM is a psychrotrophic type of bacterial pathogen that will grow at refrigeration temperatures (below 40°F). Because other flora are suppressed by refrigeration, the environment becomes less competitive and Listeria can be more viable; thus the time duration between milking and pasteurization/cheese making should be kept to a minimum.

In the case of raw milk cheeses, it is advisable to utilize only raw milk free of LM. While this is difficult to ensure from a practical point of view, it is at least possible to lower the risk of LM by frequent testing of raw milk sources, with subsequent exclusion of LM positive suppliers. Certain dairy management deficiencies can be directly linked to high LM levels in raw milk. These production practices include: inadequate frequency of cleaning the exercise area; poor cow cleanliness; insufficient lighting of milking barns and parlors; active milking machines lying on the parlor floor sucking up manure-contaminated water, and either non-use of single service paper towels or incorrect disinfection of towels between individual cows (20, 42). Farmstead dairy plants have direct control over their raw milk quality; in contrast, when milk is purchased from outside sources, there is often little or no control over LM content.

LM counts do not generally correlate with total plate counts; therefore it is difficult to assess the potential level of LM contamination of the raw milk. However, when assessing the contamination of raw milk with pathogens, it seems more appropriate to view the situation from a “qualitative” perspective than a “quantitative” one. In other words, the important point is if the pathogen is present or not — the specific level of contamination is less important. This is especially true for LM, because the Food and Drug Administration (FDA) follows a “zero-tolerance” policy for this pathogen and considers all ready-to-eat foods with any detectable LM as adulterated.

Prevention of post-processing contamination

Pasteurization controls LM only in the raw milk supply. Cheeses made from pasteurized milk can become contaminated with LM from numerous other sources (26, 32) following pasteurization. In fact, retail level testing has shown that LM contamination levels in pasteurized milk cheeses can be similar to levels encountered in raw milk cheeses (40).

This paper describes factors that must be controlled to prevent post-pasteurization contamination, especially:

- plant layout,
- plant construction, equipment construction and design,
- effective cleaning & sanitation,
- personal hygiene,
- Hazard Analysis Critical Control Point (HACCP),
- environmental and product testing

All of these are required components of a successful LM prevention strategy, and deficiencies in just one can significantly increase the risk of LM contamination (Fig. 1). Most of these parameters are part of the Current Good Manufacturing Practices (cGMPs), which are regulations published by the FDA that outline minimum requirements for maintaining a safe and wholesome processing environment (21CFR110) (9).

Plant layout. LM prevention must be considered prior to construction of the cheese plant, because the plant layout determines the flow of people as well as products. The concept of hygienic zones focuses on restricting the access of people to sensitive areas of the plant. People will have access only to pre-determined hygienic zones at the plant, and only the cheese maker and assistants would be allowed in the production area. On a farmstead dairy, it would be essential to prevent those who have been in the dairy barn/milking parlor from entering the processing plant unless they have showered and changed clothes and foot-wear. Besides restricting the movement of people, the product flow must be controlled. It is common practice in all food processing that, to prevent cross contamination, a product can move only forward in the manufacturing chain. Larger food plants separate the raw and the processed sides of the manufacturing chain. This is rarely possible in smaller cheese plants, where the vat pasteurizer is often located in the cheese-making room, and in some situations the vat pasteurizer doubles as the cheese vat. Extreme care must be taken to prevent any possible recontamination of product in process by material from the raw milk side. For example, it is unacceptable to have spills/drips of raw milk onto plant floors.

Plant construction. Construction of the cheese plant must involve close consulting with state regulatory agencies.
The US Public Health Service—FDA Grade A Pasteurized Milk Ordinance (PMO) (12) contains general regulations regarding most aspects of the building. For example, the PMO states: "The floors... shall be constructed of concrete or other equally impervious and easily cleanable material; and shall be smooth, properly sloped, provided with trapped drains and kept in good repair...". Although plain concrete is allowed, eventually it will be eroded by whey and cleaning solutions. The resulting cracks and loosened tiles are impossible to clean and can serve as harborage and incubators for LM. A better solution is to use concrete covered with an epoxy coating. The floor should slope sufficiently to allow for quick draining and prevention of puddle formation on the floor surface. Appropriate wall materials include fiberglass reinforced plastic (FRP), which is easy to clean and resistant to moisture, heat and chemicals. In general, piping and equipment should be mounted approximately 2 ft from the wall to allow for cleaning.

The most common areas of dairy plants found positive for LM contamination are the floor drains (10, 26, 28). Up to 80% of environmental Listeria sites have been attributed to floor drains (16) where LM can attach to cast iron (46). Refrigerated areas are another common environmental incubator for LM (45).

It is important to construct facilities and equipment so that they are easy to clean and sanitize. Special attention should focus on preventing condensate from dripping onto products, product contact surfaces, shelving and/or floors. In addition, ventilation systems can disperse LM-contaminated condensate inside the cooler. Draining of drip pans and formed condensate via sanitary pipes to a drain lowers this contamination risk.

Some cheeses are ripened for an extensive time on shelves that can be a source of LM contamination (23). Formerly, wooden shelves were used for supporting the cheese for ripening and aging. Because raw or bare wood is difficult to clean and sanitize, only finished and poly-urethane-coated wood should be used. Currently, stainless steel (SS) shelves are preferable because of the ease of cleaning and sanitizing and of their overall durability. All items must be stored at least 18 inches above the floor, to prevent water splash from the floor. Water in contact with the floor is at high risk for LM contamination. It is recognized that water from high-pressure nozzles is a serious source of post-pasteurization contamination. Aerosols produced by high pressure water striking the floor can reach and contaminate most food contact surfaces within the plant.

Equipment construction and design. It can be difficult to find equipment for smaller-sized dairy processing operations. Equipment suppliers have become accustomed to building machinery of ever-increasing sizes and capacities. Hence, small-scale equipment has become a high-priced specialty product. This has driven processors to purchase and install used and/or retrofitted equipment. Used equipment can contain damaged stainless steel (SS) surfaces, as well as worn or stressed seams and/or welded joints that are very difficult to clean and sanitize. Both new and used equipment must follow design specifications that meet 3-A sanitary standards (1). A number of different unit operations within dairy plants, such as tanks, tables, product fillers, and conveyers, have been observed to test positive for LM, although the contamination rate is lower than for environmental samples (28, 39). LM attaches very tenaciously to SS even after short contact times (33, 51), and SS cleanliness is dependent on the SS surface finish (37, 47).

Prior to purchase of equipment, it is important to consider both the construction and design features for relative ease of cleaning. Selection of equipment that is difficult to clean can prevent a proposed plant from becoming licensed by food industry regulators. A suggested strategy is to make payment(s) to equipment suppliers contingent on approval by regulatory agency representatives; this approach has been successfully used by some specialty cheese processors.

Effective cleaning and sanitation. It is important that a comprehensive cleaning and sanitation program be implemented and strictly followed. This program is normally developed in collaboration with suppliers of detergents and sanitizers. Two fundamentals apply when cleaning and sanitizing dairy plants: (1) cleaning alone does not destroy bacteria, and (2) it is impossible to sanitize a dirty surface. Thus a plant must first be thoroughly cleaned and then sanitized. There are two methods utilized in cleaning equipment and piping: Clean In Place (CIP) and Clean Out of Place (COP). In CIP, cleaning and sanitizing solutions are pumped through the equipment. Detergent concentration, solution temperature, and flow rate are set to ensure that all internal equipment surfaces are cleaned without disassembly. In some circumstances, CIP is not feasible, so that the equipment is disassembled and cleaned by hand or in a parts washer instead. As mentioned earlier, drains are particularly vulnerable to bacterial biofilms. Cleaning of a drain is basically the same as hand cleaning. Chemical supply companies recommend the use of hot, soapy water and a brush that makes contact with as much of the drain surface as possible. Following cleaning, the drain should be rinsed with potable water and sanitized, using sanitizer at higher concentrations than are used on food contact surfaces. While cleaning drains and floors, there is a risk of contaminating food contact surfaces from exposure to aerosols and condensate. Therefore, it is recommended that floors and drains be cleaned before equipment. Tompkin et al. (49) outlines an easy-to-follow cleaning procedure for equipment: dry clean, pre-rinse equipment, visually inspect equipment, foam and scrub equipment, rinse equipment, visually inspect equipment, clean floors, sanitize equipment and floors, and dry floors. Thus, cleaning from top down minimizes the risk of re-contaminating equipment during the cleaning and sanitation process. All brushes used during cleaning should be color coded, with black being used for floors and drains.

At least once a week, the plant walls and floors should be foamed with quats at concentrations from 400 to 800 ppm. This is especially important if condensate regularly collects on the wall, window, ceiling and equipment surfaces.

To prevent corrosion of SS it is important to follow the following recommendations: (1) use only soft fiber brushes, pads, and/or sponges for manual cleaning and for removal of milk residues; (2) apply chemical cleaners only as directed by the manufacturer/supplier; (3) thoroughly rinse all alkaline and acid cleaners from equipment surfaces with tap water; and (4) limit exposure time of SS to sanitizers. For example, chlorinated compounds should contact SS equipment surfaces for no longer than 20 min (18).

The cheese plant's water supply needs to be of high quality in terms of both chemical content and microbiological profiles. Although no published studies report cheese contamination from LM in
the water supply, the quality of the water supply contributes to the overall cleanliness of the plant. The PMO states that dairy plant water supplies must be of a "... safe, sanitary quality" and should be tested by a certified laboratory at least every 6 months. In-plant testing of water quality is advisable for immediate detection of potential problems. An example of an in-plant testing protocol to monthly tests of water from several sources, such as sinks and hose stations. Collected in-plant water samples are then plated on aerobic count plates (2). Potential coliforms in the water supply are best tested by a presence/absence method such as Colilert, which, like use of petrifilm, is relatively cost effective and requires little operator training (5). A number of cheese types, such as Gouda and Morbier, include a curd washing step in which water is added directly to the curd/whey mixture. To avoid the risk of contamination from the water source, some cheese makers have chosen to add only filtered or UV-treated water. Water sources for humidity control in ripening rooms must also be controlled. All water sources must be equipped with backflow prevention devices.

Microbial air quality within the plant should be monitored. A simple technique for monitoring air quality is the 3M air sampling technique, using 3M plates (3). For farmstead operations or plants located in urban areas, it is advisable to filter plant intake air. All incoming air should be filtered through a sterilizing filter and the plant should be under positive air pressure to prevent the entrance of bacteria through cracks or open doors. As a general rule, plant air should be filtered 16 times per hour, and care should be taken that filters are dry because wet filters lead to mold and bacteria growth. Filter efficiency can be improved by bringing the filtered air past a metal-based filter or a UV light source. A UV activated titanium dioxide catalyst removes odors and unwanted bacteria.

Personal hygiene. Plant employees can spread pathogens around the plant and thus potentially can contaminate in-process or finished food products. Listeria has been isolated from the hands and clothing of food workers (29). A rigorous and thorough hand washing protocol is one of the most effective strategies for LM control. For plant GMPs and pathogens control, each strategically placed hand washing station must: (1) be kept clean; (2) be continuously supplied with a biocidal-detergent; (3) contain hand rinsing capability; and (4) be supplied with paper towels for hands drying (44). Mandated hand washing prompt signs and documented personal hygiene procedures need to be appropriately posted at each hand wash station and in rest room(s). A designated changing area also serves as a storage area for personal clothing and footwear. Upon entering production areas, all workers (as well as visitors) should step through either a sanitizer foot bath or a sanitizer foam sprayer (activated by either a timer or a motion detector). Footwear sanitation devices are quite effective in eliminating and/or controlling LM on personnel footwear (49) as long as the sanitizer is regularly changed (often 2-3 times/8 h) and the sanitizer concentration is maintained. Quats (-800 ppm) are commonly used in foot baths because of their residual effect, as compared to chlorine-based solutions. However, because of their residual effect, quats may interfere with the fermentation. Other options are iodophors (iodine complex in phosphoric acid) or peroxyacetic acid. Many dairy plants utilize a foot bath containing 25-35 ppm iodophor, since with loss of solution strength it loses its readily recognized amber color intensity. Hair and beard nets must always be worn and should always be available at the entrance to production area(s). It is most important that personnel recognize and appreciate that LM can presumably be found in all areas of the plant environment (i.e., in soils, water, air, aerosols, floors and floor drains, on insects and animals, in raw milk, and on footwear, clothing, and skin).

**Hazard Analysis Critical Control Points (HACCP).** Before starting up cheese production, it is important to consider risks involved in each step of the process and to develop strategies for controlling these risks, i.e., to develop a HACCP plan. This involves preparing a detailed process flow chart that diagrams each step or unit operation and that lists the inputs (raw materials and ingredients) and outputs (finished product[s] and whey), and the potential sites for contamination occurrence (human or product contact surfaces) as well as potential microbial kill (i.e., pasteurization) assessment (45). This science-based undertaking of a formalized risk analysis (which is globally recognized and accepted) then reveals which steps of the process should be constantly monitored and controlled, thus providing for a determination of when "process is out of control" and corrective action protocols are mandated. A HACCP plan, in concert with its Prerequisite Programs, functions to provide the ultimate in food safety for food processing plants. A list of (not all inclusive) some examples (but not all inclusive) of HACCP Prerequisite Programs are: Sanitation, Facilities & Equipment Preventive Maintenance, GMP's, Pest Control, Personal Hygiene, Training, Internal Audits, Specifications and/or COA's (Certificates of Analysis for raw materials, ingredients and packaging materials), Allergenic/Sensitizing Agents Control, Emergency Response/recall Plan, and Food Plant Site Security.

Developing and implementing a formal HACCP Program may seem overwhelming for an artisan cheese processor. However, assistance is available either through the internet (52) or in reference books (21). HACCP plans are both plant- and product-specific, but pre-developed plans can provide the framework on which to build a HACCP plan specifically adapted to the production of cheeses at an individual facility.

When developing a HACCP plan for raw milk cheese production, there is no apparent kill step to control LM. Instead, alternative options can be utilized, most notably the testing of incoming raw milk and control of the rates and extent of the fermentation process (14).

Many foodborne outbreaks are linked to products that were produced in manufacturing situations that deviated from normal procedures. For example, the electric service was lost, the boiler failed, starter cultures lost their activity, etc. Therefore, it is essential to observe and fully document the process of every single lot of finished product in terms of: (1) a record of any unusual occurrences; (2) code numbers of each lot(s) of raw materials; (3) ingredients; and (4) direct-contact packaging materials. Time, temperatures, pH values and other essential process parameters must be recorded, and the records must be retained for at least 2 years (a general food industry rule of thumb is "the shelf-life period, plus one year"). Hence, the manufacturing records for a given lot of 4-year-old "aged cheddar" would need to be retained for a period of at least 5-6 years (4 yrs aging + 9 months sell-by-date on the package + the one-year-expectation).
TABLE 2. Environmental testing program for farmstead queso fresco plant. Each environmental test is done using 3M swabs and Petrifilm

<table>
<thead>
<tr>
<th>Risk Assessment</th>
<th>Type of risk areas</th>
<th># of risk areas</th>
<th>Frequency of testing</th>
<th>Bacteria tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>High risk</td>
<td>Drain, refrigeration condensate</td>
<td>2</td>
<td>Weekly</td>
<td>Listeria, Coliforms, Enterobacteriaceae, Total Aerobic Count</td>
</tr>
<tr>
<td>Low risk</td>
<td>Door handles, walls, equipment surfaces</td>
<td>60</td>
<td>Tested in a 4 weeks rotation with 15 swabs per week</td>
<td>Listeria, Coliforms Enterobacteriaceae, Total Aerobic Count</td>
</tr>
</tbody>
</table>

FIGURE 2. Safety hurdles for three cheeses based on processing and compositional hurdles. A: Raw milk Comté, B: Cheddar, C: French raw milk Camembert. The larger the vertical lines, the more effective the safety hurdle. The hurdles are raw milk quality (absence of pathogens), pasteurization vs. no pasteurization, cooking time and temperature of the curd whey mixture, rate and extent of pH development, water activity (a_w) in the final cheese, and duration of ripening.

Verification procedures. Unfortunately, the only system that assures that a cheese is not contaminated with LM is to sample and test every single cheese. This is obviously not possible, feasible and/or cost effective, and it is most infrequent that dairy products are tested for LM. Instead, from a practical standpoint, product manufacturing environment (i.e., environmental) sampling and testing is utilized, because it is generally accepted that a relationship may be found between environmental LM contamination and LM in the final products (48). Thus determination of LM in the cheese making environment increases the likelihood for producing a LM-positive cheese. However, it is important to note that a LM positive plant doesn’t necessarily produce LM-positive cheeses (26). Testing is frequently done on a weekly basis (49), although this can be adjusted based on results.

In the past, plant environmental pathogen testing was always performed by outside (i.e., off-site) laboratories. Recently, the 3M Co. has developed a relatively simplified test method for Listeria that does not require positive controls (19). This apparently provides a reasonably safe test protocol for the conduct of in-plant testing. Product contact surfaces as well as non-contact areas such as drains and floors should be tested. An example of a product contact and environmental testing program at a farmstead queso fresco plant is outlined in Table 2.

BUILDING SAFETY HURDLES INTO THE PROCESS AND CHEESE COMPOSITION

When produced correctly, cheese is a safe food product. There is not one particular factor that renders cheese safe, but rather a combination of product and process parameters that all contribute to overall product safety. This principle of food safety is described as the hurdle approach (30). Properties such as water activity, salt in moisture, pH, and lactic acid bacteria are hurdles built into the composition of the cheese. Raw milk quality, pasteurization, cook step, rate of fermentation, refrigeration, ripening and packaging are hurdles built into the process of producing the cheese. Different cheeses experience varied levels of these hurdles. Figure 2 outlines some of these hurdles in raw milk Comte, cheddar, and raw milk Camembert. It is clear that Comte and cheddar are cheese types that naturally provide protection against pathogens. In contrast, raw milk Camembert, as produced in France, is more susceptible to contamination. Thus, when considering starting up production of artisan cheese, the choice of cheese type is crucial.

CONCLUSION

The consumption of specialty cheeses is currently increasing rapidly in the United States (22). It is important that consumers have faith in the safety of these products, but a cheese-borne outbreak
could shatter this trust. A serious cheese-borne outbreak would likely damage not only the specialty cheese sector but conceivably the entire dairy industry. Thus everybody associated with the United States cheese industry has an interest in promoting safety. As this paper demonstrates, many parameters must be controlled to ensure LM free cheese. Cheese producers who follow rigorous procedures to prevent milk and product contamination and who control raw milk quality will be able to produce specialty cheeses safely, whether these products are made from pasteurized or raw milk.

ACKNOWLEDGMENTS

The authors thank Jim Postlewait and Eric Paulson, Oregon Department of Agriculture, and Ron Christianson, Ecolab, for their helpful comments.

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County of Sacramento Selected 2008 Crumbine Award Winner

The County of Sacramento Environmental Management Department has been selected as the recipient of the 2008 Samuel J. Crumbine Consumer Protection Award for Excellence in Food Protection.

For 53 years, the Crumbine Award, named for one of the United States most renowned public health sanitarians, has been presented to a local public health unit by a jury of leading environmental health officials and public health sanitarians and is the most prestigious recognition that a public health unit can receive. Crumbine winners serve as models for other public health and safety programs across the nation.

2008 Crumbine Award Jury Chair Gary Erbeck of the County of San Diego Department of Environmental Health (the 2005 Crumbine Award winner) said, “The County of Sacramento has demonstrated leadership, innovation and a commitment to food safety that transcends the boundaries of their county. It is a guiding light for local food safety programs throughout the nation.”

The County of Sacramento Environmental Management Department Director Val Siebal said collaboration with industry stakeholders and having a multi-pronged approach were key factors in developing their Retail Food Program. “We are extremely proud to receive this award as it demonstrates our ongoing commitment to consumer information and protection in Sacramento County.”

Sacramento will receive the Crumbine Award at the Annual Educational Conference of the National Environmental Health Association, June 22–25 in Tucson, AZ. Award presentations will also be made at the annual meetings of the International Association for Food Protection, August 3–6 in Columbus, OH and the National Association of County and City Health Officials, September 9–12 in Sacramento, CA.

The Crumbine Award is supported by the Conference for Food Protection, in cooperation with the American Academy of Sanitarians, American Public Health Association, Association of Food & Drug Officials, Foodservice Packaging Institute, International Association for Food Protection, National Association of County and City Health Officials, National Environmental Health Association, National Restaurant Association Solutions, National Sanitation Foundation International and Underwriters Laboratories Inc.

3M Microbiology Wins Prestigious IAFP Black Pearl Award

The International Association for Food Protection (IAFP) recently selected 3M Microbiology as the 2008 recipient of the prestigious Black Pearl Award. The Black Pearl Award is given annually to one company for its outstanding achievement of corporate excellence in advancing food safety and quality.

When evaluating candidates for the Black Pearl Award, IAFP seeks companies that exemplify excellence in advancing food safety and quality through numerous channels, including customer programs, employee relations, educational activities, adherence to standards and support of the goals and objectives of IAFP.

According to David Tharp, executive director of IAFP, 3M Microbiology has long been an active and dedicated member of IAFP. “3M Microbiology’s integrated approach to providing food safety solutions to the food industry is second to none. They have a history of partnering with customers and industry organizations to address issues or problems. Through active involvement in IAFP scientific journals and industry events, 3M Microbiology regularly provides ideas and solutions to the food industry.”

“For 24 years, 3M Microbiology has partnered with the food industry to maximize food safety and quality worldwide,” said Karen Mullery, global business manager, 3M Microbiology. “We are honored to receive such a prestigious award, and appreciate our efforts being endorsed in this way. As the food industry faces dynamic challenges, we at 3M are committed to responding with truly innovative solutions.”

“In my opinion, 3M Microbiology epitomizes the commitment to protecting the food supply that we all strive to attain. Not only have they developed revolutionary technologies, they have also contributed to the profession by allowing their people the freedom to work with their customers in long-term thinking about methods to improve the quality of the food supply,” said Larry Cohen, North American senior food safety program leader for Kraft Foods, who submitted a
nomination letter in support of 3M Microbiology. "We have worked with 3M Microbiology for almost 20 years, and in this time, we've come to view our relationship as a partnership."

3M Microbiology has been an IAFP Sustaining Member for 22 years and its employees are actively involved in IAFP committees, events and volunteer work.

**NSF International Announces Recipients of the 2008 Food Safety Leadership Awards**

NSF International announced the 2008 recipients of its Fifth Annual Food Safety Leadership Awards. NSF’s Food Safety Leadership Awards Program recognizes key individuals and organizations who have demonstrated outstanding leadership in the foodservice industry.

The 2008 award recipients were announced at the Food Safety & Security Summit, March 19, 2008, Washington, D.C.

After reviewing all nominations, an independent panel of food safety experts recognized the following recipients for their groundbreaking achievements:

- Paul A. Lachance, Ph.D., F.A.C.N., C.N.S., Lifetime Achievement in Education & Technology;
- Daniel L. Engeljohn, Ph.D., Lifetime Achievement in Public Service;
- National Environmental Health Association, Education and Training;
- Elizabeth A. Bugden, MS, Education and Training;
- Jeanne Gleason, Ph.D., Education and Training;
- Christine Moe, Ph.D., Research Advancement;
- Sterilox Food Safety Systems, Equipment Design; and
- Norm Faiola, Ph.D., Product Development.

"NSF International is honored to present the 2008 food safety leadership awards. I was proud to congratulate this year’s winners on their outstanding food safety efforts in March," said William Fisher, NSF International vice president.

This panel included industry notables:

- Mary Adolf, Stan Bailey, John Farquharson, Ernest Julian, Ellen Laymon, Jim Mann, Donald Schaffner, David M. Theno and Ewen C.D. Todd.

**International Commission on Microbiological Specifications for Foods Receives 2008 GMA Food Safety Award**

Robert Brackett, chief science officer of the Grocery Manufacturers Association (GMA) has announced that the International Commission on Microbiological Specifications for Foods (ICMSF) is the 2008 recipient of the GMA Food Safety Award.

"On behalf of GMA and its members, I wish to congratulate the Commission on Microbiological Specifications for Foods for being named the recipient of the 2008 GMA Food Safety Award," said Dr. Brackett.

The books prepared by ICMSF are indispensable references for food safety professionals around the world. ICMSF has also made outstanding contributions to microbiological risk assessment and food safety policy, including the development of risk management concepts such as Food Safety Objectives that have become recognized internationally through Codex Alimentarius. ICMSF was described as "a guiding light for the microbiological food safety community."

The GMA Food Safety Award honors those individuals or organizations who have demonstrated a longstanding commitment to improving the safety of food. The recipient of this award must possess at least 10 years of service in the food safety arena and have successfully demonstrated sustained contributions in research, education and information transfer. In addition, the recipient must display innovative and effective strategies to promote a safer food supply while solving significant food safety problems.

**FDA Posts Revised Questions and Answers on Acrylamide**

The US Food and Drug Administration’s (FDA) Center for Food Safety and Applied Nutrition (CFSAN) has updated the Qs & As on acrylamide with new information related to acrylamide in foods, including adding consumer information on optional ways to reduce acrylamide levels in certain foods.

Acrylamide is a substance that forms in certain foods during some high-temperature cooking practices, such as frying and baking. Acrylamide causes cancer in laboratory animals at high doses, and is therefore a potential human carcinogen. Since the discovery of acrylamide in food in 2002, FDA has initiated a broad range of surveillance and research activities related to acrylamide.

In 2003, FDA posted Qs & As on acrylamide on its Web site, including the dietary message "to eat a
balanced diet, choosing a variety of foods that are low in trans fat and saturated fat, and rich in high-fiber grains, fruits, and vegetables." In 2004, in the Action Plan for Acrylamide in Food, FDA announced its intention to "develop and revise consumer messages about dietary choices and cooking methods, as additional knowledge is gained about acrylamide in food." Given advances in knowledge about ways to mitigate acrylamide in food and FDA's stated intention to revise consumer messages as more knowledge becomes available, FDA has updated its Qs & As on acrylamide to include limited consumer information on acrylamide reduction. This information covers storage of potatoes before cooking, cooking practices for potato products and toasted bread, and dietary intake.

FDA is providing this information for consumers who are looking for optional ways to reduce acrylamide. FDA's best advice for acrylamide and eating is that consumers adopt a healthy eating plan, consistent with the Dietary Guidelines for Americans, that emphasizes fruits, vegetables, whole grains, and fat-free or low-fat milk and milk products; includes lean meats, poultry, fish, beans, eggs, and nuts; and is low in saturated fats, trans fats, cholesterol, salt (sodium) and added sugars. FDA is waiting for completion of new toxicology research that is underway before considering whether new consumer advice on acrylamide is needed.

Retailers Joining Group Effort to Educate Millions of Consumers about Food Safety

Food retailers from around the country are joining a cooperative government, industry and consumer group effort to reach millions of consumers with important food safety information.

Be Food Safe, originally launched by the United States Department of Agriculture (USDA) and the US Partnership for Food Safety Education, encourages retailers to display food safety messages and visual reminders in front of customers through in-store promotions, brochures, flyers, packaging, circular ads and other forms of customer outreach. Nearly 40 retailers, representing approximately 6,000 supermarkets and an estimated 81 million consumers, have volunteered to implement Be Food Safe through their in-store and external customer communications programs. The campaign encourages the use of colorful, modular icons and photography to illustrate the basic safe food handling practices of clean, separate, cook and chill.

According to research conducted by the Partnership, 64 percent of consumers say it is "very important" to follow safe food handling at home, yet many consumers are not consistent in doing so. The same study found that consumers believed it was "very important" to educate the public on safe food handling, with most believing that food companies and the government should provide this information.

"The Partnership's work with food retailers will help us keep food safety top-of-mind with people who shop for and prepare food at home," said Shelley Feist, executive director of the Partnership for Food Safety Education. "It is important that consumers receive frequent reminders of the importance of safe food handling to reduce the risk of illness.

While the overall rate of foodborne illness has been declining, the Centers for Disease Control and Prevention indicate that an estimated one in four Americans suffers from foodborne illness each year.

"Ten years of consumer education through the Partnership has led to improved levels of awareness about basic safe food handling practices," said Bryan Silbermann, chairman of the Partnership's Board of Directors and the president of the Produce Marketing Association. "By adding the reach of retailers and suppliers using the consistent Be Food Safe messaging, we will be able to get important reminders in front of consumers where they shop."

The Food Marketing Institute (FMI) US Grocery Shopper Trends 2007 found that only 66 percent of shoppers are confident that the food they buy at the supermarket is safe, which is a 16 percent decrease from 2006 when 82 percent of consumers reported they were confident the food they purchase at the grocery store was safe.

"Food retailers across the country are eager to help communicate critical food safety messages to their customers," said Tim Hammonds, president and CEO of FMI. "Be Food Safe is an important, consumer-tested tool that grocers can use with confidence."

What Does the Label on Your Chicken Really Mean?

According to the US Department of Agriculture (USDA) "100 percent natural" means the poultry doesn't contain artificial ingredients like preservatives. But experts warn — there are no guarantees. "100 percent natural — remember — no inspections are done. So we don't know if those claims are really true," says Shannon Wallace, R.D., registered dietitian with Baylor University Medical Center at Dallas.

Chicken labeled as "organic" must meet much stricter standards. Inspections are conducted and organic chicken cannot contain artificial ingredients, hormones or antibiotics. But are those really harmful to consumers?
“The USDA does not make any claims that organically produced food is any safer or more nutritious than conventionally produced food,” adds Wallace.

Another popular chicken label—“grain fed.” This is supposed to mean the chicken was not fed animal by-products, but just like “100 percent natural” and “free range,” there is no outside monitoring for this claim.

And probably the most confusing label of them all—“free range.” Chicken labeled as “free range” is supposed to be leaner, but again, experts warn the claim can be deceiving. “Free range does not always mean that the animal has been in an open area its whole life. It may only mean they were in a restricted area and let out into that open area one time during their life,” says Wallace.

So what should you shop for in chicken?

“If you would like to have a healthy diet—trimming the fat or buying leaner cuts of meat is always important. And the research is still out regarding these other issues of hormones and antibiotics,” says Wallace.

**Start at the Store: Seven Ways to Prevent Foodborne Illness**

Safeguarding your home against foodborne illnesses begins not at home, but at the supermarket, grocery store, or any other place where you buy food that you plan to store and serve.

Combating foodborne illnesses is a top priority at the Food and Drug Administration (FDA). That’s because, according to the Centers for Disease Control and Prevention (CDC), foodborne ailments cause about 325,000 hospitalizations and 5,200 deaths nationwide each year.

You as a consumer can play a key role in preventing these illnesses.

While shopping for food, you should:

1. **Check for cleanliness.** Buying from a retailer who follows proper food handling practices helps assure that the food is safe.

2. **Keep certain foods separated.** Separate raw meat, poultry, and seafood from other foods in your grocery shopping cart. Place these foods in plastic bags to prevent their juices from dripping on other foods.

3. **Inspect cans and jars.** Don’t buy food in cans that are bulging or dented.

4. **Inspect frozen food packaging.** Don’t buy frozen food if the package is damaged.

5. Select frozen foods and perishables last. Meat, poultry, fish and eggs should be the last items placed in your shopping cart. Always put these products in separate plastic bags so that drippings don’t contaminate other foods.

6. **Choose fresh eggs carefully.** Before putting eggs in your cart, open the carton and make sure that the eggs are clean and none are cracked.

7. **Be mindful of time and temperature.** It’s important to refrigerate perishable products as soon as possible after grocery shopping. Food safety experts stress the “2-hour rule”—because harmful bacteria can multiply in the “danger zone” (between 40° and 140°F), perishable foods should not be left at room temperature longer than 2 hours. Modify that rule to 1 hour when temperatures are above 90°F, as they often are in cars that have been parked in the sun.

If it will take more than an hour to get your groceries home, use an ice chest to keep frozen and perishable foods cold. Also, when the weather is warm and you are using your car’s air conditioner, keep your groceries in the passenger compartment, not the trunk.
Eriez® XR-41 X-Ray Inspection System is Ideal to Meet Large Package Production Requirements

Eriez’s advanced Model XR-41 is part of the company’s new line of E-Z Tec® X-Ray Inspection Systems designed specifically for larger packaged products. The XR-41 offers enhanced capabilities where multiple products and belt speeds are required. This system is ideal for foreign body detection of metal, glass, calcified bone, PVC and to inspect packages for mass and missing or defective objects.

The sophisticated XR-41 features a 15-inch color touch screen, stainless steel construction and auto set-up. The XR-41’s external connectors can be networked as an SQL Client with full remote support facilities. For simplified operation, the XR-41 does not require frequent calibration.

Six E-Z Tec XR models are available to fit practically any inspection need. All Eriez Inspection Systems use advanced linear array technology that is recognized in the industry for its sensitivity, speed and sophistication.

Eriez
814.835.6000
Erie, PA
www.eriez.com

AOAC Approves bioMérieux VITEK® Two Identification Cards for Biological Threat Organisms, E. coli O157, Listeria and Staph

bioMérieux has received Performance-Tested Methods™ (PTM) approval from the AOAC Research Institute for two critical identification cards for the food industry. The VITEK® 2 Gram-Positive (GP) card is certified for the identification of Listeria and Staphylococcus species and the VITEK 2 Gram-Negative (GN) card is certified to identify Gram-negative organisms such as Salmonella and E. coli O157.

“Our validation programs use rigorous testing methods to measure a product’s performance in several key performance parameters including accuracy, precision, sensitivity, specificity, and ruggedness,” said Scott G. Coates, managing director, AOAC Research Institute. “In addition, the test cards were validated by an AOAC RI recommended independent laboratory.”

Recent reports from the US Centers for Disease Control and Prevention reveal that 76 million Americans get sick, more than 300,000 are hospitalized, and 5,000 people die from foodborne illnesses each year. The most commonly recognized foodborne infections are caused by bacteria such as Listeria, Salmonella, and E. coli O157:H7.

“Rapid and accurate identification of foodborne pathogens and biological threat organisms is crucial for ensuring food safety and protecting consumer health,” stated Alexandre Mérieux, bioMérieux corporate vice president, industrial microbiology.

The VITEK 2 GP and GN cards were developed to address growing demand for quality control measures within the food industry and provide identification of organisms in just hours, while traditional methods take days to deliver results. The GN card offers automated identification of the most significant fermenting and non-fermenting Gram-negative bacilli, including several Salmonella species and E. coli O157, in addition to the select agent organisms Brucella melitensis, Francisella tularen-sis, Burkholderia mallei, Burkholderia pseudomallei and Yersinia pestis. The VITEK 2 GP card provides rapid identification of common Gram-positive organisms, including Listeria and Staphylococcus species.

bioMérieux
800.638.4835
Hazelwood, MO
www.biomerieux-usa.com

JohnsonDiversey Introduces TASKI JFit for Onboard Dilution Control

Professional cleaners can reduce costs and increase cleaning performance with TASKI JFit, the new onboard dilution control system for TASKI Swingo scrubber driers from JohnsonDiversey. The TASKI JFit unit is connected with the proven Cleaning Solution Dosing system and helps save up to 40 percent in cleaning solution compared to conventional scrubber driers.

The unit measures flow from the water tank to the brushes and automatically adds the right amount of chemicals. A microprocessor
delivers the accurate ratio of dilution, by continuously calculating demand for chemicals and controlling a peristaltic pump.

Chemicals for the JFit come in 1.5 litre super-concentrated closed pouches, which prevent operators coming in contact with the chemicals. Pouches are easily locked into the JFit unit. At the lowest dosage of 0.2 percent, one pouch cleans up to 25,000 square meters between changes.

JFit enhances safety by reducing the risk of product contact, spilling or accidental product mixing by eliminating the need for manual handling of open chemicals. Because the JFit system is simple and easy to use, operator training is kept to a minimum.

JFit helps control cleaning costs by eliminating costly overdosing, which can happen frequently in day-to-day cleaning operations. Additionally, JFit reduces chemical residue on the floor caused by overdosing. TASKI cleaning products used in the JFit system include Jontec 300 neutral floor cleaner, Jontec Forward heavy duty floor degreaser, and Jontec Tensol floor cleaner and maintainer.

Using super concentrates in 1.5 liters pouches, operators also eliminate handling, storing and transportation of heavy canisters. Smaller packaging has a positive impact on the environment and customer business by saving energy use and reducing emissions. Two 1.5-liter pouches have the equivalent cleaning power of three 5-liter canisters of conventional product, reducing amounts of chemicals and packaging material.

New White Films Serve Luminescence and Microscopy Applications from Excel Scientific

Excel Scientific has introduced BrightMax™ Adhesive White Vinyl Films.

Used with white clear-bottom microplates, BrightMax films help to maximize signals in luminescence assays.

A split backing facilitates application of the film to either top or bottom of the plate. Applied to the bottom of a 96-well filter plate, the white film provides a convenient medium for holding dried filters removed from the plate for microscopic examination and storage, for example in ELISPOT techniques.

Excel Scientific, Inc.
760.246.4545
Victorville, CA
www.excelscientific.com

Olymel Plant Adopts SISTEM™ Learning Solution for Employee Training Program

The Olymel production facility in Brampton, ON, has signed an agreement with Silliker, Inc. to train its workforce with SISTEM™, an interactive, group-based training platform created by Alchemy Systems, Silliker’s partner company.

SISTEM™ allows companies to deliver competency-based, streamlined, and consistent training via the Internet or company intranet. The customizable platform incorporates simple remote control devices with color-coded buttons for students, and features an integrated training management system that tracks participant interactions and automatically updates training records.

In an industry that is undergoing profound changes to meet new safety challenges, SISTEM™ was the obvious solution for the Brampton plant to promote and improve their safety practices. By implementing SISTEM™, the Ontario operation recognized the importance and urgency of harnessing a progressive training technology to meet the needs of its entire workforce that includes over 500 employees from diverse educational and cultural backgrounds.

SISTEM™ allows for the training of up to 32 workers at a time, with or without a facilitator, and maintains individual training records in a secure, auditable web database. Currently, the product is used to train nearly 85,000 food processing and food service workers. In 2006, Silliker and Alchemy entered into a strategic partnership to create custom food training programs to be used in addition to Alchemy’s existing library of content. Food allergens, good manufacturing practices, plant sanitation, and HACCP are among the training topics featured in the Silliker-Alchemy alliance.
DuPont Launches Renewably Sourced Solutions for Packaging Market

DuPont has announced the expansion of its renewably sourced portfolio of offerings for the packaging market with the launch of new DuPont™ Biomax® TPS thermoplastic starch and DuPont™ Biomax® PTT (polytrimethylolene) injection moldable resin. The launch took place at the global Interpack packaging trade fair.

“Expanding our portfolio of solutions in renewably sourced packaging is a key strategy for DuPont’s Performance Materials segment,” said Diane Gulyas, group vice president, DuPont Performance materials. “These new offerings demonstrate the power of marrying DuPont’s core competency in materials and polymer science with our leadership in bio-based technologies and renewable feedstocks to deliver offerings that provide comparable or better performance than the petrochemical-based materials they replace. They support our commitment to helping customers improve the sustainability of their value chains.”

Biomax® TPS is a renewably sourced thermoplastic starch for packaging applications. The offering consists of sheet stock that contains 85-90 percent renewably sourced content for thermoformed trays and articles, and resins for injection-molded parts and containers. Biomax® PTT contains up to 35 percent renewably sourced content for packaging applications. It is especially suitable for use in injection-molded containers, cosmetic packaging and other parts where polyesters are used.


Renewably Sourced Materials from DuPont offer several benefits over petroleum-based products. These products reduce dependence on petroleum and, in many instances, reduce the net production of greenhouse gases and energy consumption when compared to incumbent products. With today’s innovative technologies, all this can be achieved without compromising performance. Applications for renewably sourced products cross numerous industries and markets. They are used in a wide variety of products including carpeting, fabrics for apparel and interiors, personal care products, automotive components, liquid detergents, food packaging and antifreeze.

Lambda Solutions, Inc.
800.441.7515
Wilmington, DE
www.dupont.com

Food Safety Assured with SISTEM™ Training – Food Industry Leaders are Turning to SISTEM for Food Safety Training Compliance

Alchemy Systems has been selected by a number of major food manufacturers to help combat food safety challenges and regulatory compliance issues through employee training. Recent product recalls and improper animal-handling incidents have spurred a need for updated food safety initiatives that will restore confidence in consumers. By implementing Alchemy’s unique group-based training platform, SISTEM, companies such as the American Foods Group (AFG), Buckhead Beef, Kerry Inc., Olympe and Tyson Foods Corporation have targeted workforce education to

Lambda Solutions, Inc.
781.478.0170
Waltham, MA
www.LambdaSolutions.com

JULY 2008 | FOOD PROTECTION TRENDS 493
promote the prevention of similar food safety incidents.

“Our customers are role models to the entire food industry for food safety training and compliance,” said Steve Merrill, vice president of Alchemy Systems. “In addition to training their employees with our OSHA, HACCP and SQF compliance courses, they have used the customizing features of SISTEM to add courses unique to their equipment and food safety initiatives.”

SISTEM is a ground-breaking training management solution used by more than 400 food-processing plants across the US and Canada to effectively train in-plant personnel and provide audit-ready reports. The SISTEM platform is applicable to, and used in a wide range of plants that process all types of food products including meat and poultry, dairy, produce, confections and pet food.

The adoption of SISTEM training brings a positive outlook to an industry battling troublesome food safety issues. Incorporating consistent and effective training is a fundamental way companies like AFG, Tyson, and Buckhead Beef are reinforcing current food safety techniques and regulatory compliance with their employees.

Alchemy Systems
888.988.8832
Austin, TX
www.alchemysystems.com

Met One Instruments
BAM-1020 Continuous Particulate Monitor
Awarded USEPA Class III Designation

Met One Instruments has become the first instrument manufacturer ever to successfully be awarded USEPA Class III equivalency designation for a continuous PM-2.5 particulate monitor. The BAM-1020 beta attenuation mass monitor has been assigned USEPA designation EQPM-0308-170, notice of which was published in the US Federal Register on March 12, 2008.

The implication of this achievement is very significant as it will allow state, local and tribal air monitoring agencies currently performing PM-2.5 surveillance using conventional samplers for regulatory enforcement purposes to replace these samplers with the BAM-1020. Manual samplers for PM-2.5, which typically are operated on one-in-three or one-in-six day sampling schedules in which results were often not known for weeks or months after the event, may now be replaced with the BAM-1020 monitor.

The BAM-1020 monitor produces reliable, accurate, continuous, hourly results in real time. Elevated PM-2.5 events can be determined as they occur (instead of weeks after the fact), which will allow government officials to take timely mitigating action. Daily (vs. one-in-six day) PM-2.5 averages will be available and network operational costs may be substantially reduced.

Met One Instruments, Inc.
541.471.7111
Grants Pass, OR
www.metone.com

New Variable Speed DC Vacuum Pumps from Welch Pumps

The new Welch® VARIFLOW™ DC-Drive Vacuum Pumps are ideal for OEM and Laboratory applications.

These totally dry DC-drive variable speed vacuum pumps can be used for full chemical-duty and standard-duty operation.

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For more information, contact:

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Oakdale, MN 55128
Phone: 651.501.2337
Fax: 651.501.5797
E-mail address: qmi2@aol.com

Manufactured under license from Galloway Company, Neenah, WI, USA. QMI products are protected by the following U.S. Patents: 4,914,517; 5,086,813; 5,289,359; other patents pending.

Quality Management, Inc.

For more information, visit our website at www.qmisystems.com or the University of Minnesota website at http://mastitislab.tripod.com/index.htm
You can’t afford to guess at how clean your vegetables are. The standards for fresh-cut fruits and vegetables are becoming more stringent due to the recent rise of industry outbreaks, and you need a proven product to consistently meet those standards. You need Tsunami® 100.

*Tsunami 100 is the ONLY EPA-registered antimicrobial water additive product on the market that reduces pathogens in process water. It reduces 99.9% of Escherichia coli O157:H7; Listeria monocytogenes and Salmonella enterica in fruit and vegetable processing waters. It also provides control of spoilage and decay causing non-public health organisms present on the surface of post-harvest, fresh-cut, and processed fruits and vegetables.

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International Commission on Microbiological Specifications for Foods

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AFFILIATE AWARDS

C.B. SHOGREN MEMORIAL
British Columbia Food Protection Association

BEST AFFILIATE OVERALL MEETING AWARD
Turkish Food Safety Association

BEST AFFILIATE EDUCATIONAL AWARD
Texas Association for Food Protection

BEST AFFILIATE COMMUNICATION MATERIALS AWARD
Ontario Food Protection Association

AFFILIATE MEMBERSHIP ACHIEVEMENT
Florida Association for Food Protection
### Committee Meetings

**Columbus, Ohio • August 3-6**

<table>
<thead>
<tr>
<th>TIMES</th>
<th>COMMITTEE MEETING</th>
<th>ROOM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Saturday, August 2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3:00 p.m. – 4:00 p.m.</td>
<td>Past Presidents’ Membership</td>
<td>Fayette</td>
</tr>
<tr>
<td>3:00 p.m. – 4:30 p.m.</td>
<td></td>
<td>Marion</td>
</tr>
<tr>
<td><strong>Sunday, August 3</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7:00 a.m. – 10:00 a.m.</td>
<td>Affiliate Council</td>
<td>Franklin CD</td>
</tr>
<tr>
<td>8:00 a.m. – 5:00 p.m.</td>
<td>Committee on Control of Foodborne Illness</td>
<td>Garfield</td>
</tr>
<tr>
<td>9:00 a.m. – 11:00 a.m.</td>
<td>Applied Laboratory Methods</td>
<td>Union B</td>
</tr>
<tr>
<td>9:00 a.m. – 11:00 a.m.</td>
<td>Food Chemical Hazards and Food Allergy</td>
<td>Delaware B</td>
</tr>
<tr>
<td>9:00 a.m. – 11:00 a.m.</td>
<td>Food Safety Education</td>
<td>Marion</td>
</tr>
<tr>
<td>9:00 a.m. – 11:00 a.m.</td>
<td>Viral and Parasitic Foodborne Disease</td>
<td>Delaware A</td>
</tr>
<tr>
<td>9:00 a.m. – 11:00 a.m.</td>
<td>Water Safety and Quality</td>
<td>Delaware C</td>
</tr>
<tr>
<td>10:00 a.m. – 12:00 p.m.</td>
<td>3-A Committee on Sanitary Procedures</td>
<td>Madison</td>
</tr>
<tr>
<td>10:00 a.m. – 12:00 p.m.</td>
<td>JFP Management</td>
<td>Union A</td>
</tr>
<tr>
<td>10:00 a.m. – 12:00 p.m.</td>
<td>Microbial Risk Analysis</td>
<td>Fairfield</td>
</tr>
<tr>
<td>10:00 a.m. – 12:00 p.m.</td>
<td>Retail Food Safety and Quality</td>
<td>Morrow</td>
</tr>
<tr>
<td>11:00 a.m. – 12:00 p.m.</td>
<td>Awards</td>
<td>Delaware A</td>
</tr>
<tr>
<td>11:00 a.m. – 12:00 p.m.</td>
<td>Constitution and Bylaws</td>
<td>Delaware B</td>
</tr>
<tr>
<td>12:00 p.m. – 1:30 p.m.</td>
<td>Student</td>
<td>Franklin CD</td>
</tr>
<tr>
<td>1:00 p.m. – 3:00 p.m.</td>
<td>Audiovisual Library</td>
<td>Madison</td>
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<td>1:00 p.m. – 3:00 p.m.</td>
<td>Food Hygiene and Sanitation</td>
<td>Marion</td>
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<td>1:00 p.m. – 3:00 p.m.</td>
<td>Predictive Modeling in Food</td>
<td>Delaware D</td>
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<td>1:00 p.m. – 3:00 p.m.</td>
<td>Fruit and Vegetable Safety and Quality</td>
<td>Union B</td>
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<tr>
<td>1:00 p.m. – 3:00 p.m.</td>
<td>Seafood Safety and Quality</td>
<td>Delaware A</td>
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<td>2:00 p.m. – 4:00 p.m.</td>
<td>Beverage</td>
<td>Delaware B</td>
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<td>2:00 p.m. – 4:00 p.m.</td>
<td>Dairy Quality and Safety</td>
<td>Fairfield</td>
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<td>2:00 p.m. – 4:00 p.m.</td>
<td>FPT Management</td>
<td>Union A</td>
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<td>2:00 p.m. – 4:00 p.m.</td>
<td>Meat and Poultry Safety and Quality</td>
<td>Morrow</td>
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<td>2:00 p.m. – 4:00 p.m.</td>
<td>Food Law</td>
<td>Delaware C</td>
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<td>3:00 p.m. – 4:30 p.m.</td>
<td>Foundation</td>
<td>Marion</td>
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<tr>
<td>3:00 p.m. – 4:30 p.m.</td>
<td>International Food Protection Issues</td>
<td>Delaware A</td>
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<tr>
<td>3:30 p.m. – 4:30 p.m.</td>
<td>Nominating</td>
<td>Madison</td>
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<tr>
<td>4:30 p.m. – 5:30 p.m.</td>
<td>Editorial Board Reception</td>
<td>Franklin CD</td>
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<td><strong>Wednesday, August 6</strong></td>
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<tr>
<td>7:00 a.m. – 8:30 a.m.</td>
<td>Program</td>
<td>Marion</td>
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</tbody>
</table>

*Organizational Meetings

IAFP Members are welcome to attend Committee Meetings.
Both Members and Nonmembers are welcome to attend and participate in PDG meetings.
Utility of Microbiological Testing
for Food Safety Assurance:
The Good, the Bad, and the Ugly

Dr. Russell S. Flowers
Silliker Group Corporation
Homewood, Illinois

Dr. Russell S. Flowers, Jr. is Chairman and Chief Scientific Officer of Silliker Group Corporation in Homewood, Illinois, where he spearheads strategic growth opportunities and assures that Silliker remains on the forefront of science and technology.

Dr. Flowers earned his BS and MS degrees from North Carolina State University, and his Ph.D. from the University of Illinois. He began his career with Silliker as a Laboratory Director in 1979, advancing to President in 1990. At that time, Silliker expanded to a global network with more than 45 locations, offering analytical and advisory services related to food safety and quality. He assumed his present position in January 2007.

Dr. Flowers has been an active researcher, author and speaker in the field of food microbiology, with particular emphasis on the development and validation of rapid analytical methods, and laboratory performance. He was the study director for the validation of the first Enzyme Immuno-Assay and Nucleic Acid Hybridization Assay approved by AOAC, and many subsequent studies that have led to industry-wide method implementation for the detection of pathogens in foods and food environments. Dr. Flowers also chaired the Food Laboratory Accreditation Working Group, which developed specific ISO accreditation criteria adopted by AOAC and A2LA for food testing laboratories.

The recipient of numerous industry awards and honors, Dr. Flowers is an active member of IAFP and several other professional organizations and societies, including the International Commission on Microbiological Specifications for Foods (ICMSF); AOAC International; Institute of Food Technologists (IFT); and the International Dairy Foods Association (IDFA).
FROM WILD PIGS IN SPINACH TO TILAPIA IN ASIA: THE CHALLENGE OF THE FOOD SAFETY COMMUNITY

DR. MICHAEL P. DOYLE
University of Georgia
Griffin, Georgia

Dr. Michael P. Doyle is a Regents Professor of Food Microbiology and Director of the Center for Food Safety at the University of Georgia. He is an active researcher in food safety and security, working closely with the food industry on issues related to the microbiological safety of foods.

Dr. Doyle is a graduate of the University of Wisconsin-Madison, where he earned his BS in Bacteriology, and MS and Ph.D. in Food Microbiology. The author of more than 400 scientific publications, Dr. Doyle has given more than 600 invited presentations at national and international scientific meetings, and has received several research awards from academic and national scientific organizations. He is a Fellow of IAFP, the American Academy of Microbiology, and the Institute of Food Technologists (IFT), and is a member of the National Academy of Sciences-Institute of Medicine.

In addition to current service on the food safety committees of several scientific organizations, Dr. Doyle has also served as a scientific advisor to many of them, including the World Health Organization (WHO); the National Academy of Sciences-Institute of Medicine and National Research Council; the International Life Sciences Institute-North America (ILSI); the Food and Drug Administration (FDA); the US Department of Agriculture (USDA); the US Department of Defense; and the US Environmental Protection Agency (EPA).
SUNDAY, AUGUST 3
6:00 p.m. - 7:00 p.m.
OPENING SESSION – Regency Ballroom
Ivan Parkin Lecture – Utility of Microbiological Testing for Food Safety Assurance: The Good, the Bad, and the Ugly — Russell S. Flowers, Ph.D., Silliker Group Corp., Homewood, IL
Cheese and Wine Reception to follow in the Exhibit Hall.

MONDAY MORNING
AUGUST 4
SYMPOSIA • 8:30 a.m. – 12:00 p.m.

S1 2008 Foodborne Disease Update: Salmonella in Processed Foods
Delaware A-D
Sponsored by the IAFP Foundation
Organizer: Jack Guzewich
Convenor: Jack Guzewich
8:30 Salmonella Serotype Mbandaka in Peanut Butter, Australia, 1996 — AGNES TAN, The University of Melbourne, Parkville, Australia
9:00 Outbreak Investigation: Salmonella Tennessee in Peanut Butter in the United States, 2007 — IAN WILLIAMS, CDC-NCZVED, Atlanta, GA, USA
9:30 Environmental Investigation and Regulatory Response: Salmonella Tennessee in Peanut Butter in the United States, 2007 — DON ZINK, FDA-CFSAN, College Park, MD, USA
10:00 Break
10:30 Outbreak Investigation: Salmonella 4,5,12:i:-Associated with Pot Pies in the United States, 2007 — IAN WILLIAMS, CDC-NCZVED, Atlanta, GA, USA
11:00 Environmental Investigation and Regulatory Response: Salmonella 4,5,12:i:-Associated with Pot Pies in the United States, 2007 — PATRICIA WHITE, USDA-FSIS, Omaha, NE, USA
11:30 Industry Perspective on the Peanut Butter and Pot Pie Outbreaks — JOSEPH D. MEYER, ConAgra, Omaha, NE, USA

S2 Coming Out of the Campylobacter Closet: International Strategies for Reducing Human Campylobacteriosis
Franklin A-C
Sponsored by the IAFP Foundation
Organizer: Roger Cook
Convenor: John Marcy
8:30 CODEX Initiatives for Control of Campylobacter in Poultry — JUDI LEE, New Zealand Food Safety Authority, Wellington, New Zealand
9:00 Scandinavian Regulatory Programs for Control of Campylobacter — Trials, Tribulations, Failures and Successes — HANS LINDMARK, National Food Administration, Uppsala, Sweden
9:30 Report Card — Two Years into the New Zealand Strategy for Controlling Campylobacter in Poultry — ROY BIGGS, Tegel Foods Ltd., New Market, Auckland, New Zealand
9:45 Report Card — Two Years into the New Zealand Strategy for Controlling Campylobacter in Poultry — JUDI LEE, New Zealand Food Safety Authority, Wellington, New Zealand
10:00 Break
10:30 Iceland, the Test-Bed of Regulatory Campylobacter Control and On-Farm Interventions: and Canada: A Study in Contrasts — RUFF LOWMAN, Canadian Food Inspection Agency, Ottawa, Ontario, Canada
11:00 An Industry Perspective of Regulatory Campylobacter Control Programs in the United Kingdom and United States — MIKE ROBACH, Cargill, Inc., Minneapolis, MN, USA
11:30 Panel Discussion

S3 Globalization of Acceptance Criteria for Microbiological Methods: Separating the Science from the Politics
Union D-E
Organizers: Michael Brodsky and Ruth Eden
Convenors: Michael Brodsky and Ruth Eden
8:30 Viewpoint: It’s Hard to Play Ball When the Playing Field Isn’t Level. An Industry Perspective on the Need to Level the Playing Field to Achieve a More Science-Based, Seamless Global Acceptance Process for Proprietary Methods — RONALD JOHNSON, bioMérieux, Inc., Hazelwood, MO, USA

Program subject to change

504 FOOD PROTECTION TRENDS | JULY 2008
9:00 Viewpoint: Represents the AOAC Point-of-View. How AOAC is Working with Other Certification Bodies to Achieve Worldwide Harmonization of Methods Acceptance Criteria. Interaction with USDA, FDA and WHO/FAO under Codex — SCOTT COATES, AOAC RI, Gaithersburg, MD, USA


10:00 Break

10:30 Viewpoint: A Canadian Regulatory Perspective on Adopting Analytical Methods and Prospects for Global Harmonization of Method Validation Protocols in Food Microbiology — JEFFREY M. FARBER, Food Directorate, Health Canada, Ottawa, ON, Canada

11:00 Viewpoint: Pharmaceutical Perspective and Experience on Harmonization of Methods Validation — SCOTT SUTTON, The Microbiology Network, N. Chili, NY, USA

**TECHNICALS • 8:30 a.m. – 12:00 p.m.**

**T1** Pathogens, Beverages and Water Technical Session

Franklin D

Convenors: To be determined

T1-01 Expression of the Urease Operon in *Escherichia coli* O157:H7 Treated with 0.5% Sodium

DSC

Benzoate — FAITH J. CRITZER, Doris H. D’Souza and David A. Golden, University of Tennessee, Knoxville, TN, USA

T1-02 Polylsine-Induced Sensitization of *Enterobacteriaceae* to Medium-Chain Fatty Acid Derivatives — ROEL OTTO and Purac Biochem B.V., Gorinchem, The Netherlands

T1-03 Gene Expression Profiling of *Listeria monocytogenes* Strain F2365 in UHT Pasteurized Skim Milk — YANHONG LIU, USDA-ARS-ERRC, Wyndmoor, PA, USA

T1-04 Interactions between σ8 and σ1 Appear to Contribute to *L. monocytogenes* Antimicrobial Resistance — M. ELIZABETH PALMER, Martin Wiedmann and Kathryn J. Boor, Cornell University, Ithaca, NY, USA

T1-05 Influence of Oxygen on Survival and 9:30 Quantification of *Escherichia coli* O157:H7 and *Salmonella* serovar Typhimurium in Manure and Slurry — ALEXANDER V. SEMENOV, Eelco Franz, Leo van Ovebeek and Ariena van Bruggen, Wageningen University and Research Centre, Wageningen, The Netherlands

T1-06 Survival of Norovirus in Biosolids — JIE WEI, Kalmia E. Kniel, Yan Jin and Tom Sims, University of Delaware, Newark, DE, USA

T1-07 Effect of Zero-Valent Iron on Removal of 10:30 *Escherichia coli* O157:H7 from Agricultural Waters — ALEXANDRA M. DEREVIANKO, J. Handlin, A. Yoskowitz, Y. Jin, P. Chiu, M. Sharma and K. E. Kniel, University of Delaware, Newark, DE, USA

T1-08 Transcriptome Analysis of *Escherichia coli* 10:45 O157:H7 under Acidic Conditions — KRICSTINA K. CARTER, Doris H. D’Souza, Arnold M. Saxton and David A. Golden, University of Tennessee, Knoxville, TN, USA

T1-09 Transcriptional Regulators SigB and PrfA, and 11:00 Flagella, Interact in a Temperature-Dependent Manner to Facilitate *L. monocytogenes* Invasion — REID A. IVY and M. Wiedmann, Cornell University, Ithaca, NY, USA

T1-10 Virulence Attenuated *Listeria monocytogenes* 11:15 Strains Commonly Isolated from Food Show Potential to Confer Protective Immunity — KENDRA K. NIGHTINGALE, Alphina J. Ho, Esther D. Fortes, Bradley L. Njaa and Martin Wiedmann, Colorado State University, Fort Collins, CO, USA

**ROUNDTABLE • 8:30 a.m. – 10:00 a.m.**

**RT1** Eating Seafood—Is It Worth the Risk?

Union A-C

Organizer: Kathleen T. Rajkowski

Convenors: Marlene E. Janes and Kathleen T. Rajkowski

8:30 Cooking Requirement for Different Types of Seafood — JOSEPH M. MADDEN, Neogen Corporation, Lansing, MI, USA

8:50 Pathogenic Bacteria and Viral and Parasite Concerns in Seafood Purchased by Consumers — MICHAEL JAHNCKE, Virginia Tech, Hampton, VA, USA

9:00 To be determined — LEE-ANN JAYKUS, North Carolina State University, Dept. of Food Science, Raleigh, NC, USA

9:10 Consumer Education on Safe Cooking and Handling of Seafood — ANTHONY O. FLOOD, International Food Safety Information Council, Washington, D.C., USA

9:15 Consumer Education on Safe Cooking and Handling of Seafood — CHRISTINE M. BRUHN, University of California–Davis, Davis, CA, USA

9:20 To be determined — JOE HUNSAKER, Hissho Sushi, Charlotte, NC, USA

9:30 Roundtable Discussion
T1-11 Characterization of the Ability of Bovine Intestinal Epithelium Cells — BRANDON A. CARLSON, John N. Sofos, Gary C. Smith, Keith E. Belk and Kendra K. Nightingale, Colorado State University, Fort Collins, CO, USA

T2-08 Antimicrobial Resistance in Campylobacter Isolates Recovered from Chicken Carcass Rinsates in 2007 — PAULA J. FEDORKA-CRAY, Jodie R. Plumlee and Neena Anandaraman, USDA-ARS, Athens, GA, USA

T2-09 Modeling of Activity of Triple Combinations of Antimicrobials, Using Lauric Arginate, Cinnamic Acid, and Sodium Benzoate or Potassium Sorbate as a Case Study — YUMEI DAI, Micha Peleg and Jochen Weiss, University of Massachusetts, Amherst, MA, USA

T2-10 Inactivation of Salmonella spp. and Escherichia coli O157:H7 on Tomatoes by Allyl Isothiocyanate, Carvacrol and Cinnamaldehyde in Vapor-State — MOHAMMAD M. OBAIDAT and Joseph F. Frank, University of Georgia, Athens, GA, USA

T2-11 Survival of Yersinia in Whole Liquid Egg as Influenced by the Presence of Nisin — JOSHUA B. GURTLER, Howard Q. Zhang and Chris H. Sommers, USDA-ARS-ERRC, Wyndmoor, PA, USA

T2-12 Effects of Protein and Fat on Viral Inactivation through High Pressure Processing in Seafood Salad — KIRSTEN A. HIRNEISEN, Dallas G. Hoover, Doris Hicks, Lori Pivarnick and Kalmia E. Kniel, University of Delaware, Newark, DE, USA

P1 Produce, Toxicology and Sanitation Poster Session

P1-01 Potential Internalization of Escherichia coli O157:H7 in Lettuce (Lactuca sativa L.) by Soil Inoculation — G. ZHANG, L. Ma, L. R. Beuchat, M. C. Erickson, V. H. Phelan and M. P. Doyle, University of Georgia, Griffin, GA, USA

P1-02 Comparison of Thermal Tolerance between Outbreak-Associated and Clinical Isolates of Salmonella Tennessee in Peanut Butter — L. Ma, G. ZHANG, P. Gerner-Smidt and M. P. Doyle, University of Georgia, Griffin, GA, USA

P1-03 Evaluation of Surface-Sterilization Methods for Escherichia coli O157:H7 on Lettuce — G. ZHANG, L. Ma, L. R. Beuchat, M. C. Erickson, V. H. Phelan and M. P. Doyle, University of Georgia, Griffin, GA, USA

P1-04 Potential Internalization of Escherichia coli O157:H7 in Pre-harvest Iceberg Lettuce (Lactuca sativa L.) — G. ZHANG, L. Ma, L. R. Beuchat, M. C. Erickson, V. H. Phelan and M. P. Doyle, University of Georgia, Griffin, GA, USA

P1-05 Pre-Harvest Internalization of Zoonotic Pathogens by Lettuce as Influenced by Environmental Growth Conditions — Marilyn Erickson, Jean Liao, Alison Payton, CATHY WEBB, Li Ma, Guodong Zhang, Michael Doyle and Larry Beuchat, University of Georgia, Griffin, GA, USA
P1-06 Persistence of Enterohemorrhagic and Non-Pathogenic _Escherichia coli_ on Spinach Leaves and in Rhizosphere — JITENDRA PATEL, Patricia Millner, Xiangwu Nou and Manan Sharma, USDA-ARS, Beltsville, MD, USA

P1-07 Attachment of _Escherichia coli_ O157:H7 to Intact and Cut Lettuce Surfaces — JITENDRA PATEL and Gabriel Sanglay, USDA-ARS, Beltsville, MD, USA

P1-08 Impact of Pre-Inoculation Growth Conditions on the Behavior of _E. coli_ O157:H7 Inoculated onto Romaine Lettuce Plants and Cut Leaf Surfaces — CHRISTOPHER THEOFEL and Linda Harris, University of California—Davis, Davis, CA, USA

P1-09 The Attachment of Shiga Toxigenic _Escherichia coli_ to Iceberg Lettuce as Affected by Hydrophobicity and Bacterial Growth Medium — Daniel Mitchell, Narelle Fegan, Mark Fegan and GARY DUKES, (will be presented by Patricia Desmarchelier), Food Science Australia, Tingalpa DC, Australia

P1-10 Use of Fluorescent Dyes for Visualization of Bacterial Attachment to Lettuce Leaves — LINDSEY A. KESKINEN, Peter H. Cooke and Bassam A. Annous, USDA-ARS-NAA-ERRC, Wyndmoor, PA, USA

P1-11 Efficacy of Chlorine Concentration and Acidic Electrolyzed Water in Decontaminating Lettuce Leaves Artificially Inoculated with _Escherichia coli_ O157:H7 — LINDSEY A. KESKINEN, Angela Burke and Bassam A. Annous, USDA-ARS-NAA-ERRC, Wyndmoor, PA, USA

P1-12 Influence of Biofilm-Forming Bacteria on Association of Hepatitis A Virus with Lettuce — ADRIENNE E.H. SHEARER, Jie Wei and Kalmia E. Kniel, University of Delaware, Newark, DE, USA


P1-14 Survival and Growth of _Escherichia albertii_ on Fresh-Cut Lettuce Stored at Various Temperatures — MANAN SHARMA, T. Matthew Taylor and Peter J. Taormina, USDA-ARS, Beltsville, MD, USA

P1-15 Visualization of Attachment and Internalization of a Bioluminescent Derivative of _Escherichia coli_ O157:H7 ATCC 43895 on Lettuce Leaves — PATTI E. TANNER, Ronald Turco, Bradley Reuhs, Bruce Applegate and Maribeth Cousin, Purdue University, West Lafayette, IN, USA


P1-17 Survival of _Salmonella_ and _Escherichia coli_ O157:H7 in Peanut Butter under Different Storage Temperatures — AGNES KILONZO-NTHENGE, Emily Rotich and Sandra Godwin, Tennessee State University, Nashville, TN, USA

P1-18 Environmental Investigation of a Restaurant's _Escherichia coli_ O157:H7 Outbreak Linked to Iceberg Lettuce — MAHA HAJMEER, Christopher Yee, Carol Myers, Benson Yee, Davina Martinez, Patrick Kennelly, Jeff Farrar and Barbara Cassens, California Dept. of Public Health, Sacramento, CA, USA

P1-19 Survival of Attenuated _Escherichia coli_ O157:H7 ATCC 700728 in Field-Inoculated Lettuce — ANNE-LAURE MOYNE, Mysoo R. Sudarshana and Linda J. Harris, University of California—Davis, Davis, CA, USA

P1-20 Evaluation of Chemical Disinfection Treatments to Inactivate _Escherichia coli_ O157:H7 and _Listeria monocytogenes_ on Mexican Spinach — JULIAN J. ESQUIVEL, Beatriz L. Alvarez-Mayorga, Leopoldo Orozco R. and Montserrat H. Iturria, Universidad Autonoma de Queretaro, Queretaro, Mexico

P1-21 Effects of Temperature Abuse and Subsequent Cold Storage on Natural Microflora and _Escherichia coli_ O157:H7 on Spinach — TAM L. MAI, Ervin L. Faulmann and Mansour Samadpour, Institute for Environmental Health, Lake Forest Park, WA, USA

P1-22 Characterization of Seasonal Diversity of the Microbial Community on _Spinacea oleracea_ Phyllosphere Using Culture and Non-Culture Dependent Techniques — GABRIELA LOPEZ-VELASCO and Monica Ponder, Virginia Tech, Blacksburg, VA, USA

P1-23 Epiphytic Bacteria and Survival of _Escherichia coli_ O157:H7 on Spinach — SANJA ILIC and Jeffrey T. LeJeune, The Ohio State University, Wooster, OH, USA

P1-24 Reduction of _Escherichia coli_ O157:H7 in Fresh Commercial Spinach by Lactic Acid Bacteria — WILLIAM E. CHANEY, Enusha Karunasena, Sara E. Gragg and Mindy M. Brashears, Texas Tech University, Lubbock, TX, USA

P1-25 The Effect of Different Refrigerator Storage Sites on the Proliferation of Spoilage and Indicator Bacteria on Bagged Spinach — DANIEL ARUSCAVAGE, Raymond Bowdish, Robert Seeley and Joelyn VanEss, SUNY-Potsdam, Potsdam, NY, USA

P1-26 Effect of Lactic Acid-Producing Bacteria on the Sensory Characteristics of Fresh Spinach — SARA E. GRAGG, Chance Brook, Angela Laury and Mindy Brashears, Texas Tech University, Lubbock, TX, USA

P1-27 Environmental Contamination of Spinach Placed in Close Proximity to Cattle Feedyard Operations — SARA E. GRAGG, Angela Laury, Markus Miller and Mindy Brashears, Texas Tech University, Lubbock, TX, USA
P1-28 Evaluation of Growth Kinetics of *Escherichia coli* O157:H7 on Bagged Spinach in Relation to Consumption Decisions Based on Visual Quality and Off-Odors — TREvor suslow, Elena de Castro, victoria zabala and Magdalena Sosa, university of California–Davis, Davis, CA, USA

P1-29 Characterization of Microbial Content of Organic and Conventional Produce in Maryland Relative to Production Practices and Inputs — Patricia Millner, David Ingram, Sara Reynolds, Daniel Shelton and Jitendra Patel, USDA-ARS, Beltsville, MD, USA

P1-30 Comparison of Moist Heat Inactivation Rates of *Salmonella* Enteritidis and *Pediococcus* spp. NRRL B-2354 on Whole almonds under commercial Plant Conditions — Erdogan Ceylan, Guangwei Huang and Mark Carter, Silliker Inc., South Holland, IL, USA

P1-31 Inactivation of *Salmonella* Enteritidis PT30 by Low-Energy X-ray Irradiation on Almonds at Different Water Activities — Sanghyup Jeong, Bradley P. Marks and Elliot T. Ryser, michigan state University, East Lansing, MI, USA

P1-32 The Survival of *Salmonella* Enteritidis on Walnuts during and after Walnut Hulling — Tyann Blessington, Elizabeth J. Mitcham and Linda J. Harris, University of California–Davis, Davis, CA, USA

P1-33 Use of the Weibull Model to Evaluate the Impact of Storage Time and Temperature on Thermal Inactivation of *Salmonella* Enteritidis PT 30 on Oil Roasted almonds — Shirin J. Abd, Kathryn L. McCarthy and Linda J. Harris, University of California–Davis, Davis, CA, USA

P1-34 Microbiological Evaluation of Step-by-Step Process in Seed Sprouting — So Yun Jun and Y.K. Lee, Kyungpook National University, Buk-gu, Daegu, South Korea

P1-35 Detection and Recovery of *Escherichia coli* O157:H7 in Artificially Contaminated Alfalfa Sprouts by Pathatrix immunomagnetic Separation, Real-Time PCR and Cultural Methods — Stephen D. Weagant, Ken J. Yoshitomi, Karen C. Jinneman, Ruben Zapata, Chitra Wendakoon, Paul Browning and Willis M. Fedio, New Mexico state University, Las Cruces, NM, USA

P1-36 Reduction of Salmonellae Inoculated onto Alfalfa Sprouts’ Surfaces by Gaseous Chlorine Dioxide — Arpan R. Bhagat, Jeongmok Kim and Richard H. Linton, Purdue University, West Lafayette, IN, USA

P1-37 Efficacy of Chlorine Dioxide Gas and Various Freezing Rates on the Microbiological Quality of Frozen blueberries — Lei Zhang, Zhinong Yan, Eric J. Hansen and Elliot T. Ryser, michigan state University, East Lansing, MI, USA

P1-38 Impact of Harvesting and Handling on Bell Pepper Contamination with Viral Pathogens — Cristobal Chaidez, Josefinna Leon, rosa martinez, felipe peraza, Marcela Soto, Andres Medrano and Celida Martinez, Centro de Investigacion en Alimentacion y Desarrollo, Culiacan, Sinaloa, Mexico

P1-39 Assessing Microbiological Quality of Produce from a Cleaning Project in Nashville, Tennessee — Furd-chi Chen, Sandria L. Godwin, sean C. Siple and Bhargavi Sheshachala, Tennessee state University, Nashville, TN, USA

P1-40 Washing Effect of Sodium Hypochlorite with DSC 5% Acetic Acid and Acidified Sodium Chlorite on Reduction in Population of Foodborne Pathogens on Fresh Produce — Kyung Yoon Kwon, Kyung A. Kang and Ki. S. Yoon, Kyung Hee University, Dongdaemun-Ku, Seoul, Korea

P1-41 Evaluation of Commercial Test Kits and Tangential Flow Filtration for Detection of *Salmonella* in Spent Mung Bean Irrigation Water — Tong-jen Fu and Nicole Maks, USDA, Summit-Argo, IL, USA

P1-42 Dump Tank Water Sanitation Technologies — Lindsay Arthur, Kelley Knight and Robin McKellar, Ontario Ministry of Agriculture, Food and Rural Affairs, Guelph, ON, Canada

P1-43 Transfer Prevalence of *Escherichia coli* O157:H7 from Soil, Water, and Manure Contaminated with Low Numbers of the Pathogen to Lettuce Plants of Varying Age — Gabriel Mootian, Wen-Hsuan Wu, Hoan-jen Pang and Karl R. Matthews, Rutgers University, The State University of New Jersey, New Brunswick, NJ, USA

P1-44 Effects of Time and Sanitizer Concentration in Produce Wash Water on Cross Contamination of *Salmonella* and *Escherichia coli* O157:H7 — Jacob A. Polsky and Mark A. Harrison, University of Georgia, Athens, GA, USA

P1-45 Microbiological Quality of Surface Water Used for Irrigation of Fresh Vegetable in Mpumalanga, South Africa — Oluwatosin Ijabadeniyi, Amanda Minnaar and Elna Buys, University of Pretoria, Pretoria, Gauteng, South Africa

P1-46 Effect of Coffee Cherries Storage after Harvest before the Beginning of Drying on Contamination by Fungi and the Relationship to Ochratoxin A Production — Irene Ahou Kouadio, University of Cocody-Abidjan, Abidjan, Ivory Coast

P1-47 Determination of Aflatoxin Levels in Herbal Medicines by ELISA-HPLC-LC/MS/MS — Kyongyeol Kim, Hyuna Park, Won-Bo Shin and Duck-Hwa Chung, Gyeongsang National University, Jinju, Gyeongnam, South Korea

P1-48 Monitoring of Ochratoxin A in Alcoholic Beverages — Heeyun Kim, Joongoo Lee, Jihye Jeong, Mijung Noh, Seok Heo and Jong Seok, Gyeongin Regional Korea Food & Drug Administration, Nam-Gu, Incheon, Korea

P1-49 Determination of Patulin Level in Fruit Juices and Juice Concentrates in Korea — Joon Ho Eom, You-Young Park, Jung A Byun, Dong Mi Seo, Eun Mi Lee, Mi Ra Kim, Nam Kyu Sun, Woon Young Jung and Jin Ha Lee, Korea Food and Drug Administration, Seo-gu, Daejeon, Korea
The Exploratory Data on Furan Content in Processed Foods in the Korean Local Market — Gi-Myoung Kim, Kwang-Geun Lee and YOUNG SIG PARK, Korea University, Seongbuk-Gu, Seoul, Korea

Comparison of Different SPE (Solid-Phase Extraction) Methods for the Analysis of Heterocyclic Amines from Fried Pork Patties — Jae-Hwan Lee, Yu-Mi Back, Kwang-Geun Lee and HAN-SEUNG SHIN, Dongguk University, Seoul, Korea

Monitoring and Risk Assessment of Furan in Processed Foods by Solid Phase Microextraction Gas Chromatography Mass Spectrometry (SPME-GC/MS) — Tae-Kyu Kim, Mi-Kyoung An, Hyu-Shin Lim and KWANG-GEUN LEE, Dongguk University, Choong-Gu, Seoul, Korea


Acute Toxicity and Mutagenic Effect of Methanol Extracts of Cirsium japonicum — SOON-MI SHIM, Eunkyung Bae and Gun-Hee Kim, Duksung Women's University, Plant Resources Research Institute, Dobong-Gu, Seoul, Korea

Effect of Acids on Optimum pH of Benzene Formation — YU TING DAI, Song He Sun, Xue Shu Xu, Jing Li Xie, Shi Can Lu and Ming Fang, East China University of Science and Technology, Shanghai, China

Dietary Exposure to Chloropropanols of Secondary School Students in Hong Kong — JOAN C. W. YAU, Y. Xiao, Stephen W. C. Chung, and K.P. Kwong, Center for Food Safety, Hong Kong, China

Mercury Levels in Female Students of the University of Japan — Relationship with Contents of Meals — MAMI ANDO, Hisako Aki and Wakaba Ishimoto, Osaka Shoin Women's University, Osaka, Japan

Fish Consumption by Mothers of Infants and by Women of Childbearing Age — Conrad J. Choiniere, BABGALEH TIMBO, Debra Street, Paula Trumbo and Sara Fein, Center for Food Safety and Applied Nutrition, FDA, College Park, MD, USA

Responses of Listeria monocytogenes to Disinfection Stress Monitored by Measurements of Intracellular pH and Viable Counts — VICKY G. KASTBJERG, Dennis S. Nielsen, Nils Amberg and Lone Gram, National Institute of Aquatic Resources, Technical University of Denmark, Kgs. Lyngby, Denmark

Characterization of Yeast Heterogeneity and Succession during the Spontaneous Fermentation of Natural Black Olives — Aspasia A. Nisiotou, Maria Souris, GEORGE-JOHN E. NYCHAS and Efstatios Z. Panagou, Agricultural University of Athens, Athens, Attica, Greece

Impact of Teichoic Acids D-Alanylation in Lactococcus lactis on Its Surface Physico-chemical Properties, Adhesion Behavior and Nisin and Lysozyme Sensitivity — Efstatios Giaouris, Romain Briandet, Mickael Meyrand, Pascal Courtin, GEORGE-JOHN E. NYCHAS and Marie-Pierre Chapot-Chartier, Agricultural University of Athens, Athens, Attica, Greece

Assessment of Microbiological Quality and Food Safety Management Performance for School Food Service in South Korea — JUNG HWA CHOI, Na Young Yi, Hye-Ja Chang and Tong-Kyung K. Yum, Yonsei University, Seoul, South Korea

Efficacy of Electrolyzed Oxidizing Water against Listeria monocytogenes and Morganella morgani Biofilms — USAN MCCARTHY, Aladar Bencsath and Deborah Johnson, FDA-Gulf Coast Seafood Laboratory, Dauphin Island, AL, USA

Assessment of Microbial Contamination Levels of Street-Vended Foods in Incheon and Daegu, Korea — Soon-Han Kim, Seung-Hwan Kim, EUN-JUNG CHANG, Jee-Yoon Shim, Sookyul Cho, Joon-Il Cho, Chi-Yeun Cheung, Sun-mi Lee, In-Sun Hwang, Kyu-Heon Kim, Jong-Mi Lim and Ok-Hee Kim, Korean Food and Drug Administration (KFDA), Dalseogu, Deagu, Korea

Evaluation of the Effectiveness of Prerequisite Programs and HACCP in Small Size Food Service Establishments in Birmingham, United Kingdom — Madeleine Smith and NANCY ACOSTA, University of Birmingham, School of Chemical Engineering, Birmingham, UK

Monitoring of Hand Sanitation of Employees in Public Restaurants, and Evaluation of Hand Washing Methods to Reduce Bacterial Populations on Their Hands — HYO-WON LEE, Kyeoungyeol Kim, Yohan Yoon and Duck-Hwa Chung, Gyeongsang National University, Jinju, Gyeongnam, South Korea

Analysis of School Foodservice Dietitians' Perception of Barriers to HACCP Implementation and Food Sanitation/Safety Management Performance in South Korea — Na Young Yi, Jung Hwa Choi, HYE-JA CHANG and Tong-Kyung K. Yum, Dankook University, Jukjeondong, Suji-gu, Yongin-si, Gyeonggi-do, 448-701, South Korea

Evaluation of Sanitation Practices in South Korean School Food Service Facilities — YOHAN YOON, Hyo-Won Lee, Eunkyong Seo and Duck-Hwa Chung, Gyeongsang National University, Jinju, Gyeongnam, South Korea

A Novel Kitchen Disinfectant Effective against Norovirus — FUMIHITO INAGETA, Kumiko Ikarashi, Shiori Sugawara, Erika Sobe, Naoko Morii, Yukifumi Konagaya, Hiroshi Kibuse and Hiroshi Urakami, JohnsonDiversery Japan, Yokohama, Kanagawa, Japan

JULY 2008 | FOOD PROTECTION TRENDS 509
Efficacy of Aerosolized Sanitizers on the Inhibition of Bacterial Biofilms — Seung-Youb Baek, Se-Wook Oh, Young-Ho Kim and SUN-YOUNG LEE, Chung-Ang University, Anseong-si, Gyeonggi-do, Korea

Monday Afternoon
August 4

Symposia • 1:30 p.m. – 5:00 p.m.

S4 Bacterial Physiology — A Forgotten Theme That is Critical for the Food Microbiologist
Delaware A-D
Sponsored by ILSI North America Technical Committee on Food Microbiology
Organizer: ILSI North America
Convenors: Laurie S. Post and Martin Wiedmann
1:30 Genomics Meets Physiology: What Have Genomics Taught Us about the Effects of Growth Phase and Stress Exposure on Bacterial Physiology? — CHARLES W. KASPAR, University of Wisconsin-Madison, Madison, WI, USA
2:00 Effects of Growth Phases, Temperature and Stress Exposure on Foodborne Pathogen Virulence: The L. monocytogenes Example — KATHRYN J. BOOR, Cornell University, Dept. of Food Science, Ithaca, NY, USA
2:30 Effects of Growth Phases, Temperature and Stress Exposure on Foodborne Pathogen Survival and Stress Resistance: The Salmonella Example — ROY P. BETTS, Campden & Chorleywood Food Research Association, Chipping Campden, Gloucestershire, UK
3:00 Break
3:30 Effects of Stress Exposure on Foodborne Pathogen Physiology: The E. coli Example — TERESA M. BERGHOLZ, Cornell University, Dept. of Food Science, Ithaca, NY, USA
4:00 How the Physiological State of the Challenge Inoculum Affects Validation Study Outcomes — LARRY R. BEUCHAT, University of Georgia, Center for Food Safety, Griffin, GA, USA
4:30 Development and Validation of Detection Methods — How Does the Physiology of the Target Cell Affect Assay Sensitivity? — MARTIN WIEDMANN, Cornell University, Dept. of Food Science, Ithaca, NY, USA

S6 New and Innovative Ways to Derive Risk-Based Management Options
Union D-E
Organizers: Fumiko Kasuga and Ewen Todd
Convenors: Leon Gorris and Fumiko Kasuga
1:30 Regulatory Perspectives to Derive Risk Management Options — RICHARD WHITING, FDA-CFSAN, College Park, MD, USA
1:50 Setting Industrial Process Parameters on the Basis of Risk-Based Metrics — JEANNE-MARIE MEBRE, Unilever—Safety and Environmental Assurance Centre, Sharnbrook, Bedford, UK
2:10 Green Field Risk-Based Approach to Managing Clostridium botulinum — MARTIN COLE, National Center for Food Safety and Technology, Illinois Institute of Technology, Summit-Argo, IL, USA
2:30 Scenario Analyses in Supporting Management of Listeria in Ready-to-Eat Meat — TOM ROSS, University of Tasmania, School of Agricultural Science, Hobart, Tasmania, Australia

S7 Food Safety Issues in Food Transportation — Keeping It Cold and Keeping It Clean
Franklin D
Sponsored by the IAFP Foundation
Organizers: Veny Gapud, Ronald H. Schmidt, Amy Simonne and Philip Wolff
Convenors: Veny Gapud and Ronald H. Schmidt
1:30 What Do We Expect from Our Distributors? — VENY GAPUD, Popeyes Chicken and Biscuits, Atlanta, GA, USA
2:00 RFID: New Applications in the Food Industry — JEAN-PIERRE EMOND, University of Florida, Gainesville, FL, USA
2:30 Food Safety Challenges in the Distribution — JORGE A. HERNANDEZ, US Foodservice, Rosemont, IL, USA
3:00 Break
ROUNDTABLE • 1:30 p.m. – 3:00 p.m.

RT2 Occurrence and Control of Norovirus: Is Public Vomiting Public Enemy #1?
Organizers: Doris D’Souza, Charles Gerba, Kali Kniel, Melvin Kramer and Suresh Pillai
Convenors: Doris D’Souza, Kali Kniel and Charles Gerba

1:30 Recommendations and Questions of Clean-up and Liability of Noroviruses — MELVIN KRAMER, EHA Consulting Group, Inc., Baltimore, MD, USA

1:45 Influence on Genotypes on Emerging and Increasing Norovirus Virulence and Infectivity — JAN VINJE, CDC, Atlanta, GA, USA

2:00 Update on Norovirus Outbreaks in Europe and Calicinet — DAVID BROWN, Health Protection Agency Colindale, London, UK

2:15 Perspectives on Battling and Combating Norovirus Infections — HAL KING, Chick-fil-A Restaurants, Atlanta, GA, USA

2:30 Roundtable Discussion on Survival and Control of Noroviruses on Fomites — CHARLES GERBA, Tucson, AZ, USA

2:45 Roundtable Discussion

ROUNDTABLE • 3:30 p.m. – 5:00 p.m.

RT3 Does Internalization of Pathogens Occur in Fresh Produce during Commercial Production and Processing?
Organizers: Pascal DeLaquis and Linda Harris
Convenors: Pascal DeLaquis and Linda Harris

3:30 To be determined — KARL MATTHEWS, Rutgers University, New Brunswick, NJ, USA

3:45 To be determined — KEITH WARRINER, University of Guelph, Guelph, ON, Canada

4:00 To be determined — JOSEPH FRANK, University of Georgia, Athens, GA, USA

4:15 To be determined — LARRY BEUCHAT, University of Georgia, Griffin, GA, USA

4:30 Roundtable Discussion

TECHNICALS • 1:30 p.m. – 5:00 p.m.

T3 Toxicology, Seafood and Meat and Poultry Technical Session
Fairfield
Convenors: To be determined

T3-01 Development of Best Management Practices
1:30 to Reduce the Likelihood of Soybeans

DSC Accumulating High Levels of Cadmium — LINDSAY ARTHUR, Beverley Hale, Debbie Chan and Edward Berkelaar, Ontario Ministry of Agriculture, Guelph, ON, Canada

T3-02 Analysis of the Mycotoxin Zearalene and Masked
1:45 Mycotoxins α- and β-Zearalenol Glucoside

DSC in Wheat Samples, Using a New LC-UV/MS Method — JAMES, J. SASANYA, C. Hall and C. W. Hall, Great Plains Institute of Food Safety, North Dakota State University, Fargo, ND, USA

T3-03 Decrease in the Mercury Concentration in Bluefin
2:00 Tuna by Breeding Fishes with Low Mercury Levels — MASASHI ANDO, Masashi Nakao, Manabu Seoka, Masahiro Nakatani, Tokihiko Okada, Yasuyuki Tsukamura and Ken-ichi Kawasaki, Kinki University, Nara, Japan

T3-04 A Comparative Study for the Detection of
2:15 Histamine-Producing Bacteria in Fish by Culture, Potentiometric and Molecular-Based Methods — KRISTIN BJORNSDOTTIR, Greg Bolton and David P. Green, North Carolina State University, Morehead City, NC, USA

T3-05 Effect of Cooling and Temperatures on Quality and Safety of Quahog Clams (Mercenaria mercenaria) — GEORGE FLICK, Robert Croonenberghs, Michael Peirson, Dianne Wall-Bourne and Linda Ankenman Granata, Virginia Tech, Blacksburg, VA, USA

T3-06 Changes in the Levels of V. parahaemolyticus and V. vulnificus during Commercial Harvesting of Gulf Coast Oysters — STEPHENIE DRAKE, Brooke Whitney, Miguel Gutierrez, Amrish Chawla, Richelle Beverly, Marlene Janes, Jon Bell, John Supan, Jay Levine and Lee-Ann Jaykus, North Carolina State University, Raleigh, NC, USA

3:00 Break

T3-07 Molecular Characterization of Antibiotic-Resistant Salmonella Typhimurium and Salmonella
3:30

DSC Kentucky Recovered from Pre- and Post-Chill Whole Broiler Carcasses — TAGELSIR MOHAMED, Salina Parveen, David White, Shaohua Zhao, Sharon Friedmann and Karen Blickenstaff, University of Maryland Eastern Shore, Princess Anne, MD, USA

T3-08 Validation of Intervention Strategies to Control
3:45 Escherichia coli O157:H7 and Salmonella Typhimurium DT 104 in Moisture-Enhanced Beef — ALEJANDRO ECHEVERRY, J. Chance Brooks and Mindy M. Brashears, Texas Tech University, Lubbock, TX, USA
Validation of Commercial Thermal Process for Control of Escherichia coli O157:H7 and Salmonella spp. in Chopped and Formed Beef Jerky — NIGEL HARPER, Kelly J. K. Getty and Elizabeth A. E. Boyle, Kansas State University, Manhattan, KS, USA


On-Line Brush and Spray Washers to Lower Numbers of Campylobacter and Escherichia coli and Presence of Salmonella on Broiler Carcasses during Processing — MARK E. BERRANG and J. Stan Bailey, USDA-ARS, Athens, GA, USA

Multiplication of Salmonella Enteritidis on Egg Yolk Membranes and Penetration into Yolk Contents — RICHARD K. GAST, Rupa Guraya, Jean Guard-Bouldin and Peter S. Holt, USDA-ARS, Athens, GA, USA

The Effect of Juice Temperature on Clostridium botulinum Type A Toxin Activity during the Hot-Filling of Juice Bottles — FRAN DOERR, G.E. Skinner, K. Reineke, G. Fleischman and J.W. Larkin, National Center for Food Safety and Technology/Illinois Institute of Technology, Summit-Argo, IL, USA

Inactivation of Listeria innocua in Apple and Carrot Juices by High Pressure Homogenization and Nisin — PANCHALEE PATHANIBUL, T. Matthew Taylor, P. Michael Davidson and Federico Harte, University of Tennessee, Knoxville, TN, USA

Inactivation of Escherichia coli K-12 in Apple Juice and Apple Cider Using High Pressure Homogenization and Chitosan — SAURABH KUMAR, Federico Harte, P. Michael Davidson, Svetlana Zivanovic, Jeyamkondan Subbiah and Harshvardhan Thippareddi, University of Nebraska-Lincoln, Lincoln, NE, USA


Subclinical Mastitis in Dairy Ewes as a Source of Contamination for Bulk Milk and Cheese — VANESSA M. RALHA, Carlos C. Belo, Manuela E. Pintado and F. Xavier Malcata, Escola Superior de Biotecnologia — Universidade Católica Portuguesa, Porto, Portugal

Culture-Dependent and Independent Methods to Monitor the Evolution of Lactic Acid Bacterial Microflora in a Greek PDO Soft Cheese — Dafni-Maria Kagkli, Vassilios Iliopoulos and GEORGE-JOHN E. NYCHAS, Agricultural University of Athens, Athens, Attica, Greece

Bacterial Dynamics in Model (Sterile) Portuguese Traditional Cheeses: A Case Study of Food Safety — CLAUDIA I. PEREIRA, Ana M. P. Gomes and F. Xavier Malcata, Escola Superior de Biotecnologia — Universidade Católica Portuguesa, Porto, Portugal

Isolation, Identification, Virulence Tests and Determination of Pathotypes of Escherichia coli Isolated from Ricotta Cheese Commercialized in Campinas, São Paulo — Rosimary Turri, Maria-Magali Soares, SILVANA SREBERNICH, Patricia Jacob and Cristiane Soares, Pontificia Universidade Católica de Campinas, Campinas, São Paulo, Brazil

Meat and Poultry, Microbial Food Spoilage, Beverage and Dairy Poster Session

Exhibit Hall
2:00 p.m. – 6:00 p.m.
Authors present 3:00 p.m.–5:00 p.m.
Convenors: To be determined

Genetic Diversity of Alicyclobacillus acidoterrestris and the Correlation with Their Spoilage Ability — KOHEI MATSUMOTO, Yuko Tanaka and Keiichi Goto, Food Research Laboratories, Mitsui Norin Co., Ltd., Fujieda, Shizuoka, Japan

Survey of Yeast and Mold Found in Food Bought at Retail — FRANK R. BURNS, Lois Fleck, and Kimberley Austin, DuPont Qualicon, Philadelphia, PA, USA

Production of Shelf-Stable Ranch Dressing with Elevated pH Using Ultra-High Pressure — JOSEPH M. JONES, Joy G. Waite, Evan J. Turek, C. Patrick Dunne and Ahmed E. Yousef, The Ohio State University, Columbus, OH, USA

Investigation for Possible Sources of Contamination of Spoilage Microflora Associated with “Blown-Pack” Spoilage of Ground Beef Chubs — BALASUBRAHMANYAM KOTTAPALLI, Jarret D. Stopforth, Rico Suhalim and Mansour Samadpour, Institute for Environmental Health, Lake Forest Park, WA, USA

Microbial Quality of Beverages Sold by Fast Food Restaurants and Convenience Stores in Griffin, Georgia and Surrounding Areas — YOEN JU PARK and Jinru Chen, University of Georgia, Griffin, GA, USA

Withdawn
Efficacy of Chlorine Dioxide against Listeria monocytogenes in Brine Solutions — WLADIR VALDERRAMA, Edward W. Mills and Catherine N. Cutter, Pennsylvania State University, University Park, PA, USA

Evaluation of Spraying a Lactic Acid-Based Antimicrobial Product on the Reduction of Salmonella on Broiler Chickens — MANUEL V. ALVARADO, A. Laury, C. Z. Alvarado and M. M. Brashears, Texas Tech University, Lubbock, TX, USA

Evaluation of the Reduction of Escherichia coli O157:H7 and Salmonella spp. by Spraying a Lactic Acid-Based Antimicrobial Product on USDA Select Beef Tips — ANGELA LAURY, Manuel Alvarado, Gary Nace, Chance Brooks and Mindy Brashears, Texas Tech University, Lubbock, TX, USA

HACCAP Validation for Use of Lactic Acid on Bologna, Ham, and Red Hot Ready-to-Eat Meat and Poultry Products — OMAIMA AHMED, Tom White and F. Ann Draughon, Food Science and Technology, The University of Tennessee, Knoxville, TN, USA

Survival of Campylobacter jejuni on Sterile and Naturally Contaminated Vacuum-Packed Beef and Pork at Refrigerated Temperatures — BALA SAMPATHKUMAR and Frances M. Nattress, Agriculture and Agri-Food Canada, Lacombe, AB, Canada

Effectiveness of Non-Thermal Atmospheric Plasma on Reducing Foodborne Pathogens on Raw Poultry — BRIAN P. DIRKS, Danil Dobrynin, Alexander Gutsol, Yurii Mukhin, Alexander Fridman and Jennifer J. Quinlan, Drexel University, Philadelphia, PA, USA

Validation of Ground-and-Formed Beef Jerky Processing Lethality with Commercial Lactic Acid Bacteria Starter Cultures — ALENA G. BOROWSKI, Steven C. Ingham and Barbara H. Ingham, University of Wisconsin-Madison, Madison, WI, USA

Validation of Intervention Strategies to Control Escherichia coli O157:H7 and Salmonella Typhimurium DT 104 in Injected Beef at the Retail Level — ALEJANDRO ECHEVERRY, J. Chance Brooks and Mindy M. Brashears, Texas Tech University, Lubbock, TX, USA

Effect of Substrate on Attachment and Subsequent Fate of Escherichia coli O157:H7 on Meat-Contact Surfaces — CATHERINE A. SIMPSON, Dimitra Dourou, Yohan Yoon, Keith E. Belk, John A. Scanga, Gary Smith and John N. Sofos, Colorado State University, Fort Collins, CO, USA

Effect of Temperature, Shear and Substrate on Attachment and Biofilm Formation by Escherichia coli O157:H7 on Various Food-Contact Surfaces Encountered in Beef Processing — DIMITRA DOouro, Catherine A. Simpson, Yohan Yoon, Keith E. Belk, John A. Scanga, Gary C. Smith, Konstantinos Koutsoumanis, George-John E. Nychas and John N. Sofos, Colorado State University, Fort Collins, CO, USA

Inactivation of Escherichia coli O157:H7 on Raw and Frozen Ground Beef by High Pressure Processing — Elaine P. Black, KIRSTEN A. HIRNEISEN, Dallas G. Hoover and Kalmia E. Kniel, University of Delaware, 044 Townsend Hall, Newark, DE 19711, USA

Antilisterial Activities of Salad Dressings without or with Prior Microwave Oven Heating on Frankfurters during Simulated Home Storage — CANGLIANG SHEN, Ifigenia Geornaras, Patricia A. Kendall and John N. Sofos, Colorado State University, Fort Collins, CO, USA

Viability of Listeria monocytogenes in Artificially Inoculated Turkey Breast Roll Treated with Lauric Arginate and High Hydrostatic Pressure and Stored at 4°C — DEVIN K. DUTILLY, David Manu, Stephanie Jung, Byron Brehm-Stecher and Aubrey Mendonca, Iowa State University, Ames, IA, USA

Controlling Listeria monocytogenes in Ready-to-Eat Cooked Meats with Lactate or High Pressure Processing — J. DAVID LEGAN, Abdullatif Tay, Dennis L. Seman, Adam C. Borger and Evan J. Turek, Kraft Foods, Glenview, IL, USA

Detection and Identification of Listeria spp. at Different Processing Stages of Ready-to-Eat Meat Products Sold in Trinidad — STACEY-MARIE SYNE, Adesh Ramsubhag and Abiodun Adeyiun, The University of the West Indies, La Romain, Trinidad

Growth and Survival of Listeria monocytogenes in German Sausage — MICHLINE BRICE and Clytrice Austin-Watson, Delaware State University, Dover, DE USA

Effects of Sodium Lactate, Sodium Citrate, and Sodium Diacetate on Microbiological Quality and Inhibition of Listeria monocytogenes in Ready-to-Eat Hams — KEARALINE A. POVEY, DENNIS E. BURSON, Harshavardhan Thippareddi and Roger W. Mandigo, University of Nebraska, Lincoln, NE, USA

Effect of Fat Content on Survival of Listeria monocytogenes during Simulated Digestion of Inoculated Beef Frankfurters Stored at 7°C — IOANNA M. BARMPALIA-DAVIS, Ifigenia Geornaras, Patricia A. Kendall and John N. Sofos, Colorado State University, Fort Collins, CO, USA

Effectiveness of Bacteriophage to Control the Outgrowth of Listeria monocytogenes on the Surface of Frankfurters — JEFFREY E. CALL, Anna Porto-Fett and JOHN B. LUCHANSKY, USDA-ERRC, Wyndmoor, PA, USA

Cytotoxicity and Genotypic Characterization of Campylobacter jejuni Isolated from Poultry Products — VANIJA KALLUR and LEONARD L. WILLAMs, Alabama A&M University, Normal, AL, USA

Effects of Heat Treatment and Freezing Stress on Survival of Arcobacter butzleri Isolated from Chicken — Min Hwa Lee, Kang-Bum Lee and CHANGSUN CHOI, Chung-Ang University, Ansung, Kyounggi, South Korea
Growth of *Escherichia coli* O157:H7 and *Salmonella* Typhimurium during the Fermentation of Korean Kim-chi Supplemented with Pork Meat — Min Hwa Lee, Kang-Bum Lee and CHANGSUN CHOI, Chung-Ang University, Ansun, Kyounggi, South Korea

Processing Conditions Associated with *Salmonella* Contamination of Pork Carcasses in Very Small Wisconsin Slaughter Plants — RYAN J. ALGINO, Gene A. Badtram, Barbara H. Ingham and Steven C. Ingham, University of Wisconsin-Madison, Madison, WI, USA

Serotypes, Intimin Variants and Other Virulence Factors of *eae*-positive *Escherichia coli* Isolated from Pigs and Sheep at Slaughter — CLAUDIO ZWEIFEL, Erik Fröhlicher, Gladys Krause, Lothar Beutin and Roger Stephan, Institute for Food Safety and Hygiene, Vetsuisse Faculty University of Zurich, Zurich, Switzerland

*Campylobacter* Transmission Routes in Broiler Flocks on Selected Poultry Farms in Switzerland — CLAUDIO ZWEIFEL, Kathrin D. Scheu, Michaela Keel and Roger Stephan, Institute for Food Safety and Hygiene, Vetsuisse Faculty University of Zurich, Zurich, Switzerland

Effect of Ozone Concentration on Inactivation of *Salmonella enterica* Serovar Enteritidis in Shell Eggs by Sequential Application of Heat and Ozone — JENNIFER PERRY, Luis Rodriguez-Romo and Ahmed Yousef, The Ohio State University, Columbus, OH, USA


Occurrence of *Campylobacter* in Commercially Shelled Liquid Egg in Japan — MIKI SATO and Nobuhiro Sashihara, R&D Div. of Q. P. Corporation, Tokyo, Japan

**TUESDAY MORNING**
**AUGUST 5**

**SYMPOSIA • 8:30 a.m. – 12:00 p.m.**

S8 Validating Processes for Reducing *Salmonella* in Low Water Activity Foods Delaware A-D
Organizers: Linda J. Harris and Paul A. Hall
Convenors: Linda J. Harris and Paul A. Hall

8:30 *Salmonella* — Factors Affecting Resistance to Heat — LINDA J. HARRIS, University of California–Davis, Dept. of Food Science and Technology, Davis, CA, USA

9:00 Factors to Consider in Modeling Thermal Inactivation — BRADLEY P. MARKS, Michigan, State University, Biosystems Engineering, Davis, CA, USA

9:30 Surrogate Selection Strategy — GUANGWEI HUANG, Almond Board of California, Modesto, CA, USA

10:00 Break

10:30 Translating Laboratory Data to Equipment Validation — ERDAL TUNCAN, ConAgra Foods, Inc., Omaha, NE, USA

11:00 *Salmonella* — Factors Affecting Resistance to Non-Thermal Processes — JOHN W. LARKIN, Food and Drug Administration, Summit-Argo, IL, USA

11:30 Panel Discussion

S9 Advancements in Retail Food Safety Franklin A-C
Sponsored by the IAFP Foundation
Organizers: Donna Garren, Alejandro Mazzotta and Frank Yiannas
Convenor: Frank Yiannas

8:30 Supply Chain Collaboration: Efforts to Harmonize Supplier Standards and Audits — DONNA GARREN, National Restaurant Association, Washington, D.C., USA

9:00 Norovirus Control at Retail — KATIE SWANSON, Ecolab Inc., St. Paul, MN, USA
Getting the Most Out of Retail Inspections — ALEJANDRO MAZZOTTA, McDonald’s Corporation, Oak Brook, IL, USA

10:00 Break

10:30 Consumer Attitudes to Food Safety Events — The Retailers Role in Rebuilding Consumer Confidence — JOHN HANLIN, SUPERVALU, To be determined

11:00 Developments in Food Allergy Consumer Perspectives — ANNE MUNOZ-FURLONG, FAAN Founder, Fairfax, VA, USA

11:30 Panel Discussion

S10 From Fish to Table
Union D-E
Organizer: Kathleen Rajkowski
Convenors: Beilei Ge and Kathleen Rajkowski

8:30 Seafood: Balancing the Risks with the Benefits — CHARLES R. SANTERRE, Purdue University, Dept. of Foods and Nutrition, West Lafayette, IN, USA

9:00 To Cook or Not to Cook — DORIS T. HICKS, University of Delaware, College of Marine Studies, Lewes, DE, USA

9:30 Harvesting — Safety in the Filleting Industry — GEORGE J. FLICK, JR., Virginia Tech, Blacksburg, VA, USA

10:00 Break

10:30 Shipping — Temperature Abuse, Packaging, Etc. — PETER HIBBARD, Darden Restaurants Inc., Oviedo, FL, USA

11:00 Point of Sale (Retail) — GALE PRINCE, Retired-Director, Corporate Regulatory Affairs, Cincinnati, OH, USA

11:30 Safety in the Home — ANTHONY O. FLOOD, International Food Information Council, Washington, D.C., USA

S11 Best Practices in Global Food Export and Import
Franklin D
Organizers: Ewen Todd, Hudaa S. Neetoo and Ivan J. Nastasijevic
Convenors: Agnes G. Tan, Catherine A. Simpson and Hudaa S. Neetoo

8:30 Equivalence and International Comparison of Food Safety Systems — WHO Perspective — ROBERT L. BUCHANAN, DHHS/FDA/CFSAN, College Park, MD, USA

9:00 EU Food Import Management — WOLF MAIER, European Commission Delegation, Washington, D.C., USA

9:30 Multinational Companies and Import of Foodstuffs — Traceability and Sourcing — LEON G.M. GORRIS, Unilever, Sharnbrook, England

10:00 Break

10:30 International Food Export: Experience from Brazil — SUELY M.K. NAKASHIMA, Sadia Foods GmbH, Frankfurt, Hessen, Germany

11:00 Consumer Perception on Imported Foods — CAROLINE SMITH-DEWAAL, Center for Science in the Public Interest, Washington, D.C., USA

11:30 Global Food Trade Issues: Smuggling and Counterfeit — JOHN SPINK, Michigan State University, Okemos, MI, USA

ROUNDTABLE • 8:30 a.m. - 10:00 a.m.

RT4 Global Perspectives and Novel Approaches for Effective Food Safety Communication within Culturally Diverse Audiences
Union A-C
Sponsored by the IAFP Foundation
Organizers: Renee Boyer, Christine M. Bruhn, Benjamin Chapman and Tony Flood
Convenors: Renee Boyer and Benjamin Chapman

8:30 Challenges Associated with Delivering Effective Food Safety Education within Culturally Diverse Groups — VINCENT FASONE, Columbus Public Health, Columbus, OH, USA

8:45 Using Children to Collect Information and Convey Messages — DAVID MCCLEERY, Food Safety Promotion Board, Eastgate, Cork, Ireland

9:00 Using Cultural Perspectives to Enhance Food Safety Practices — PHILPPA ROSS-JAMES, New Zealand Food Safety Authority, Wellington, New Zealand

9:15 Reaching Consumers in an Asian Environment — HELEN YU, Asian Food Information Centre, Bangkok, Thailand

9:30 Roundtable Discussion

INTERACTIVE SESSION
8:30 a.m. - 5:00 p.m.

The Sequel to the Mystery Outbreak — What to Do When It Happens to You!
Morrow
Organizers: Sherry McGarry, Michael Roberson, Thilde Peterson and Greg Bear
Convenors: Sherry McGarry, Thilde Peterson, Ewen Todd, Christopher Griffith and Agnes G. Tan

Session 1: 8:30 a.m. - 10:00 a.m.
Session 2: 10:30 a.m. - 12:00 p.m.
Session 3: 1:30 p.m. - 3:00 p.m.
Session 4: 3:30 p.m. - 5:00 p.m.

TECHNICALS • 8:30 a.m. - 12:00 p.m.

T4 Risk Assessment and Produce Technical Session
Fairfield
Convenors: To be determined

T4-01 A Chain Modeling Approach to Estimate the Impact of Soil Cadmium Pollution on Human Dietary Exposure — EELCO FRANZ, Paul Römken and Irene van der Fels-Klerx, RIKILT — Institute of Food Safety, Wageningen University and Research Centre, Wageningen, The Netherlands
T4-02 Risk-Based Sampling for Foodborne Pathogens
8:45 — A Probabilistic Algorithm for *Escherichia coli* O157:H7 Sampling of the Federally Inspected Ground Beef Supply — Wayne Schlosser and JAMES WITHEE, USDA, Alameda, CA, USA

T4-03 Risk Assessment for Thermal Inactivation of
9:00 *Salmonella* spp. in Fresh Pork — Nga Tran, Leila Barraj, ARTHUR MILLER, Brian Eblen and Steve Larsen, Exponent, Inc., Bowie, MD, USA

T4-04 Evaluating the Safety of Eggs — Duncan Craig, Ben Daughtby and DEON MAHONEY, Food Standards Australia New Zealand, Canberra, Australia

T4-05 Predictive Modeling of *Listeria monocytogenes*
9:30 Reduction on Fully-Cooked Chicken Drums during Post-Process Hot Water Pasteurization — MIN LI, L. Cooney, A. Pradhan and Y. Li, University of Arkansas, Fayetteville, AR, USA

T4-06 Development of a Predictive Model for the
9:45 Growth of *Listeria monocytogenes* in Pasteurized Vanilla Cream and Validation under Dynamic Temperature Storage Conditions — Efstathios Z. Panagou, Niki Fasoulaki and GEORGE-JOHN E. NYCHAS, Agricultural University of Athens, Athens, Attica, Greece

10:00 Break

T4-07 Combined Effects of Sucrose Laurate Esters
10:30 and Pressure-Assisted Thermal Processing to Inactivate *Bacillus amyloliquefaciens* Spores Suspended in Mashed Carrots — SILVIA De Lamo-Castellvi, W. Ratphtagsanti, V.M. Balasubramaniam and A.E. Yousef, The Ohio State University, Columbus, OH, USA

T4-08 The Role of Nutrients and Biodiversity in
10:45 Controlling *Escherichia coli* O157:H7 in the Primary Production Chain of Lettuce — EELCO FRANZ, Alexander V. Semenov and Ariena H.C. van Bruggen, RIKILT — Institute of Food Safety, Wageningen University and Research Centre, Wageningen, The Netherlands

T4-09 Survival and Dispersal of Surrogate *Escherichia coli* under Lettuce Field Conditions: Effect of Irrigation — Michael Cahn, Elena de Castro, Carol D’lima, Steven Koike, Adrian Sbodio and TREVOR SUSLOW, University of California—Davis, Davis, CA, USA

T4-10 Growth of *Escherichia coli* O157:H7 on
11:15 Commercially Packaged Fresh-Cut Salads — YAGUANG LUO, James McEvoy, Qiang He, Lin Shen, Ivana Vico and William Conway, USDA-ARS, Beltsville, MD, USA

T4-11 Glo Germ as a Cross-Contamination Indicator during Processing of Leafy Greens — ANNEMARIE L. BUCHHOLZ, Zhinong Yan and Elliot T. Ryser, Michigan State University, East Lansing, MI, USA

T4-12 Evaluation of the Sensitivity and Specificity of Rapid Test Kits for Detection of Pathogenic *Escherichia coli* O157:H7 from Lettuce and Leafy Greens — CAROL D’LIMA, Elena de Castro and Trevor Suslow, University of California—Davis, Davis, CA, USA
P3-09 Comparison of Swiffer<sup>®</sup> Wipes and Conventional Drag Swab Methods in the Recovery of Salmonella from Swine Production Environment — BAYLEY EG MOLLA, Melanie J. Abley, Brandon House, W.E. Morgan Morrow, Rebecca Robbins and Wondwossen A. Gebreyes, The Ohio State University, Columbus, OH, USA


P3-11 Validation to EN ISO 16140 of a New Rapid Culture-Based Salmonella Detection Method — ALASTAIR THOMAS, James Stringer, Daniéle Sohier and Maryse Rannou, Thermo Fisher Scientific, Basingstoke, Hampshire, UK

P3-12 Comparison of Enrichment Media for Recovery of Escherichia coli O157:H7 from Meat and Environmental Samples — SARAH JOHNSON and John Luchansky, USDA-ARS, Athens, GA, USA

P3-13 Increased Levels of Lithium Chloride in Growth Media Eliminates the Growth of Enterococcus spp. during Recovery of Listeria spp. from Environmental Samples — Travis Steiner and LAWRENCE GOODRIDGE, Colorado State University, Fort Collins, CO, USA

P3-14 Comparison of Supplements to Enhance the Recovery of Thermally-Injured Salmonella from Liquid Egg White — JOSHUA B. GURTULER and Jeffrey L. Kornacki, USDA-ARS-ERRC, Wyndmoor, PA, USA


P3-16 Efficacy of a Chromogenic Plating Medium for Detecting Listeria Species from Environmental Samples — RICKARD SWIECH, Lawrence Restaino, Elen W. Frampton, William C. Lionberg and Anthony L. Restaino, R & F Laboratories, Downers Grove, IL, USA

P3-17 Recovery of Listeria monocytogenes from Pasteurized Liquid Egg Products — MARK PRAATT, Lorenza Rozier, Jr., Mary Niemann, John Jarosh, Pam Rappole, Warren Wong, Neelam Narang, Cathy Pentz, Victor Cook and Evelyne Mbandi, USDA-FSIS-OPHS-Midwestern Laboratory, St. Louis, MO, USA

P3-18 Comparison of Four Compact Dry Plate Methods against Standard (ISO) Methods for the Enumeration of Enterobacteriaceae, Coliforms and Escherichia coli in Foods during a MicroVal EN ISO 16140 Validation — CHRISTOPHER L. BAYLIS, Rebecca A. Green, Keith Jewell, Farinaz Monadjemi and Roy P. Betts, Campden and Chorleywood Food Research Association, Chipping Campden, Gloucestershire, UK

P3-19 Evaluation of ChromID sakazakii Medium (ESPM) for the Recovery of Enterobacter sakazakii from Several Food and Environmental Samples — JIM. ROCHE, I. Desforges, L. Restaino and F. Villeval, bioMérieux, Inc., Salins, France

P3-20 Suitability of Modified Eosin Methylene Blue Agar for Recovering Heat-Injured Escherichia coli O157:H7 and Salmonella Serovars from Cooked Meat Products — Kimberly G. Wiegand, ALENA G. BOROWSKI, Steven C. Ingham and Barbara H. Ingham, University of Wisconsin-Madison, Madison, WI, USA


P3-22 The Application of Immunomagnetic Separation in Combination with ALOA Listeria Chromogenic Agar for the Isolation and Identification of Listeria monocytogenes in a Variety of Foods — CARLOS G. LEON-VELARDE, Nathan Larson and Joseph A. Odumeru, Laboratory Services Division, Guelph, ON, Canada

P3-23 Addressing Potential Contaminants in Soil for the Study of Pathogenic Escherichia coli O157 and O8 Strains — ANDREA LAYCOCK, Manan Sharma and Kali Kriel, University of Delaware, Newark, DE, USA

P3-24 Comparison of Colony Lysis Procedures for Listeria monocytogenes PCR — JACQUELINE P. UPHAM, Allana N. Loder and Carmel R. Young, Canadian Food Inspection Agency, Dartmouth, NS, Canada

P3-25 A Highly Sensitive Real-Time PCR Assay for the Detection and Identification of Campylobacter jejuni from Retail Broiler Samples — LIN LIU and Omar A. Oyarzabal, Auburn University, Auburn, AL, USA

P3-26 Validation of a PCR-Based Protocol for the Rapid Detection of Salmonella from Environmental Surfaces — VIVIANA FINO, Jack Janes, Andrew D. Farnum, Shawn Gartside and Morgan Wallace, DuPont Qualicon, Wilmington, DE, USA

P3-27 Multiplex Ready-to-Use PCR Assays for the Detection of STEC and the Identification of EHEC — Sylvie Hailler-Soulier, Patrick Fach and Loïc Beutin, Genesystems, Centre d'affaires CICEA, Bruz, France


P3-29 MPN Determination of Salmonella Levels in Naturally-Contaminated Raw Almond Kernels with Two Sample Preparation Methods and Comparison of the Isolates Using Pulsed Field Gel Electrophoresis — ANIKA SINGLA and Linda J. Harris, University of California–Davis, Davis, CA, USA
P3-30 Detection of the Escherichia coli FLIC7 Gene with Real-Time PCR — NEELAM NARANG, Pina M. Fratamico, Glenn Tillman, Kitty Pupedis and William C. Cray, Jr., USDA-FSIS-OSEL, Athens, GA, USA

P3-31 Effective Procedures Independent of Serotype to Detect Shiga Toxin-Producing Escherichia coli and Surveillance on Beef — YUKIKO HARA-KUDO, Jun Nizuma, Ikuo Goto, Shinji Iizuka, Yoshifumi Kaji, Kazumasa Kamakura and Sosuke Suzuki, National Institute of Health Sciences, Tokyo, Japan

P3-32 Sensitive and Direct Detection of Salmonella enterica in Chicken Rinse by Combined Immunomagnetic Separation (IMS) and Quantitative Real-Time PCR (qPCR) with an Internal Amplification Control (IAC) — HARI PRAKASH DWIVEDI, R. Denike Smiley, Helen Rawsthorne and Lee-Ann Jaykus, North Carolina State University, Raleigh, NC, USA

P3-33 Modeling the Responses of Lactobacillus paracasei and Enterobacter aerogenes in a Gel Cassette System — Chrysoula C. Tassou, Eleni Langou, Eleftherios Saravanos, GEORGE-JOHN E. NYCHAS and Efstatios Z. Panagou, Agricultural University of Athens, Athens, Attica, Greece

P3-34 Highly Specific and Sensitive Detection of Escherichia coli O157:H7 with Real-Time PCR — LILY WONG, Paolo Vatta, Priya Balachandran, Robert Tebbs, Pius Brzoska, Craig Cummings, Manohar Furtado and Olga Petrauskene, Applied Biosystems, Foster City, CA, USA


P3-37 Withdrawn

P3-38 Comparison of Detection Methods and Their Sensitivity in Identifying and Quantifying Escherichia coli O157 Isolated from Beef Carcasses and Hides — CORRI L. REKOW, M. F. Miller, J. C. Brooks, G. H. Loneragan and M. M. Brashears, Texas Tech University, Lubbock, TX, USA

P3-39 Comparative Evaluation of Three Selective Media and Automated ELISA Method for Detection of Campylobacter jejuni in Ground Beef — JEONG-HWAN CHEON, Ji-Yeon Hyeon, Kwang-Young Song, Jong-Seok Park, Seok Heo and Kun-Ho Seo, Konkuk University, Seoul, Korea

P3-40 The Use of Feline Calicivirus as an Internal Control for the Detection of Hepatitis A Virus with the Pathatrix System VANESSA McINTON, Michelle Driscoll, Kirsten Mattison, Sabah Bidawid and Jeff Farber, Health Canada, Ottawa, ON, Canada

P3-41 Inclusivity of Three Immunomagnetic Beads for Forty Strains of E. coli O157 — K. J. Yoshitomi, S. D. Weagant, C. N. Wendakoon, C. Carrillo, K. C. Jinneman, R. Zapata, P. Browning and WILLIS M. FEDIO, New Mexico State University, Las Cruces, NM, USA

P3-42 Development of Immunochromatography Test Strip Containing Monoclonal Antibody for Rapid Detection of Ochratoxin A in White Rice — Ju-Mi Choe, WON-BO SHIM, Yohan Yoon and Duck-Haw Chung, Gyeongsang National University, Division of Applied Life Science, Jinju, Gyeongsangnam 660-701, South Korea

P3-43 An Independent Comparative Evaluation of the TEMPO® EB for the Enumeration of Enterobacteriaceae in Foods — ERIN CROWLEY, Patrick Bird, Meghan McDonough, James Agin and David Goins, Q Laboratories, Inc., Cincinnati, OH, USA

P3-44 A Comparison of the bioMérieux TEMPO® EC Method to the Petrifilm™ Escherichia coli-Coliform Count Plate Method (MFHPB-34) for the Enumeration of Escherichia coli from Food Products — José Riva, Joséou Houle, Karine Seyer, STÉPHANIE BONNEAU and Bérengère Genest, bioMérieux Canada Inc., St-Laurent, QC, Canada

P3-45 Performances of the TEMPO® STA Method in Comparison with Conventional Plate Count Method for Enumeration of Staphylococcus aureus in Food Samples — AURELIEN COSTA, Frederic Derepas, Christophe Meunier, Sophie Cagnes, Christine Vivier, Sonia Chatellier and Raffaella Giardino, bioMérieux, Inc., La Balme les Grottes, France

P3-46 Evaluation of a New Automated Lactic Acid Bacteria Method for Enumeration in Food Products Using the TEMPO® System — GREGORY DEVULDER, Cedim Iiter and Audrey Maingue, bioMérieux SA, Marcy-l’Etoile, France

P3-47 Evaluation of a New Method for the Enumeration of Enterobacteriaceae in Foods — JUDITH COLON-REVELES, John Mills, Darla Pyse, Linette Beiner, Mary Beth Anheuser, Ronald Johnson and Gregory Devulder, bioMérieux, Inc., Hazelwood, MO, USA

P3-48 Evaluation of a New Method for the Enumeration of Coïliforms in Foods JOHN MILLS, Judith Colón-Reveles, Darla Pyse, Linette Beiner, Ronald Johnson and Gregory Devulder, bioMérieux, Inc., Hazelwood, MO, USA

P3-49 Binding Characterization of Listeria Adhesion Protein from Different Listeria Species to Its Eukaryotic Receptor Hsp60 with a Surface Plasmon Resonance Biosensor — BALAMURUGAN JAGADEESAN and Arun K. Bhunia, Purdue University, West Lafayette, IN, USA
P3-50 Chromatographic Method for Monitoring of Patulin in Fruit Juices Produced in South Korea — EUNKYOUNG SEO, Kyeongyeol Kim, Hyo-Won Lee and Duck-Hwa Chung, Gyeongsang National University, Jinju, Gyeongsangnam, South Korea

P3-51 Advantages of Bacteriophage in Conventional Selective Agars for the Isolation of Salmonella — VERAPAZ GONZALEZ, Meredith Sutzko, Mark Muldoon and Michael Brown, Strategic Diagnostics Inc., Newark, DE, USA

P3-52 Impact of Growth Phase, Chemicals and Food Matrices on Bacterial Differentiation Using FTIR Spectroscopy — VERA PETROVA, Catherine Donnelly, Giuseppe Petrucci and Kenneth Puzey, University of Vermont, Burlington, VT, USA

P3-53 Insight into Asian and Hispanic Restaurant Managers’ Needs for Safe Food Handling — OMAR NIODE and Christine Bruhn, University of California—Davis, Davis, CA, USA

P3-54 Promoting Science-Based Home Food Preservation Learning for Adult Consumers through the Use of Online Educational Tools — ELIZABETH ANDRESS, Elaine D’Sa, James Hansen, Judy Harrison and Mark Harrison, The University of Georgia, Athens, GA, USA

P3-55 When Do Dieticians and Nurses Provide Food Safety Information to High Risk Populations? — JANET BUFFER, Lydia Medeiros, Wei Yuan, Pat Kendall and John Sofos, The Ohio State University, Columbus, OH, USA

P3-56 Food Safety Practices and Educational Needs of Dietary Managers in Nursing Care Facilities — PATRICIA KENDALL, Lydia Medeiros, Mary Schroeder, Wei Yuan and John Sofos, Colorado State University, Fort Collins, CO, USA

P3-57 Preparation and Storage of Reconstituted Powdered Milk Formula: Caregiver Perspectives — ELIZABETH C. REDMOND and Christopher Griffith, University of Wales Institute, Cardiff, Food Research and Consultancy Unit, Western Ave., Cardiff, South Glamorgan CF52YB, Wales, UK

P3-58 Characterization of Food Safety Knowledge and Behaviors of Adolescents — ASHLEY PEDIGO, Jennifer Richards, Arnold Saxton and Ann Draughon, University of Tennessee, Knoxville, TN, USA

P3-59 Food Safety Labels and Education for Meals-on-Wheels Participants — JULIE A. ALBRECHT and Sarah E. Purcell, University of Nebraska-Lincoln, Lincoln, NE, USA

P3-60 Successful Listeriosis Prevention Continuing Education Seminars for Health Professionals Working with Pregnant Women — MARY SCHROEDER, Patricia Kendall and John Sofos, Colorado State University, Fort Collins, CO, USA

P3-61 An Evaluation of the Technical Development Programs and Training Needs of Food Manufacturers — DAVID LLOYD, Helen Taylor and John Sweeting, University of Wales Institute, Cardiff, Cardiff, Wales, UK

P3-62 A Pilot Study of the Conference for Food Protection’s Proposed Model for Training and Standardizing Food Safety Inspection Officers in Retail Food Regulatory Agencies — DAVID MCSWANE and John Marcello, Indiana University, Indianapolis, IN, USA

P3-63 Analyzing the Social Costs of Food Safety — MEEBOK KIM and Neal Hooker, The Ohio State University, Columbus, OH, USA

P3-64 A Socio-Psychological Model Applied to the Implementation of Food Safety Management Systems — BRITA BALL, Anne Wilcock and May Aung, University of Guelph, Guelph, ON, Canada

P3-65 Determining The Level of Compliance with Legal Traceability Requirements — GORDON HAYBURN and Andrew Clarke, The Tetley Group Limited, Greenford, Middlesex, UK

P3-66 Risk Communication and the Lessons Learned from the 2007 Melamine Associated Outbreak: Potential Food Safety Benefits — STELLA OPENDI SASANYA, Margaret Khaita and Robert Littlfield, North Dakota State University, Fargo, ND, USA

P3-67 Good Agricultural Practices Online Produce Safety Course — ELIZABETH A. BIHN and Robert B. Gravani, Cornell University, Geneva, NY, USA

P3-68 An International Comparison of Food Safety Programs in the Fresh Produce Industry — ALBERT F. CHAMBERS and Sally Rutherford, Monachus Consulting, Ottawa, ON, Canada

P3-69 Evidence for Implicating Food Vehicles in Outbreaks, 1998–2006 — HEENA B. JOSHI, Tracy Ayers, Mike Lynch and Ian Williams, CDC, Atlanta, GA, USA

P3-70 Epidemiology of Seafood-Associated Outbreaks in the United States, 1973–2006 — TRACY AYERS, Martha Iwamoto, David Swerdlow and Ian Williams, CDC, Atlanta, GA, USA

P3-71 Food Commodities Associated with Salmonella Outbreaks, 1998–2006 — TRACY AYERS, Mike Lynch and Ian Williams, CDC, Atlanta, GA, USA

P3-72 Enteric Disease Outbreaks Associated with Fairs and Festivals, 1998–2006 — STEPHANI GRAY, Tracy Ayers, Jonathan Yoder, Robert Tauxe and Michael Lynch, CDC, Atlanta, GA, USA

P3-73 Contributing Factors Identified in Outbreaks from CDC’s National Electronic Foodborne Outbreak Reporting System, FoodNet Sites, 2006 — IDA ROSENBLUM, Alicia Cronquist, Quyen Phan, Kirsten Larson, David Nicholas, Patrick McCarthy, Mary Patrick and Timothy F. Jones, CDC, Atlanta, GA, USA

P3-74 Invasive Salmonella Infections in the United States, 1996–2006 — KELLY JACKSON, M. Iwamoto and D. Swerdlow, CDC, Atlanta, GA, USA
P3-75 Estimation of the Burden of Diarrheal Diseases in Miyagi Prefecture, Japan, 2005-2006 — KUNIHIRO KUBOTA, Emiko Iwasaki, Shunichi Inagaki, Tomomi Nokubo, Yoshinari Sakurai, Mayumi Komatsu, Koshi Abe, Masanori Kumagai, Miyako Oguro, Hajime Toyofuku, Fumico Kasuga, Frederick J. Angulo, Elaine Scallan and Kaoru Morikawa, National Institute of Health Sciences, Tokyo, Japan

P3-76 Assessing Food Safety Trends in Mexican Food — WENDY FRANCO, Kimberly M. Evans and Amarat Simonne, University of Florida, Gainesville, FL, USA

P3-77 Microbiological Quality of Eggs in Six States of Mexico — C. Aguilar, B. L. Álvarez-Mayorga, J. Castro-Rosas, T. S. Cid-Pérez, S. Garcia, N. Heredia, MONTSERRAT H. ITURRIAGA, M. E. Hernández, G.V. Nevarez-Moorilón, F. Tejeda-Trujillo and J. M. Ventura-Sobrevilla, Universidad Autonoma de Queretaro, Querétaro, Mexico


IAFP Business Meeting • 12:15 p.m. – 1:00 p.m.
Union A-C

• Welcome and Introduction
  Stan Bailey, President-Elect

• Moment of Silence
  Gary Acuff, President

• Call to Order
  Gary Acuff, President

• Minutes of the 2007 Business Meeting
  Gary Acuff, President

• President’s Report
  Gary Acuff, President

• Report of Committees
  Tellers, Mindy Brashears
  JFP Management, Mark Harrison
  FPT Management, Jinru Chen
  Foundation, Gale Prince

• Report of the Affiliate Council
  Carl Custer, Affiliate Council Chairperson

• Report of the Executive Director
  David Tharp, Executive Director

• Unfinished Business

• New Business

• Adjournment
  Gary Acuff, President

SYMPOSIA • 1:30 p.m. – 5:00 p.m.

S12 Back to the Future: How Clinical Microbiology Findings Today Predict the Food Microbiology Headaches for Tomorrow
Delaware A-D
Sponsored by ILSI North America Technical Committee on Food Microbiology
Organizer: ILSI North America
Convenors: Marguerite A. Neill and Peter Gerner-Smith

1:30 Introduction — MARGUERITE A. NEILL, Brown Medical School and Memorial Hospital of Rhode Island, Pawtucket, RI, USA

1:35 E. coli O157:H7 and Other STEC: How We Came to Test Foods (and What Does This Tell Us)? — STEFANO MORABITO, Istituto Superiore di Sanita, Roma, Italy

2:05 The Hepatitis – Food Connection: A and E — GREGORY L. ARMSTRONG, CDC, Atlanta, GA, USA

2:35 Noroviruses: From Unknown Etiology to Major Pathogen in Our Food: Role of Better Diagnostics — JAN VINJE, CDC, Atlanta, GA, USA

3:05 Break

3:30 Is Inflammatory Bowel Disease an Infectious Disorder? — JAN-MICHAEL A. KLAPPROTH, Emory University, Atlanta, GA, USA

4:00 Clostridium difficile: The Lastest Bad Bug and Coming on Strong but from Where? — J. GLENN SONGER, The University of Arizona, Tucson, AZ, USA

4:30 Roundtable Discussion

S13 Pathogen Data Sharing to Advance Food Safety
Franklin A-C
Organizer: Mickey Parish
Convenor: Mickey Parish

1:30 How More Data Sharing Would Improve Public Health Efforts to Control and Prevent Disease — ROBERT TAUXE, CDC, Atlanta, GA, USA

1:45 Government Interagency Interactions and Food Law — CARL S. CUSTER, Retired-USDA FSIS OPHS MD MIB, Bethesda, MD, USA

2:00 BIFSCO: Beef Industry Collecting and Comparing Pathogen Data — TIMOTHY P. BIELA, Texas American Foodservice, Fort Worth, TX, USA

2:15 International Perspective on Data Sharing for Risk Assessments — LEON GORRIS, Unilever, SEAC, Shambrook, Bedford, UK

2:30 Pathogen Data Sharing Can Increase Economic Incentives for Food Safety — S. ANDREW STARBIRD, Santa Clara University, Santa Clara, CA, USA
Consumer Perspective on Sharing Pathogen Data with the Public — BARBARA KOWALCYK, Center for Foodborne Illness Research & Prevention, Grove City, PA, USA

S14 Food Safety and Regulatory Issues Associated with Non-Thermal Processing of Foods and Beverages
Union A-C
Sponsored by the IAEP Foundation
Organizers: Alejandro Castillo, Kathy Lawlor, Steve Murphy, Mangesh Palekar, Kathleen Rajkowski, Ron Schmidt and Jay Schuman
Convenors: Kathleen Rajkowski and Kathy Lawlor

Processing Using Food Irradiation — CHRISTOPHER SOMMERS, USDA-ARS-ERRC-FSITRU, Wyndmoor, PA, USA

Removal of Microorganisms — Microfiltration and Bactofugation — HEINRICH IVERSEN, Tetra Pak Inc., Vernon Hills, IL, USA

Pulsed Electric Field and Ohmic Processing — GUSTAVO BARBOSA-CANOVAS, Washington State University, Pullman, WA, USA

Break

High Pressure and High Pressure Carbon Dioxide Processing — MURAT O. BALABAN, University of Alaska Fairbanks, Fishery Industrial Technology Center, Kodiak, AK, USA

Consumer Acceptance of Alternative Technologies — CHRISTINE M. BRUHN, University of California-Davis, Davis, CA, USA

Regulatory Implications of Alternative Technologies (Panel Discussion) — JOHN W. LARKIN, National Center for Food Safety and Technology, FDA, Summit-Argo, IL, USA; VOLKER HEINZ, German Institute of Food Technologies (DIL e.V.), Quackenbruck, Germany; JEFFREY T. BARACH, GMA, Washington, D.C., USA; and DAVID R. JOY, Keller and Heckman, LLP, Washington, D.C., USA

S16 Spores in the Dairy Industry — A Growing Concern — What Can You Do?
Franklin D
Sponsored by the IAEP Foundation
Organizers: Dennis Bogart and David Blomquist
Convenor: John Bruhn

Impact of Spores and Current Issues in the Industry — RAY MCCOY, Dean Foods Corporation, Dallas, TX, USA

Current Research in North America — KATHRYN J. BOOR, Cornell University, Dept. of Food Science, Ithaca, NY, USA

Bacterial Spores in the Dairy Industry — What Can Be Done to Solve the Problem? — PER EINAR GRANUM, Norwegian School of Veterinary Science, Oslo, Norway

Break

Spores and Special Considerations in Cultured Products — KATHLEEN A. GLASS, University of Wisconsin, Food Research Institute, Madison, WI, USA

Accumulative Case Study of Dairy Plants’ Experiences with Heat Resistant Psychrotrophs — DARRELL BIGALKE, Quality Management Incorporated, Oakdale, MN, USA

What’s a Farm to Do? Dairy Farm Procedures to Address Spores — MARK WUSTENBERG, Bay City, OR, USA

Harmonization of Irrigation Water Practices
S15 Union D-E
Sponsored by the IAEP Foundation
Organizers: Dean C. Davidson and Peter Kennedy
Convenors: Dean C. Davidson and Peter Kennedy

Legislative Review of Recreational Water Standards for Irrigation Waters — MICHELLE A. SMITH, CFSAN, College Park, MD USA

Microbiological Quality of Irrigation Water: Separating Fantasies from Realities — SURESH D. PILLAI, Texas A&M University, College Station, TX, USA

Non-Microbial Threat Analysis of Irrigation Water — RITA SCHENY, US Environmental Protection Agency, Washington, D.C., USA

A National Review of Irrigation Water Practices — NORMAN FOGG, FDA, Division of Field Investigations, Rockville, MD, USA

Animal Agriculture: Potential Impacts on Irrigation Water Quality — JEANETTE THURSTON, USDA-ARS, Lincoln, NE, USA

Irrigation Water Case Studies: A Grower’s Perspective — BARRY A. EISENBURG, River Ranch Fresh Foods, Salinas, CA, USA

Irrigation Water Practices — NORMAN FOGG, FDA, Division of Field Investigations, Rockville, MD, USA

Animal Agriculture: Potential Impacts on Irrigation Water Quality — JEANETTE THURSTON, USDA-ARS, Lincoln, NE, USA

Irrigation Water Case Studies: A Grower’s Perspective — BARRY A. EISENBURG, River Ranch Fresh Foods, Salinas, CA, USA

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What’s a Farm to Do? Dairy Farm Procedures to Address Spores — MARK WUSTENBERG, Bay City, OR, USA

TECHNICALS • 1:30 p.m. – 5:00 p.m.

T5 Applied Laboratory Methods and Novel Laboratory Methods Technical Session
Fairfield
Convenors: To be determined

T5-01 Comparative Evaluation of Stomacher®, Pulsifier®, Bagmixer®, and Smasher® for Sample Preparations of Foods for Viable Cell Count and Coliform Counts — CESAR CABALLERO, E. Wenke, J. Saini, B.A. Crozier-Doson and D.Y.C Fung, Kansas State University, Manhattan, KS, USA

T5-02 Collaborative Study to Evaluate a Total Bacteria Count Assay Using Quantitative Real-Time PCR — THOMAS ROMICK and Rafael Marfil, Industrial Microbial Testing, Newport Coast, CA, USA
T5-03 Construction of an Internal Amplification Control by In Vitro Transcription for Salmonella Detection Using Real-Time RT-PCR — FAITH J. CRITZER and Doris H. D’Souza, University of Tennessee, Knoxville, TN, USA

T5-04 Eliminating Sample Preparation for Real-Time PCR Food Pathogen Detection — ROBERT TEBBS, Priya Balachandran, Ada Wong, Somaya Bit, Cristin O’Shea, Maura Barbisin, Jen-Kuei Liu, Olga Petruaskene and Manchur Furtado, Applied Biosystems, Foster City, CA, USA

T5-05 Evaluation of Fecal DNA Purification Methods and Conventional Culture Methods for the Detection of Escherichia coli O157:H7 in Feces of Naturally Infected Feedlot Cattle — EBOT TABE, Dawn Doetkott, James Oloya and Margaret Khaitis, North Dakota State University, Fargo, ND, USA

T5-06 Evaluation of an Automated ELISA and Real Time PCR by Comparing with Conventional Culture Method for the Detection of Listeria monocytogenes in Various Food Samples — SO-RI HAN, Ji-Yeon Hyeon, Kwang-Young Song, Hyo-Sun Kwak, In-Gyun Hwang and Kun-Ho Seo, Konkuk University, College of Veterinary Medicine, Seoul, Korea

T5-07 Evaluation of the Validity of Rapid Methods for the Detection of Listeria monocytogenes in Various Food Samples — JUNG-YOUN PARK, Ji-Yeon Hyeon, Kwang-Young Song, Jong-Seok Park, Seok Heo and Kun-Ho Seo, Konkuk University, Seoul, Korea

T5-08 Performance of Media for Recovery of Salmonella from Thermally-Treated Egg White — JOSHUA B. GURTLER, USDA-ARS-ERRC, Wyndmoor, PA, USA

T5-09 Establishment of ELISA-LC/MS/MS System to Detect Aflatoxin B1 in Agricultural Products — LUISA SOLIS, Norma Heredia, Irene W. Wesley and Santos Garcia, Universidad Autonoma de Nuevo Leon, San Nicolas, NL, Mexico

T5-10 Rapid Assay for Detecting Cryptosporidium parvum in Milk Using Piezoelectric-Excited Millimeter-Sized Cantilever (PEMC) Sensors — Sen Xu and RAJ MUTHARASAN, Drexl University, Philadelphia, PA, USA

T5-11 The Use of Propridium Monoazide (PMA) to Distinguish between Viable and Dead C. sporogenes (PA 3679) Spores after Thermal Processing — CHRISTINA N. DOCK, RONALD DERIKE SMILEY and Lee-Ann Jaykus, North Carolina State University, Raleigh, NC, USA

T5-12 Fourier Transform Infrared (FT-IR) Spectroscopic Methods for Analyzing Biofilms on Food Equipment Surfaces — MICHELE Y. MANUZON, Nurdan A. Kocaoglu-Vurma, Luis E. Rodriguez-Saona and W. James Harper, The Ohio State University, Columbus, OH, USA
Enzymatic Release of DNA from Fusarium Spores or Use in Real-Time PCR — JANAKA S. MORANDAGE, Charles Woloshuk and Maribeth Cousin, Purdue University, West Lafayette, IN, USA

Development of Conventional PCR Method to Detect the Presence of Ara h 1 Peanut (Arachis hypogaea) Allergen in Food — EVA RÉNCOVA and Zora Hubalkova, Veterinary Research Institute, Brno, Czech Republic

Internal and Independent Laboratory Validation of a Reverse-Transcriptase PCR Assay for Detection of Genus Listeria from Stainless Steel Surfaces — DANIEL R. DEMARCO, Stephen Varkey and Joanne Ruebl, DuPont Qualicon, Wilmington, DE, USA

Methods for the Characterization of Bacterial Starters Used in Food Applications — Nicolas Desroche, Sylvaine Quatraux, Jean Guzzo and PATRICE ARBAULT, Biodvantage Consulting, Oorilenas, France

Identification of Primers to Detect Lactobacillus acidophilus NP51 in Cattle Feces — SUNEET RANDHAWA, M. M. Brashears, M. Fokar and E. Karunasena, Texas Tech University, Lubbock, TX, USA

An Independent Evaluation of a New Method: An Automated System for Simultaneous Detection and Differentiation of Listeria monocytogenes and Listeria Species in Food — ERIN CROWLEY, Patrick Bird, Joseph Benzinger, Dianne Moss, Michelle Kelly, Emily Kellner, Daniel Barket, James Agin and David Goins, Q Laboratories, Inc., Cincinnati, OH, USA

Novel Phage Ligand Enzyme-Linked Fluorescent Assay (ELFA) for Same Day Detection of Escherichia coli O157:H7 in Environmental and Feed Samples — DELPHINE THEVENOT, Marion Bouvier, Audrey Gleizal and Christine Vernozy-Rozand, Ecole Nationale Vétérinaire de Lyon, Marcy l’Etoile, France

Novel Phage Ligand Enzyme-Linked Fluorescent Assay for Same Day Detection of Escherichia coli O157:H7 in Composite Samples of Raw Ground Beef and Trimmings — CHRISTINE VERNOZY-ROZAND, Marion Bouvier, Audrey Gleizal and Delphine Thevenot, Ecole Nationale Vétérinaire de Lyon, Marcy l’Etoile, France

Surface Area and Volume Measurement of Salad and Roma Tomatoes for Microbial Enumeration — JOSEPH EIFERT, Hengjian Wang and David Kang, Virginia Tech, Blacksburg, VA, USA

Determination of Fumonisins B1 and B2 in Agricultural Products by High Performance Liquid Chromatography — Eunkyoung Seo, YOHAN YOON, Hyuna Park and Duck-Hwa Chung, Gyeongsang National University, Gyeongnam, South Korea

Rapid Detection of Meat Freshness with Fourier Transform Infrared Spectroscopy — Anthoula A. Argyri, Mohammed Salim Ammor, Efstathios Z. Panagou and GEORGE-JOHN E. NYCHAS, Agricultural University of Athens, Athens, Attica, Greece


Nano-Immunomagnetic Separation of Listeria monocytogenes — YONGHUA XIONG, Chuanmin Ruan, Haibo Huang, Min Li and Yanbin Li, University of Arkansas, Fayetteville, AR, USA

Sensitive Detection of Listeria monocytogenes DSC Using an Impedance Immunosensor Combined with Semicontact Nanowire Bundle — DAMIRA KANAYEVA, Ronghui Wang, Wenjun Dong, Ryan Tian and Yanbin Li, University of Arkansas, Fayetteville, AR, USA


Application of Novel Bacteriophage Derived Binding Proteins for Specific/Magnetic Separation of Escherichia coli O157 from Pure Culture and Food — JAN KRETZER, Renate Grassl, Manfred Biebl, Stefan Miller and Karolina Heed, Profos AG, Bavaria, Germany

Isolation of Vibrio vulnificus from Oyster Homogenate by Immunomagnetic Separation Using Anti-H Monoclonal Antibodies — Ravirajshing Jadeja, Marlene Janes and Janet Simonson, Louisiana State University, Baton Rouge, LA, USA

Development of a Real-Time, NASBA-Molecular Beacon System for Rapid and Specific Detection of Live Microbes in Juice Products — LINLIN XIAO, Wangyu Tong and Hua H. Wang, The Ohio State University, Columbus, OH, USA

Practicality and Validity of Protein-Wiping Method of Sanitation Self-Inspection in Food-Processing Plants — SUSUMU KAWASAKI, Shunsuke Yamanaka and Shinichi Kawamoto, National Food Research Institute, Ibaraki, Japan

Rapid Tools for Microbial Forensics in the Food Industry — Suzanne J. Jordan, Rob Limburn, Christopher L. Baylis and ROY P. BETTS, Campden and Chorleywood Food Research Association, Chipping Campden, Gloucestershire, UK

Rapid Confirmation and Characterization of Food Related Salmonellae — Suzanne J. Jordan, Rob Limburn, Christopher L. Baylis and ROY P. BETTS, Campden and Chorleywood Food Research Association, Chipping Campden, Gloucestershire, UK

Effect of Salt and Acid and the Sequence of Application on the Growth Boundaries of Escherichia coli — Gail Betts, Annette Sansom, Nikki Hoskins, Nia Hughes and ROY P. BETTS, Campden and Chorleywood Food Research Association, Chipping Campden, Gloucestershire, UK
P4-33 Reduction of *Escherichia coli* O157:H7 on Lettuce Using Electrolyzed Oxidizing Water under Simulated Food Service Operation Conditions — PHILIPUS PANGLOLI, Y. C. Hung, L. R. Beuchat and C. H. King, The University of Georgia, Griffin, GA, USA

P4-34 Antibiotic Testing of Enterohemorrhagic *Escherichia coli* Isolated from Ground Beef Samples by Use of a Spiral Gradient Endpoint Method — MAJORITE FULLERTON and Leonard L. Williams, Alabama A&M University, Normal, AL, USA

P4-35 Attachment and Growth of *Escherichia coli* O157:H7 on Stainless Steel as Affected by Nutrient Level, Ground Beef Residues and Natural Flora — JEREMY M. ADLER, Yohan Yoon, Keith E. Beik, John A. Scanga, Gary C. Smith and John N. Sofos, Colorado State University, Fort Collins, CO, USA

P4-36 Cross Protection of Acid-Adapted *Escherichia coli* O157:H7 against Activated Lactoperoxidase and Low pH — ANGELA PARRY-HANSON, Piet Jooste and Elina M. Buys, University of Pretoria, Pretoria, Gauteng, South Africa

P4-37 Survival and Growth of Acid Adapted *Escherichia coli* O157:H7 in Traditional Goat Milk Amasi — Bhekisisa C. Dlamini and ELNAM. BUYS, University of Pretoria, Pretoria, Gauteng, South Africa

P4-38 Increased Acid Resistance of Acid Adapted *Escherichia coli* O157:H7 Isolated from Different Sources in Acetic Acid Solution — T. W. Kim, J. H. Choi, T. Ding, Y. Pan, E. Berry, F. Briedt, Syed Mohammad Ehsanur Rahman and D.H. Oh, Kangwon National University, Gangwondo, South Korea

P4-39 Role of Exopolysaccharides in Protecting the Cells of Shiga-Toxin Producing *Escherichia coli* against Chlorine Treatment — BYONG KWON YOO and Jinru Chen, The University of Georgia, Griffin, GA, USA

P4-40 Production of Cellulose by the Cells of Shiga-Toxin Producing *Escherichia coli* as Influenced by Different Environmental Conditions — BYONG KWON YOO and Jinru Chen, The University of Georgia, Griffin, GA, USA

P4-41 Prevalence of Shiga-Toxigenic *Escherichia coli* and Salmonella in Commercially Available Compost — DAVID INGRAM, Patricia Millner and Jitendra Patel, USDA-ARS, Beltsville, MD, USA

P4-42 Characterization and Potential Human Health Risks of Shiga Toxin-Producing *Escherichia coli* from Beef Cattle on the Range — L. M. BOLLINGER and H. S. Huggett, University of Nevada-Reno, Reno, NV, USA

P4-43 Determining the Impact of Environmental Factors on the Regrowth of *Escherichia coli* O157:H7 in Dairy Compost — JINKYUNG KIM and Xiuping Jiang, Clemson University, Clemson, SC, USA

P4-44 Characterization and Evaluation of Aptamers Isolated against *Listeria monocytogenes* — C. Yamamoto and T. SEN, Hitachi Chemical Research Center, Inc., Irvine, CA, USA

P4-45 Evaluation of the Diversity and Distribution of *Listeria monocytogenes* in Retail Food Establishments, Using Pulsed-Field Gel Electrophoresis and Automated Ribotyping — MARI A. SANCHEZ, Daniel Rice, Martin Wiedmann, Esther Fortes and Brian Sauders, New York State Department of Agriculture and Markets, Albany, NY, USA

P4-46 Proteome-Based Studies for Inhibition of *Listeria monocytogenes* Biofilm Formation by β-Casein Glycomacropeptide — HYUN SUN YUN, Younghoon Kim, Jin Lee, Sejong Oh and Sae Hun Kim, Korea University, Division of Food Bioscience & Technology, Anam-dong, Sungbuk-gu, Seoul, South Korea

P4-47 The Effect of Heat Treatment on the Antimicrobial Susceptibility Profiles of *Listeria monocytogenes* Scott A and *Listeria innocua* — NAGAPRASAD MUPPALA and Leonard L. Williams, Alabama A&M University, Normal, AL, USA

P4-48 Membrane Fatty Acid Changes of Cells from Ten *Listeria monocytogenes* Strains Exposed to Various Antimicrobials — GIANNA DURAN, Ifigenia Geornaras, Terry E. Engle and John N. Sofos, Colorado State University, Fort Collins, CO, USA

P4-49 Phenotypic Characterization of gtcA Transposon Mutants of Serotype 4b *Listeria monocytogenes* — NANCY G. FAITH, Ying Cheng, Sophia Kathariou, Brian Neudeck, Lewis Shi and Charles Czuprynski, University of Wisconsin-Madison, Madison, WI, USA

P4-50 The Impact of Cold Shock Family Proteins on Growth of *Listeria monocytogenes* at Low Temperatures and in Presence of Organic Acids — T. TASARA, B. Schmid, J. Klumpp, M. Loessner and R. Stepahan, Institute for Food Safety and Hygiene, Zurich, Switzerland

P4-51 The Effect of Acid Stress and Heat Shock on the Minimum Ultraviolet Light Dose Required to Inactivate *Listeria monocytogenes* in Water and 9% NaCl — JULIE S. MCKINNEY, Robert C. Williams, Susan S. Sumner, Joseph D. Efert and Greg D. Boardman, Virginia Tech, Blacksburg, VA, USA

P4-52 Invasiveness of Non-Starved and Up-to-24-Month Starvation-Stressed Cells of *Listeria monocytogenes* ScottA Serotype 4b in the Human Caco-2 Cell Model — RAMAKRISHNA NANNAPANENI, Robert Story, Keith C. Wiggins and Michael G. Johnson, Mississippi State University, MS, USA

P4-53 Comparison of Antimicrobial Resistance Determinants among *Salmonella*, *Campylobacter*, *Escherichia coli*, and *Enterococcus* Isolated from Swine — PAMELA FRY, Melanie Abley, Susan Kaydos-Daniels, Paula Cray and Wondwossen Gebreyes, The Ohio State University, Columbus, OH, USA

P4-54 Phenotypic and Genotypic Characterization of Multi-Drug Resistant *Salmonella* Serotype Heidelberg Isolated from Humans and Animals — Wondwossen A. Gebreyes, Daniel A. Tadesse and PRAPAS PATCHANEE, The Ohio State University, Columbus, OH, USA
Influence of Autoinducer-2 (Al-2) on the Growth and Virulence of Salmonella enterica Serovar Typhimurium and Modulation of These Effects from Poultry Meat-Derived Fatty Acids Having Al-2 Inhibitory Properties — Kenneth W. Widmer, Palmy Jesudhasan, Martha Cepeda and SURESH D. PILLAI, Texas A&M University, College Station, TX, USA

Induction of Cross Protected and Viable but Nonculturable Salmonella enterica serotype Typhimurium under Various Stress Conditions — HUA XU and Juhee Ahn, Kangwon National University, Division of Biomaterials Engineering, Chuncheon, Gangwon, South Korea

Simple, Rapid and Reliable Detection of Enteropathogenic Escherichia coli O26 Using Immunochromatography — TARO YONEKITA, Tatsuya Fujimura, Takashi Matsumoto and Fumiki Morimatsu, Nippon Meat Packers, Inc., Tsukuba, Ibaraki, Japan


Thermal Inactivation of Campylobacter jejuni in Broth — ALI AL-SAKKAF, Nigel French, Rob Lake, Brian Wilkinson and John Mawson, Massey University, Manawatu, New Zealand

Antimicrobial Resistance, Virulence and Genotypic Profiling of Campylobacter jejuni and Campylobacter coli Isolated from Humans and Retail Meat — S. THAKUR, B. Kroft, D. Gross, Paul A. Klockow, Katy M. Baughman, Bassam A. Anous and David E. Nivens, Purdue University, West Lafayette, IN, USA

Isolation of Bacteriophages Infecting Gram-Positive Foodborne Pathogens — Wan-Jing Lee, J. ANDREW HUDSON, Jack Heinemann, Craig Billington and Lynn McIntyre, ESR Ltd., Christchurch, New Zealand

Noroviruses to Fomites — MARYLINE GIRARD, Kirsten Mattison and Julie Jean, Université Laval, Quebec, QC, Canada

Effect of Sodium Hypochlorite on Murine Norovirus, a Surrogate for the Human Norovirus — STEPHEN F. GROVE, Alvin Lee and Cynthia M. Stewart, NCFST, Summit-Argo, IL, USA

Potential Use of Bacteriophages to Control Pathogens in Foods Stored under Refrigeration — Craig Billington, Aruni Premaratne, Lynn McIntyre, Teresa Bigwood and J. ANDREW HUDSON, ESR Ltd., Christchurch, New Zealand

SYMPOSIA • 8:30 a.m. – 12:00 p.m.

Dairy Pasteurization in Today’s Risk-Based Food Safety Environment — International Perspectives on the Use of Risk Assessment Tools
Franklin A-C
Sponsored by the IAEP Foundation
Organizers: Lisa Oakley and Joanna Shepherd
Convenors: Roger Cook and Joanna Shepherd
8:30 History of Pasteurization — The Need to Control Pathogens in Raw Milk — ALLEN SAYLER, International Dairy Foods Association, Washington, D.C., USA
8:50 Risk Assessment — The Tools to Move on — LISA OAKLEY, New Zealand Food Safety Authority, Wellington, New Zealand

9:10 Just How Many Pathogens are There in Today’s Raw Milk? — BRUCE HILL, Fonterra Co-operative Group Ltd., Palmerston North, New Zealand


10:00 Break

10:30 Influences on Australasian Risk Management Decisions — DEON MAHONEY, Food Standards Australia New Zealand, Canberra, ACT, Australia

10:45 Influences on French Risk Management Decisions — MOEZ SANAA, National Veterinary School of Alfort, Maison, Alfort Cedex, France

11:00 Influences on Canadian Risk Management Decisions — HELENE COUTURE, Health Canada, Tunney’s Pasture, Ottawa, ON Canada

11:15 Influences on United States Risk Management Decisions — STEVEN SIMS, FDA, College Park, MD, USA

11:30 Panel Discussion

S18 Innovative Applications of Bacteriophages in Rapid Enrichment, Detection and Identification of Foodborne Pathogens
Union D-E
Sponsored by the IAFP Foundation
Organizer: Jingkun Li
Convenors: George Paoli and Jingkun Li

8:30 Bacteriophages as Selective Agents for Rapid Enrichment and Detection of Foodborne Pathogens — MARK MULDOON, Strategic Diagnostics Inc., Newark, DE, USA

9:00 Bacteriophages — Mediated Adenylate Kinase Assay for High Throughput Pathogen Detection — PRADIP PATEL, Alaska Food Diagnostics, Ltd., Salisbury, Wiltshire, UK

9:30 Bacteriophage Proteins as Sample Preparation Tools to Improve the Detection of Foodborne Pathogens — JAN KRETZER, Profos AG, Regensburg, Bavaria, Germany

10:00 Break

10:30 Novel Phage Ligand-Based Detection of Escherichia coli O157:H7 and Salmonella in Food and Environmental Samples — VINCENT ATRACHE, bioMerieux Industry, Marcy l’Etoile, France

11:00 Antibody Phage Display for Foodborne Pathogen Detection — GEORGE C. PAOLI, USDA-ARS-ERRC, Wyndmoor, PA, USA

11:30 Using Bacteriophages for Rapid Identification of Bacteria Directly from Samples and Mixed Cultures — DREW SMITH, MicroPhage, Inc., Longmont, CO, USA

S19 Chemical Contaminants Testing in Foods
Franklin D
Organizers: Patrice Arbault, Tong-Jen Fu, Peter Olsen and Pamela Wilger
Convenors: Tong-Jen Fu and Pamela Wilger

8:30 Current Issues in Pesticide Testing in Produce — GRACE BANDONG, The National Food Laboratory, Inc., Dublin, CA, USA

9:00 Detecting Chemical Hazards in Seafood — GAYE SIMS, Silliker JR Laboratories, ULC, Upper Tantallon, NS, Canada

9:30 Veterinary Drug Residue Analysis in Support of Risk Assessment in Canada — ERIC BRAEKVELT, Health Canada, Ottawa, ON, Canada

10:00 Detecting Chemicals Formed during Thermal Processing of Foods — PETER VARELIS, National Center of Food Safety and Technology, Summit-Argo, IL, USA

ROUNDTABLE • 8:30 a.m.—10:00 a.m.

RT5 Comparative International Approaches to Regulating Unsafe Food
Delaware A-D
Organizer: Caroline Smith-DeWaal and Deon Mahoney
Convenor: Leon Gorris

8:30 The United States Approach to Managing Unsafe Food, Including Elaborating on the Legal Concept of Adulteration and Its Applications in Risk Management — CAROLINE SMITH DEWAAL, Center for Science in the Public Interest, Washington, D.C., USA

8:45 The Australian Legal Approach to Managing Unsafe Food — DEON MAHONEY, Food Standards Australia New Zealand, Canberra, ACT, Australia

9:00 The Japanese Legal Approach to Managing Unsafe Food — PAUL YOUNG, Waters Corporation, Manchester, England, UK

9:15 The Irish/EU Legal Approach to Managing Unsafe Food — WAYNE ANDERSON, Food Safety Authority of Ireland, Dublin, Ireland

9:30 Roundtable Discussion

ROUNDTABLE • 10:30 a.m.—12:00 p.m.

RT6 Water: Potability vs. Drinkability
Delaware A-D
Sponsored by the IAFP Foundation
Organizers: Dean C. Davidson and Peter Kennedy
Convenors: Dean C. Davidson and Peter Kennedy

10:30 Legal vs. Illegal Aspects of Potability — DAVID BENNITZ, Health Canada, Ottawa, ON, Canada


JULY 2008 | FOOD PROTECTION TRENDS 527
11:00 USDA Viewpoint with Regard to the Use and Reuse of Water in the Food Plant — KATHLEEN T. RAJKOWSKI, USDA-ARS-ERRC, FSITRU, Wyndmoor, PA, USA

11:15 EPA Viewpoint Regarding Drinking Water (Potable) Regulations as It Relates to the Food Industry — JENNIFER BEST, EPA, Office of Ground Water and Drinking Water, Cincinnati, OH, USA

11:30 Water Testing and Types of Checks for Municipal Water Supplies — KEVIN M. MORLEY, American Water Works Association, Washington, D.C., USA

11:45 Roundtable Discussion

**TECHNICALS • 8:30 a.m. – 12:00 p.m.**

**T6 Education and Sanitation Technical Session**
**Fairfield**

**Convenors:** To be determined

**T6-01** Registered Dieticians and Registered Nurses
8:30 Lack Awareness and Knowledge of Listeria
DSC monocytes isolating Need for Continuing Education — WEI YUAN, Lydia Medeiros, Janet Buffer, Patricia Kendall and John Sofos, The Ohio State University, Columbus, OH, USA

**T6-02** Best Practice — Occupational Exposure Control
8:45 Plan for Restaurants and Food Establishments — GINA M. REO, QAS, LLC, Princeton Junction, NJ, USA

**T6-03** An Observational Study of Food Safety Practices
9:00 at Food Service Conducted through Video
DSC Capture — BENJAMIN CHAPMAN, Tiffany Eversley, Katie Filion, Tanya MacLaurin and Douglas Powell, University of Guelph, Guelph, ON, Canada

**T6-04** Transportation Risk Assessment for Food Safety and Security; An Examination of Risks and Solutions Associated with Food Transportation — MARIANNE COURY, Michigan Dept. of Agriculture Food and Dairy Division, St. Clair Shores, MI, USA

**T6-05** Consumer Attitudes to Food Safety in Mexico
9:30 — EMA MALDONADO-SIMAN, P. A. Martinez-Hernández and L. López-Durán, Universidad Autonoma Chapingo, Texcoco, Edomex, Mexico

**T6-06** Efficacy of Two Commercial Sanitizers and Two Conveyor Belt Systems against Listeria monocytogenes during Normal Operation — HINONG YAN, Matthew Steele, Lei Zhang, and Elliot T. Ryser, Michigan State University, East Lansing, MI, USA

10:00 Break

**T6-07** Beyond Intent — Direct Observation of Meal Preparation Procedures in a Home Kitchen
10:30 Setting — SARAH DEDONDER, Douglas Powell, Casey Wilkinson, Brae Surgeon, Ben Chapman and Randall Phebus, Kansas State University, Manhattan, KS, USA

10:45 Consumers and Take-Out Food: Safe-Handling Practices, Desired Packaging Attributes, and Temperature Integrity of Packaging — MARGARET BINKLEY, Charlie Broz and Janice Boyce, Texas Tech University, Lubbock, TX, USA

11:00 Validation of a Four-Chain Quaternary Biocide (B) for Inhibition of Listeria monocytogenes Attachment on Food Contact Surfaces — JASDEEP SAINI, C.A. Tanus, J.L. Marsden, D.Y.C. Fung and B.A. Crozier-Dodson, Kansas State University, Manhattan, KS, USA

11:15 Presence of Aerobic Microorganisms, Enterobacteriaceae and Salmonella in the Shell Egg Processing Environment — MICHAEL T. MUSGROVE and Mark E. Bertrand, Egg Safety and Quality Research Unit, Athens, GA, USA

11:30 Food Safety Management in Fraser Health
11:45 Authority, Vancouver, BC, Canada — DERJEET GILL, Fraser Health Authority, Health Protection, Surrey, BC, Canada and O. PETER SNYDER, JR., Hospitality Institute of Technology and Management, St. Paul, MN, USA

**POSTERS • 9:30 a.m. – 1:30 p.m.**

**P5 Risk Assessment, Antimicrobials, Seafood and General Microbiology Poster Session**
**Exhibit Hall**
9:30 a.m.—1:30 p.m.
Authors present 10:00 a.m.—12:00 p.m.

**Convenors:** To be determined

**P5-01** Prevalence of Antibiotic-Resistant Bacteria in Deli and Restaurant Foods — XIAOJING LI and Hua H. Wang, The Ohio State University, Dept. of Food Science and Technology, Columbus, OH, USA

**P5-02** Trends from 2002 through 2006 in Total Campylobacter and Total Ciprofloxacin-Resistant Campylobacter Loads in Rinses from Retail Raw Broiler Chicken Carcasses — RAMAKRISHNA NANNAPANENI, Robert Story, Keith C. Wiggins and Michael G. Johnson, Mississippi State University, Mississippi State, MS, USA

**P5-03** Modeling the Growth of Listeria monocytogenes in Delicatessen Turkey and Ham — DANilo T. CAMPOS, Bradley P. Marks, Lei Zhang, Elliot T. Ryser and Ewen C.D. Todd, Michigan State University, East Lansing, MI, USA

**P5-04** Growth Model of a Plasmid-Bearing Virulent Strain of Yersinia pseudotuberculosis in Raw Ground Beef — SAUMYA BHADURI and John G. Phillips, USDA-ARS-ERRC-MFS, 600 E. Mermaid Lane, Wyndmoor, PA, USA
| P5-26 | Mechanism of Inactivating *Escherichia coli* O157:H7 by Ultra-High Pressure in Combination with Tert-Butylhydroquinone — YOON-KYUNG CHUNG, Aaron S. Malone and Ahmed E. Yousef, The Ohio State University, Columbus, OH, USA |
| P5-27 | The Probability of Growth of *Listeria monocytogenes* in Minced Salmon and Tryptic Soy Broth Containing Salt and Phenol Compounds during Storage at Various Temperatures — CHENG-AN HWANG, USDA-ARS-ERRC, Wyndmoor, PA, USA |
| P5-28 | Predictive Modeling of *Listeria monocytogenes* on Cured and Uncured Turkey Breast for Safety-Based Shelf-Life Determination — IFIGENIA GEORNARAS, Yvan Le Marc, Gianna Durán, Alexandria Lianou, Ukrit Laosiripornwattana, Camelia C. Grosulescu, Yohan Yoon, József Baranyi and John N. Sofos, Colorado State University, Fort Collins, CO, USA |
| P5-29 | Predicting the Effects of Storage Temperature on Growth of *Listeria monocytogenes* on Roast Beef Formulated with or without Antimicrobials — YVAN LE MARC, Ifigenia Geornaras, Brandon A. Carlson, Yohan Yoon, József Baranyi and John N. Sofos, Institute of Food Research, Norwich, Norwich, Norfolk, UK |
| P5-30 | Effect of Thirteen Antimicrobials on Morphology of *Listeria monocytogenes* Cells as Examined with Scanning and Transmission Electron Microscopy — GIANNA DURÁN, Ifigenia Geornaras and John N. Sofos, Colorado State University, Fort Collins, CO, USA |
| P5-31 | Control of *Listeria monocytogenes* on Frankfurters by Dipping in Hops Beta Acids Solutions — CANGLIANG SHEN, Ifigenia Geornaras, Patricia A. Kendall and John N. Sofos, Colorado State University, Fort Collins, CO, USA |
| P5-32 | Efficacy of Surface Spray Application of Lauric Arginate Derivative to Control *Listeria monocytogenes* on Roast Beef and Pastrami — L. M. SANTIAGO-CONNOLLY, G. W. Bartholomew, W. J. Dorsa, A. C. S. Porto-Fett, J. Smith, J. E. Call and J. B. Luchansky, Custom Food Products, LLC, Carson, CA, USA |
| P5-33 | Survival and Growth of *Salmonella enterica* Serovar Weltevreden in Som-fak, a Thai Low-Salt Fermented Product — NETE BERNBOM, Yoke Yin Ng and Lone Gram, National Institute of Aquatic Resources, Technical University of Denmark, Kgs. Lyngby, Denmark |
| P5-34 | UV Catalysis with Novel TiO2 Nanofiber Coating and Its Bactericidal Activity against *Escherichia coli* O157:H7 — LISA COONEY, Yanbin Li, Ryan Tian, Wenjun Dong, Michael Slavik and Hong Wang, University of Arkansas, Fayetteville, AR, USA |
| P5-35 | Effect of Antimicrobials on the Growth Kinetics and Morphological Changes of Stressed *Salmonella* Typhimurium — YANG JIN JUNG and Ki S. Yoon, Kyunghee University, Seoul, Republic of Korea |
| P5-36 | Natural Products as Inhibitors of Growth of *Campylobacter* and *Salmonella* Strains — D. VALTIERRA, S. Garcia and N. Heredia, Universidad Autonoma de Nuevo Leon, Apdo. Postal 124-F, San Nicolas, NL 66450, Mexico |
| P5-37 | Antimicrobial Activity of Chitosans and Chitooligosaccharides in Milk and Apple Juice, on *Bacillus cereus* and Spores — JOÃO FERNANDES, Peter Eaton, Freni Tavaria, Manuela Pintado and Xavier Malcata, Escola Superior de Biotecnologia, Universidade Católica Portuguesa, Porto, Portugal |
| P5-38 | Chitosans and Chitooligosaccharides: Antimicrobial Activity on *Bacillus cereus* (and Its Spores) — JOÃO FERNANDES, Peter Eaton, Freni Tavaria, Manuela Pintado and Xavier Malcata, Escola Superior de Biotecnologia, Universidade Católica Portuguesa, Porto, Portugal |
| P5-39 | Synergistic Effect of UV Irradiation on Chemical Disinfectant Treatments for Reduction of *Bacillus cereus* — JI-HYOUGN HA and Sang-Do Ha, Kyunggi-do, South Korea |
| P5-40 | Withdrawn |
| P5-41 | Antimicrobial Testing of *Staphylococcus aureus* Strains Isolated from Clinical, Milk and Meat Samples — OLASUNMBO AJAY and Leonard L. Williams, Alabama A&M University, Normal, AL, USA |
| P5-42 | Assessment of Membrane Integrity Damage of *Clostridium perfringens* and *Vibrio cholerae* by Plant Extracts — E. Sánchez, SANTOS GARCIA and N. Heredia, Universidad Autonoma de Nuevo Leon, San Nicolas, NL, Mexico |
| P5-43 | *Aspergillus flavus* and *Aspergillus niger* Growth Response to Cinnamon Extracts — AURELIO LÓPEZ-MALO and Enrique Palou, Universidad de las Américas, Puebla, Puebla, Mexico |
| P5-44 | Antimicrobial Efficacy of Vanillin and Cinnamic Aldehyde in Peach Puree — Daniela Cinta, Yani D. Ramirez-Torres, AURELIO LÓPEZ-MALO and Enrique Palou, Universidad de las Américas, Puebla, Puebla, Mexico |
| P5-45 | Reduction of Foodborne Pathogens in a Korean Fermented Fish Product (Jeot-gal) Model System with Natural Antimicrobials — Yunsk Choi, Jong-Kyung Lee and JIYONG PARK, Yonsei University, Seoul, South Korea |
| P5-46 | Dietary Exposure to Benzoic Acid from Prepackaged Non-Alcoholic Beverages of Secondary School Students in Hong Kong — K. M. Ma, C. M. Chan, S. W. C. Chung, Y. Y. Ho and Y. XIAO, Center for Food Safety, Hong Kong, China |
| P5-47 | Antimicrobial Activity of Edible Plants against Enteropathogenic Bacteria — ALEJANDRINA MONTES, Norma Heredia and Santos Garcia, Universidad Autonoma de Nuevo Leon, San Nicolas, NL, Mexico |
| P5-48 | Estimation of Shelf Life of Ethanol and Peroxide Compounds Sanitizers by Arrhenius Model — YONG-SU KIM, Ae-Yeong Kim, In-Sook Park, Sang-Do Ha and Yu-Mi Seo, Korea Health Industry Development Institute, Seoul, Korea |
P5-72 Prevalence, Persistence, and Spread of Listeria spp. in a Commercial Delicatessen — ZHINONG YAN, Annemarie L. Buchholz, Lei Zhang and Elliot T. Ryser, Michigan State University, East Lansing, MI, USA

P5-73 Inactivation of Pathogens in Compost Mixtures as Influenced by Type of Manure — MARILYN ERICKSON, Chris Smith, Xiuping Jiang and Michael Doyle, University of Georgia, Griffin, GA, USA


WEDNESDAY AFTERNOON
AUGUST 6

SYMPOSIA • 1:30 p.m. – 3:30 p.m.

S20 Food Defense Educational Programs: Status, Focus and Future
Delaware A-D
Sponsored by the IAFP Foundation
Organizer: Randall K. Phebus
Convenor: Randall K. Phebus
1:30 The Need for National Educational Programs in Food Defense — SHAUN KENNEDY, National Center for Food Protection and Defense, University of Minnesota, St. Paul, MN, USA
1:50 Developing a Curriculum that Meets Students’ Needs in Food Defense — DAVID MCSWANE, School of Public and Environmental Affairs, Indiana University, Bloomington, IN, USA
2:10 Food Defense Education: The University of Minnesota Summer Public Health Institute Approach — To be determined
2:30 Collaborative Food Defense Graduate Educational Initiatives: Examples and Challenges—ABBEY NUTSCH, National Agricultural Biosecurity Center/Food Science Institute, Kansas State University, Manhattan, KS, USA
2:50 Panel Discussion

S21 Is It Overdone? Examining the Meat and Cancer Hypothesis and Its Impact on Food Safety
Franklin A-C
Organizers: Randy Huffman and Lisa Mina
Convenors: Randy Huffman and Lisa Mina
1:30 Standards of Scientific Evidence: How Do They Impact Food Safety and Health Risk? — JAMES COUGHLIN, Coughlin and Associates, Laguna Niguel, CA, USA
2:00 Does the Science Really Connect Meat to Cancer? — DAVID M. KLURFELD, USDA, Beltsville, MD, USA
2:30 Heterocyclic Amines and Polyaromatic Hydrocarbons in Meat Products: What is the True Health Risk? — ARTHUR MILLER, Exponent, Bowie, MD, USA

S22 What is the “Real” Issue with MDR?
Union A-C
Sponsored by the IAFP Foundation
Organizer: Paula J. Fedorka-Cray
Convenors: J. Stan Bailey and Paula J. Fedorka-Cray
1:30 Resistance to Third Generation Cephalosporins in Salmonella Isolated from NARMS Retail Meats — SHAOHUA ZHAO, FDA, Center for Veterinary Medicine, Laurel, MD, USA
1:50 MDR in Food Animals — PAULA FEDORKA-CRAY, USDA-ARS, Athens, GA, USA
2:10 MDR in Humans — JEAN WHICHARD, CDC, Atlanta, GA, USA
2:30 MDR from across the Pond: The United Kingdom View — JOHN THRELFALL, Health Protection Agency, London, UK

S23 The Greening of Food Packaging — Safety of Biodegradable, Reused and Recycled Food Packaging
Union D-E
Organizers: Ken Anderson and Allen R. Sayler
Convenors: Ken Anderson and Allen R. Sayler
1:30 Current Technologies for Recyclable, Reusable, and Biodegradable Food Packaging — Susan Seike, School of Packaging, Michigan State University, East Lansing, MI, USA
2:10 Industry Experience with Recycling Compostable Food Packaging Material — Representative from TetraPak Packaging Division
2:30 Industry Experience with Safety of Biodegradable Food Packaging Material — Representative from NatureWorks LLC
3:10 Risk Analysis of Food Safety Issues Related to the Recycling, Reuse and Bio-degradability of Food Packaging Material — Representative from FDA

S24 Food Allergens: Scientific Advances and Control Measures
Franklin D
Sponsored by the IAFP Foundation
Organizers: Tong-Jen Fu and Linda Leake
Convenors: Tong-Jen Fu and Linda Leake
1:30 Food Allergy: Mechanisms and Current Advances in Disease Management — WESLEY BURKS, Duke University, Durham, NC, USA
2:00 Food Allergens: Current Understanding and Impact of Processing — TONG-JEN FU, FDA, National Center for Food Safety and Technology, Summit-Argo, IL, USA
2:30 Allergen Control Measures – Food Processors’ Perspective — RENE CREVEL, Unilever Research Colworth, Sharnbrook, Bedford, UK

3:00 Nitrites: Essential to Health? A New Story about an Old Antimicrobial — NATHAN BRYAN, University of Texas—Houston, Houston, TX, USA
3:00  Allergen Control — United States and International Regulatory Perspective — STEVE RIZK, M&M Mars, Hackettstown, NJ, USA

TECHNICALS • 1:30 p.m. – 3:15 p.m.

T7 Spillage and Epidemiology Technical Session
Fairfield
Convenors: To be determined

T7-01 Yeast and Mold Ecology in Food Factories
1:30 — DEBRA SMITH, Phil Voysey and Suzanne Jordan, Campden and Chorleywood Food Research Association, Chipping Campden, Gloucestershire, England

T7-02 Microbial Contamination during Production of Edible Peeled Chestnuts — IRWIN R. DONIS GONZALEZ, Dennis W. Fulbright, Bruce Harte, Daniel Guyer and Elliot T. Ryser, Michigan State University, East Lansing, MI, USA

T7-03 Inactivation of Bacteria and Yeast on Peeled Chestnuts Using X-ray Radiation — IRWIN R. DONIS GONZALEZ, Dennis W. Fulbright, Sanghyup Jeong, Daniel Guyer and Elliot T. Ryser, Michigan State University, East Lansing, MI, USA

T7-04 Multistate Outbreak of Salmonella I 4,[5],12:i:- Infections Associated with Commercially Produced Frozen Pot Pies — United States, 2007 — RAJAL MODY, Stephanie Meyer, Olga Henao, Thai-An Nguyen, Anandi Sheth, Jana Austin, Patsy White and Ian Williams, CDC, Atlanta, GA, USA

2:30  Increasing Incidence of Listeriosis in France and Its Relations with Host Factors and Food Control — ALEXANDRE LECLERCQ, Alban Le Monnier, Marc Lecuit and Véronique Goulet, National Reference Centre for Listeria and WHO Collaborating Centre for Foodborne Listerosis, Institut Pasteur, Paris, France


3:00  Resistance Profiles of Salmonella Isolates in Humans and Animals in North Dakota — JAMES OLOYA, Dawn Doetkott and Margaret Khatsa, North Dakota State University, Fargo, ND, USA

4:00 p.m. – 4:45 p.m.

John H. Silliker Lecture — Franklin A-C
From Wild Pigs in Spinach to Tilapia in Asia: The Challenges of the Food Safety Community — Michael P. Doyle, Ph.D., University of Georgia, Griffin, GA

Serving the food industry with:
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Visit us at IAFP 2008
ATTENTION
STUDENTS

Mark your calendar to attend the SPDG Student Mixer at IAFP 2008

Fairfield Room, Hyatt Regency Columbus

Monday, August 4
7:00 p.m. – 9:00 p.m.

Need to solve microbial contamination problem on time and on budget? Call Aemtek!

Aemtek’s team of seasoned industrial professionals and knowledgeable Ph.D. scientists has extensive expertise and experience in microbial detection and source tracking, contamination problem solving and food safety consulting. Aemtek has the people, the facility and the drive to solve your problems fast.

When safety counts, you can count on Aemtek!

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Fremont, CA 94539
Phone: 510-979-1979
E-mail: info@aemtek.com
Web: www.aemtek.com

IAFP 2008 Exhibitor
IAFP Sustaining Member
WELCOME RECEPTION
Saturday, August 2 • 5:00 p.m. – 6:30 p.m.
Reunite with colleagues from around the world as you socialize and prepare for the leading food safety conference. Everyone is invited!

COMMITTEE MEETINGS
Saturday, August 2 • 3:00 p.m. – 4:30 p.m.
Sunday, August 3 • 7:00 a.m. – 5:00 p.m.
Committees and Professional Development Groups (PDGs) plan, develop and institute many of the Association’s projects, including workshops, publications, and educational sessions. Share your expertise by volunteering to serve on committees or PDGs. Everyone is invited to attend.

STUDENT LUNCHEON
Sunday, August 3 • 12:00 p.m. – 1:30 p.m.
Sponsored by Texas A&M University, Center for Food Safety
The mission of the Student PDG is to provide students of food safety with a platform to enrich their experience as Members of IAFP. Sign up for the luncheon to help start building your professional network.

EDITORIAL BOARD RECEPTION
Sunday, August 3 • 4:30 p.m. – 5:30 p.m.
Editorial Board Members are invited to this reception to be recognized for their service during the year.

OPENING SESSION
AND IVAN PARKIN LECTURE
Sunday, August 3 • 6:00 p.m. – 7:00 p.m.
Join us to kick off IAFP 2008 at the Opening Session. Listen to the prestigious Ivan Parkin Lecture delivered by Dr. Russell S. Flowers.

CHEESE AND WINE RECEPTION
Sunday, August 3 • 7:00 p.m. – 9:00 p.m.
Sponsored by Kraft Foods
An IAFP tradition for attendees and guests. The reception begins in the Exhibit Hall immediately following the Ivan Parkin Lecture on Sunday evening.

IAFP JOB FAIR
Sunday, August 3 through Wednesday, August 6
Employers, take advantage of recruiting the top food scientists in the world! Post your job announcements and interview candidates.

COMMITTEE AND PDG CHAIRPERSON BREAKFAST
Monday, August 4 • 7:00 a.m. – 9:00 a.m.
Chairpersons and Vice Chairpersons are invited to attend this breakfast to report on the activities of your committee.

EXHIBIT HALL LUNCH
Monday, August 4 • 12:00 p.m. – 1:00 p.m.
Sponsored by JohnsonDiversey
Tuesday, August 5 • 12:00 p.m. – 1:00 p.m.
Sponsored by SGS North America
Stop in the Exhibit Hall for lunch and networking on Monday and Tuesday.

EXHIBIT HALL RECEPTIONS
Monday, August 4 • 5:00 p.m. – 6:00 p.m.
Sponsored by DuPont Qualicon
Tuesday, August 5 • 5:00 p.m. – 6:00 p.m.
Sponsored in part by The Kroger Co., Q Laboratories, Inc., Quality Assurance Magazine, and Springer
Join your colleagues in the Exhibit Hall to see the most up-to-date trends in food safety techniques and equipment. Take advantage of these great networking receptions.

PRESIDENT’S RECEPTION
Monday, August 4 • 6:00 p.m. – 7:00 p.m.
Sponsored by Fisher Scientific
This by invitation event is held each year to honor those who have contributed to the Association during the year.

BUSINESS MEETING
Tuesday, August 5 • 12:15 p.m. – 1:00 p.m.
You are encouraged to attend the Business Meeting to keep informed of the actions of YOUR Association.

JOHN H. SILLIKER LECTURE
Wednesday, August 6 • 4:00 p.m. – 4:45 p.m.
The John H. Silliker Lecture will be delivered by Dr. Michael Doyle.

AWARDS RECEPTION AND BANQUET
Wednesday, August 6 • 6:00 p.m. – 9:30 p.m.
Bring IAFP 2008 to a close at the Awards Banquet. Award recipients will be recognized for their outstanding achievements and the gavel will be passed from Dr. Gary R. Acuff to Incoming President, Dr. J. Stan Bailey.
IAFP 2008
GENERAL INFORMATION

REGISTRATION INCLUDES
Register to attend the world’s leading food safety conference.
Full Registration includes:
- Program and Abstract Book
- Welcome Reception
- Ivan Parkin Lecture
- Cheese and Wine Reception
- Technical Sessions
- Poster Presentations
- Symposium
- Exhibit Hall Admittance
- Exhibit Hall Lunch (Mon. & Tues.)
- Exhibit Hall Reception (Mon. & Tues.)
- John H. Silliker Lecture
- Awards Banquet

PRESENTATION HOURS
Sunday, August 3
Opening Session 6:00 p.m. – 7:00 p.m.
Monday, August 4
Symposia & Technical Sessions 8:30 a.m. – 5:00 p.m.
Tuesday, August 5
Symposia & Technical Sessions 8:30 a.m. – 5:00 p.m.
Wednesday, August 6
Symposia & Technical Sessions 8:30 a.m. – 3:30 p.m.
Closing Session 4:00 p.m. – 5:00 p.m.

GOLF TOURNAMENT
Saturday, August 2
Golf Tournament at Golf Club of Dublin 6:00 a.m. – 2:00 p.m.
Join your friends and colleagues for an exciting round of golf before IAFP 2008. Golf the Golf Club of Dublin (Ohio) and you may envision yourself playing in Dublin, Ireland. The new Golf Club of Dublin was designed with the spirit of golf from the British Isles and will leave you thinking that you have just played Turnberry or Carnoustie. It is the first course in the region to be built with authentic links features such as stacked sod bunkers, rectangular teeing grounds, fescue covered dunes, stone walls and enormous greens. With 18-holes, a driving range, an Irish pub and a banquet hall on site—the Golf Club of Dublin offers a first-class resort style experience.

The Golf Club of Dublin was ranked one of the “Top 25 in America” by Golf Magazine and “Must Play Golf Courses” by ESPN just to name a few. For a true championship test and memorable experience you must play the Golf Club of Dublin. Price includes transportation, greens fees with a cart, range balls, breakfast, lunch and prizes.

REGISTER ONLINE
Register online at www.foodprotection.org

EXHIBIT HOURS
Sunday, August 3 7:00 p.m. – 9:00 p.m.
Monday, August 4 10:00 a.m. – 6:00 p.m.
Tuesday, August 5 10:00 a.m. – 6:00 p.m.

HOTEL INFORMATION
Hotel reservations can be made online at www.foodprotection.org.
The IAFP Annual Meeting Sessions, Exhibits and Events will take place or depart from the Hyatt Regency Columbus. Official hotels for IAFP 2008 are as follows:
- Hyatt Regency Columbus $129 per night
- Crowne Plaza $129 per night
- Drury Inn and Suites $129 per night

CANCELLATION POLICY
Registration fees, less a $50 administration fee and any applicable bank charges, will be refunded for written cancellations received by July 18, 2008. No refunds will be made after July 18, 2008; however, the registration may be transferred to a colleague with written notification. Refunds will be processed after August 11, 2008.
Event and extra tickets purchased are nonrefundable.
IAFP 2008 REGISTRATION FORM

3 Ways to Register

ONLINE
www.foodprotection.org

FAX
515.276.8655

MAIL
6200 Aurora Ave., Suite 200W
Des Moines, IA 50322-2864, USA

First name (as it will appear on your badge) Last name

Employer Title

Mailing Address (Please specify: Home Work)

City State/Province Country Postal/Zip Code

Telephone Fax E-mail

Regarding the ADA, please attach a brief description of special requirements you may have.

If you prefer NOT to be included in these lists, please check the box.

PAYMENT MUST BE RECEIVED BY JULY 1, 2008 TO AVOID LATE REGISTRATION FEES

REGISTRATION FEES

<table>
<thead>
<tr>
<th></th>
<th>MEMBERS</th>
<th>NONMEMBERS</th>
<th>TOTAL</th>
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<tbody>
<tr>
<td>Registration</td>
<td>$ 415 ($ 465 late)</td>
<td>$ 630 ($ 680 late)</td>
<td></td>
</tr>
<tr>
<td>Association Student Member</td>
<td>$ 80 ($ 90 late)</td>
<td>Not Available</td>
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</tr>
<tr>
<td>Retired Association Member</td>
<td>$ 80 ($ 90 late)</td>
<td>Not Available</td>
<td></td>
</tr>
<tr>
<td>One Day Registration* Mon. Tues. Wed.</td>
<td>$ 225 ($ 250 late)</td>
<td>$ 350 ($ 375 late)</td>
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<tr>
<td>Spouse/Companion* (Name):</td>
<td>$ 60 ($ 60 late)</td>
<td>$ 60 ($ 60 late)</td>
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<tr>
<td>Children 15 &amp; Over* (Names):</td>
<td>$ 25 ($ 25 late)</td>
<td>$ 25 ($ 25 late)</td>
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<tr>
<td>Children 14 &amp; Under* (Names):</td>
<td>FREE</td>
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<td>Awards Banquet not included</td>
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<tr>
<td>Additional Awards Banquet Ticket - Wednesday, 8/6</td>
<td>$ 50 ($ 60 late)</td>
<td>$ 50 ($ 60 late)</td>
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<tr>
<td>Student Luncheon - Sunday, 8/3</td>
<td>$ 10 ($ 15 late)</td>
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GOLF TOURNAMENT

Golf Club of Dublin, Saturday, 8/2 | $ 140 ($ 150 late) |       |

WORKSHOPS - PRE-MEETING

Better Process Cheese Control School | $ 575 ($ 650 late) | $ 675 ($ 750 late) |
The Art of Fungal Characterization and Identification: A Hands-on Workshop | $ 620 ($ 695 late) | $ 720 ($ 795 late) |
Hands-on Workshop on Microbial Risk Assessment Modeling and Interpretation | $ 270 ($ 345 late) | $ 370 ($ 445 late) |

ABSTRACTS

Annual Meeting Abstracts (citable publication to be mailed Oct. 1) | $ 25 | $ 25 |

TOTAL AMOUNT ENCLOSED $ | US FUNDS on US BANK |

Payment Options: VISA Master Card American Express Discover

Check Enclosed

CREDIT CARD #

CARD ID # EXP. DATE

SIGNATURE

*Visa, Mastercard and Discover see 3-digit Card ID number on the back of the card after account number. American Express see 4-digit, non-embossed number printed above your account number on the face of your card.

JOIN TODAY AND SAVE!!!
(Attach a completed Membership application)

EXHIBITORS DO NOT USE THIS FORM
**WORKSHOP 1**
Better Process Cheese Control School

**Friday and Saturday**
August 1–2
8:00 a.m. – 5:00 p.m.

**REGISTRATION**
- Early Rate: $575.00
- Late Rate: $650.00

Member
Non-Member
$575.00
$675.00

Member
Non-Member
$650.00
$750.00

**Workshop 1 – Better Process Cheese Control School – Processing Controls for Shelf-Stable Pasteurized Process Cheese Product Manufacture – Friday and Saturday, August 1–2**

Current regulations for Low Acid Canned Foods (LACF) require that “Operators of systems shall be under the operating supervision of a person who has attended a school approved by the Commissioner for giving instruction appropriate to the preservation technology involved and who has been identified by that school as having satisfactorily completed the prescribed course of instruction.” The Better Process Control School (BPCS) training course currently available does not include process cheese formulation as a preservation technology.

This 2-day course is designed to cover LACF regulations as they pertain to shelf-stable process cheese manufacture, microbiology and control of *Clostridium botulinum*, thermal processing/pasteurization, formulation control, process instrumentation, HACCP, and production and packaging controls. Examinations will be given at the completion of each section. Satisfactory completion of this course will fulfill the regulatory certification requirements for operators of process cheese manufacturing systems.

**Topics:**
- Introduction to LACF Regulations for Shelf Stable Process Cheese
- Microbiology – Basic Microbiology, Factors Affecting Growth
- Thermal Processing – Microbial Death, D, Z, and F Values, Factors Affecting Thermal Resistance, Pasteurization, Commercial Sterilization, Sterilization
- Botulism and Control of *C. botulinum* – Disease, Risks, Methods to Control Toxin Production
- Formulation Control for Shelf Stable Process Cheeses – Ingredients That Affect Safety, FRI Studies, Additional Factors for Safety
- Process Controls for Process Cheese – Cheese Processing Overview, Preparations Prior to Cooking, Batch Cooking, Continuous Cooking, Testing
- Food Plant Sanitation and GMPs – Basic Principles of Sanitation, Good Manufacturing Practices
- HACCP and Production Controls – Principles of HACCP, Critical Control Points for Shelf Stable Process Cheese, Other Production Controls for Shelf Stable Process Cheese
- Packaging for Process Cheese – Package Development Process, Examples of Packaging, Development and Qualification Testing
- Records and Record-Keeping – Reasons for Record-Keeping, Proper Documentation on Records, Record Retention and Availability, Product Recalls, Processing Records

**Instructors:**
- Kathy Glass, University of Wisconsin-Madison, Madison, WI, USA
- Loralyn Ledenbach, Kraft Foods, Glenview, IL, USA
- Virgil Metzger, Kraft Foods, Glenview, IL, USA
- Don Zink, FDA-CFSAN, College Park, MD, USA

**Organizer:**
Loralyn Ledenbach, Kraft Foods, Glenview, IL, USA

This workshop is dedicated to Dr. Nobi Tanaka, whose work at the Food Research Institute, University of Wisconsin-Madison has been instrumental in assuring the safety of shelf stable process cheese products.
Workshop 2 - The Art of Fungal Characterization and Identification: A Hands-on Workshop –
Friday and Saturday, August 1–2

Mitigating the risks of yeasts and mold contamination remains a constant battle within certain segments of the food and beverage industry. Molds and yeasts cause significant pre- and post-harvest food spoilage losses and mycotoxigenic molds pose significant food safety/regulatory hazards. Fungal identification is a scientific challenge requiring both art and technical expertise. There are a limited number of scientists who understand and have developed the art of fungal identification to a sound science. This workshop provides a unique opportunity to interact with and learn first-hand from a group of experts the best practice for isolation and the basics of classical identification methods, along with current molecular methods being used. Fifty-percent of the workshop will involve live demonstration and a direct hands-on experience in a laboratory setting.

Topics:
- Classical and Molecular Methods of Identification of Yeast and Molds
- Basic Isolation and Analytical Methods of Fungal Contaminants
- Safe Handling of Fungal Cultures
- Environmental Sampling of Processing Plant

Instructors:
Anthony Armstrong, PepsiCo, Barrington, IL, USA
Frank Burns, DuPont Qualicon, Philadelphia, PA, USA
Maribeth Cousin, Purdue University, West Lafayette, IN, USA
Dave Pincus, bioMérieux, Inc., Hazelwood, MO, USA
Emilia Rico-Munoz, BCN Research Laboratories, Rockford, TN, USA

INTENDED AUDIENCE
Microbiologists in quality assurance and quality control performing routine analysis as well as investigational work for the recovery and identification of yeast and mold from food or beverage

Organizers:
Frank Burns, DuPont Qualicon, Philadelphia, PA, USA
Dave Pincus, bioMérieux, Inc., Hazelwood, MO, USA
Patricia Rule, bioMérieux, Inc., Hazelwood, MO, USA

Laboratory Host – Ahmed Yousef, The Ohio State University, Columbus, OH, USA

Workshop 3 - Hands-on Workshop on Microbial Risk Assessment Modeling and Interpretation –
Saturday, August 2

Microbiological risk assessments (MRA) have received much interest in the last decade but require particular multi-disciplinary skills for successful development. This hands-on workshop should help create awareness of the principles of risk assessment/management, the skill requirements, and experience gained regarding the utility and validity of MRA studies. The lecturers will present several of the valuable resources available for risk assessors and managers and provide insights in the challenges to interpret and utilize risk assessment studies. Case studies will help participants to understand the principles of risk assessment and risk management and there will be an opportunity given to participants to propose cases relevant to them ahead of the workshop that may be dealt within plenary or one on one. The workshop will also cover a recent development, the establishment of a broad conceptual framework for risk governance by the International Risk Governance Council. This addresses the fact that the success with which risks are managed in society depends on a complex system of risk governance.

Topics:
- Different MRA Types and Scopes: From Risk Profiles to Probabilistic Approaches to Risk Assessment
- Interpreting Outputs from Different MRA Types for Risk Management Decision-Making
- Detailed Example MRA Case Studies
- Learnings for Industry and Governments from Existing Risk Assessments
- Guidance on Utility and Validity of Microbiological Risk Assessments
- The Risk Governance Framework Developed by the International Risk Governance Council (IRGC)

Instructors:
Leon Gorris, Unilever, SEAC, Sharnbrook, UK
Tom Ross, Centre for Food Safety, Tasmanian Institute of Agricultural Research, School of Agricultural Science, University of Tasmania, Hobart, Tasmania, Australia
Ewen C. D. Todd, Michigan State University, East Lansing, MI, USA
Richard C. Whiting, FDA-CFSA, College Park, MD, USA

INTENDED AUDIENCE
Risk assessment and management staff from government, industry and academia interested in microbiological food safety management

Organizers:
Leon Gorris, Unilever, SEAC, Sharnbrook, UK
Ewen C. D. Todd, Michigan State University, East Lansing, MI, USA

TO REGISTER, GO ONLINE TO WWW.FOODPROTECTION.ORG.
IAFP 2008
EXHIBITORS
COMPANIES SCHEDULED TO EXHIBIT
AS OF JUNE 2, 2008

◆ Indicates IAFP Sustaining Member

◆ 3-A Sanitary Standards, Inc.
   703.790.0295 www.3-a.org
◆ 3M Microbiology
   800.328.1671 www.3m.com/microbiology
◆ A&B Ingredients, Inc.
   973.227.1390 www.abingredients.com
◆ A2LA
   301.644.3204 www.a2la.org
◆ Advanced Instruments, Inc.
   800.225.4034 www.aicompanies.com
◆ Aemtek, Inc.
   510.979.1979 www.aemtek.com
◆ AES – Chemunex, Inc.
   609.497.0166 www.aeschemunex.com
◆ AID GmbH
   49.7434.9364.0 www.aid-diagnostika.com
◆ American Proficiency Institute
   800.333.0958 www.api-pt.com
◆ Applied Biosystems
   650.638.5800 www.appliedbiosystems.com
◆ ASI Food Safety Consultants
   800.477.0778 www.asifood.com
◆ ASM Press
   800.546.2416 http://estore.asm.org
◆ ATCC
   800.638.6597 www.atcc.org
◆ Battelle
   614.424.5295 www.battelle.org
◆ BD Diagnostics
   410.316.4024 www.bd.com/ds
◆ BioControl
   800.245.0113 www.biocontrolsys.com
◆ BioLumix
   734.973.5870 www.mybiolumix.com
◆ BioMérieux, Inc.
   800.634.7656 www.biomerieux-usa.com
◆ Bio-Rad Laboratories
   800.4Biorad www.foodscience.bio-rad.com
◆ British Food Journal
   44.01274.785117 www.emeraldinsight.com/bfj.htm
◆ Charm Sciences, Inc.
   800.343.2170 www.charm.com
◆ Chemstar Corporation
   800.327.0777 www.chemstarcorp.com
◆ Chestnut Labs
   417.829.3724 www.chestnutlabs.com
◆ Cooper-Atkins Corporation
   860.347.2256 www.cooper-atkins.com
◆ Copan Diagnostics, Inc.
   951.696.6957 www.copanusa.com
◆ CRC Press – Taylor & Francis Group LLC
   800.272.7737 www.crcpress.com
◆ Decagon Devices, Inc.
   800.755.2751 www.decagon.com
◆ Deibel Laboratories
   847.329.9900 www.deibellabs.com
◆ DonLevy Laboratories
   219.226.0001 www.donlevylab.com
◆ DuPont Qualicon
   800.863.6842 www.qualicon.com
◆ Ecolab Inc.
   800.392.3392 www.ecolab.com
◆ Environmental Health Testing
   800.446.0257 www.nrfsp.com
◆ Exponent
   888.656.3976 www.exponent.com
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610.696.4405  www.litmusrapid-b.com

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303.277.9613  www.matrixmsci.com

Meritech
303.790.4670  www.meritech.com

Meyer Industries, Inc.
210.736.1811  www.meyer-industries.com

Michelson Laboratories, Inc.
562.928.0553  www.michelsonlab.com

Michigan State University Online Master of Science in Food Safety
517.884.2078  www.online.foodsafety.msu.edu

Microbial-Vac Systems, Inc.
801.523.3962  www.m-vac.com

MicroBioLogics, Inc.
800.599.BUGS  www.microbiologics.com

Microbiology International
800.396.4276  www.800ezmicro.com

Mol Industries
616.453.2484  www.molindustries.com

Nasco Whirl-Pak
920.563.2446  www.enasco.com

The National Food Laboratory, Inc.
925.828.1440  www.thenfl.com

Nelson-Jameson, Inc.
800.826.8302  www.nelsonjameson.com

Neogen Corporation
800.234.5333  www.neogen.com

Neutec Group, Inc
800.280.0726  www.neutecgroup.com

Nice-Pak Commercial
800.444.6725  www.nicepak.com

NSF International
800.NSF.MARK  www.nsf.org

Orkin Commercial Services
800.675.4666  www.orkincommercial.com

Partnership for Food Safety Education
202.220.0651  www.fightbac.org

Q Laboratories, Inc.
513.471.1300  www.qlaboratories.com

QMI
651.501.2337  www.qmisystems.com

Fisher Scientific
800.494.6913  www.fishersci.com

Food Quality Magazine, A Wiley-Blackwell Publication
480.419.1851  www.foodquality.com

Food Safety Magazine
818.842.4777  www.foodsafetymagazine.com

Food Safety Net Services
888.525.9788  www.food-safetynet.com

FoodHandler, Inc.
800.338.4433  www.foodhandler.com

G&K Services, Inc.
952.912.5500  www.gkservices.com

GOJO Industries
800.321.9647  www.gojo.com

Hanna Instruments, USA
401.765.7500  www.hannainst.com

HiMedia Laboratories Pvt. Limited
91.22.40951919  www.himedialabs.com

Hygiena
805.388.8007  www.hygiena.net

Idaho Technology, Inc.
801.736.6354  www.idahotech.com

IEH Laboratories & Consulting Group
206.522.5180  www.iehinc.com

International Association for Food Protection
800.369.6337  www.foodprotection.org

International Association for Food Protection – Student PDG
800.369.6337  www.foodprotection.org

International Food Hygiene
44.13.7724.1724  www.positiveaction.co.uk

International Food Information Council Foundation
202.296.6540  www.ific.org

Intertek
630.623.8318  www.intertek.com

Invitrogen
800.955.6288  www.invitrogen.com

JohnsonDiversey
513.554.4253  www.johnsondiversey.us

Kim Laboratories, Inc.
888.4.KIM.LAB  www.kimlaboratories.com

JULY 2008 | FOOD PROTECTION TRENDS 541
SPECIAL EXHIBIT HALL EVENTS

Sunday, August 3
7:00 p.m. – 9:00 p.m.
Cheese and Wine Reception
Sponsored by Kraft Foods

Monday, August 4
10:00 a.m. Pastries and Coffee
Sponsored by Deibel Laboratories, Inc.
12:00 p.m. – 1:00 p.m.
Lunch in the Exhibit Hall
Sponsored by JohnsonDiversey
3:00 p.m. Coffee Break
Sponsored by NSF International
5:00 p.m. – 6:00 p.m.
Exhibit Hall Reception
Sponsored by DuPont Qualicon

Tuesday, August 5
10:00 a.m. Pastries and Coffee
Sponsored by Food Safety Net Services
12:00 p.m. – 1:00 p.m.
Lunch in the Exhibit Hall
Sponsored by SGS North America
3:00 p.m. Coffee Break
Sponsored by BD Diagnostics
5:00 p.m. – 6:00 p.m.
Exhibit Hall Reception
Sponsored in part by Food Safety Net Services,
Kroger, Q Laboratories, Springer,
and Quality Assurance Magazine

EXHIBIT HOURS

Sunday, August 3
7:00 p.m. – 9:00 p.m.
Monday, August 4
10:00 a.m. – 6:00 p.m.
Tuesday, August 5
10:00 a.m. – 6:00 p.m.
World Technology Ingredients Company, Inc. (WTI) is a specialty ingredients company founded in 1978 to provide ingredients and technology to the meat, poultry and seafood industries. Since 1988, World Technology Ingredients has been issued 12 patents in ingredient and food processing technology.

WTI manufactures dry and liquid ingredients for use by food manufacturers to enhance finished product performance and inhibit a broad range of microorganisms in a wide array of food systems. All ingredients manufactured and sold by World Technology Ingredients are approved for use in USDA and FDA regulated products. All WTI ingredients are Generally Recognized As Safe (GRAS), nonallergenic and safe for direct contact.

WTI opened its new state of the art production facility in Jefferson, Georgia in December 2005 with additional capacity to do Custom Blending and Contract Packaging. The facility, carefully designed to exceed all Good Manufacturing Practices (GMP’s) requirements received a SUPERIOR rating by the AIB on its very first inspection.

WTI is committed to providing safe, new and innovative solutions for its customers. Through leading edge research and technical initiatives, WTI is able to meet the needs of its customers, both large and small. Our goal is simple – to continuously identify and develop new ingredients/technology which provides our customers the tools to profitably succeed.

WTI Products Portfolio

World Technology Ingredients manufactures five different brands of product, each designed to profitably enhance selected performance attributes of a wide variety of foods. The product lines are: IONAL, Myosol, MOstatin, Tenderin, Marinal and Flavorin.

IONAL Products
The IONAL brands of antimicrobials consist of three basic product lines: IONAL, IONAL Plus and IONAL LC – all based upon blends of buffered citrates alone or in combination with diacetyl or acetate. Since it’s approval as an antimicrobial for meats and poultry in 1995 extensive research has been conducted into the use of buffered citrates to inhibit the growth of pathogenic and nonpathogenic bacteria in/on raw and ready to eat meats and poultry.

IONAL is straight buffered sodium or potassium citrate. As the name implies it increases ionic strength. In muscle protein systems this equates to increased marinade/brine retention and yield during processing with less moisture migration and purge in the finished package.

IONAL Plus products are buffered citrates with diacetyl or acetate. It primarily is used to increase the shelf life of perishable foods, especially raw marinated meats, fish and poultry. Typically incorporation of IONAL Plus into a food system will double the products shelf life.

IONAL LC products are buffered citrates with diacetyl or acetate which have been specifically formulated to inhibit the growth of pathogenic bacteria such as Listeria monocytogenes in/on foods, especially ready to eat meats. Studies have also shown it to be an effective means of inhibiting the outgrowth of Clostridium perfringens.

Myosol Products
Myosol branded liquid phosphates, Myosol and Myosol Plus are performance enhanced functional ingredients designed to improve product/process yield and meat tenderness. Myosol brands phosphates are supersaturated tetrapotassium pyrophosphate solutions which are pH optimized to meet your specific needs. They are readily soluble in cold water and instantaneously reactive in meat systems.

MOstatin Products
MOstatin brand products are all natural, consumer friendly, clean label ingredients designed to enhance the retention qualities of marinades in muscle foods and inhibit the growth of pathogens and spoilage microorganisms in a wide array of food systems. MO for microorganism; statin for stasis or no growth. There are four basic product lines of MOstatins: MOstatin LV, MOstatin V, MOstatin VE, and MOstatin LVE. MOstatins have been successfully used as a CCP for Listeria in ham. They have also performed successfully against this pathogen of public health significance in refrigerated salads and soups.

MOstatin LV
MOstatin LV is an all natural blend of lemon juice concentrate and vinegar designed to enhance the organoleptic properties of foods while inhibiting a broad spectrum of bacteria, yeast and molds. MOstatin LV increases the water holding capacity of muscle protein systems. At low concentrations MOstatin LV does not have any flavor impact on the finished product. At higher concentrations, its slight citric taste enhances the natural flavors of meats, fish, poultry and vegetables.

Marinal Products
Marinal brand marinades are custom sized systems designed to deliver maximum performance at an affordable cost. They are specially formulated to maximize the interactions between substrate, process and packaging in order to achieve the customer's desired performance objectives.

Tenderins
Tenderins are all natural, consumer friendly, clean label alternatives to phosphates for use in muscle foods. Tenderins are derived from fruit juices and vegetable bi-products. They are species specific products - each formulated to accommodate the different functional characteristics encountered by different muscle foods: a.k.a. beef, chicken, pork, turkey or fish.

Tenderin L
Tenderin L is the liquid form of Tenderins, each custom blended to meet the specific performance requirements of a wide range of food systems.

Tenderin DL
Tenderin DL is processed lemon juice concentrate dried onto a rice flour carrier designed to increase the cook yield of ready to eat meats and overall viscosity of food systems. The rice flour is specially blend formulated to deliver the optimum amylase and amylpectin concentrations. Its unique properties in cooked systems make Tenderins a viable alternative to phosphates.

Flavorins
Flavorins are all natural flavor systems derived from fruit, vegetable and vinegar based ingredients designed to enhance to organoleptic attributes of food systems throughout the shelf life of a product. They are available in both a dry and liquid form depending upon the desired functionality in the finished product.
Support the Foundation by donating an item today. A sample of items donated last year included:

- iPod
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- Mickey Mouse Wrist Watch
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- New Zealand All Blacks vs. France Rugby Souvenir Pack
- Listeria, Listeriosis and Food Safety
- MP3 Player
- Cuisine and Culture: A History of Food
- Natural Freshwater Pearl Doubles
- 1966-2000 JFP Archives
- “Lucky Cow” Cow Figurine
- New York State Cheddar Cheese
- Kentucky Fun Pack

To donate an item go to our Web site at www.foodprotection.org and complete the Silent Auction Donation Form or contact Donna Gronstal at dgronstal@foodprotection.org 515.276.3344; 800.369.6337.
COMING EVENTS

AUGUST

1-2, IAFP 2008 Workshops, Workshop 1 – Better Process Cheese Control School Workshop 2 – The Art of Fungal Characterization and Identification: A Hands-on Workshop Workshop 3 – Hands-on Workshop on Microbial Risk Assessment Modeling and Interpretation For more information, contact Julie Cattanach at 800.369.6337; E-mail: jcattanach@foodprotection.org. See our workshop information on page 538.

3-6, IAFP Annual Meeting, Hyatt Regency Columbus, Columbus, OH. For more information, contact Julie Cattanach at 800.369.6337; E-mail: jcattanach@foodprotection.org. See our registration form on page 537.

12-13, Food and Nutritional Labeling Workshop, University of Arkansas, Fayetteville, AR. For more information, go to http://www.uark.edu/ua/foodpro/Workshops/.

12-13, NMC Regional Meeting, Hotel Sierra, Green Bay, WI. For more information, call NMC at 608.848.4615 or go to www.nlmconline.org.

12-14, Statistical Process Control for the Food Industry, Athens, GA. For more information, contact University of Georgia Food Science Extension Outreach Program at 706.542.2574 or go to www.EFSoLine.uga.edu.

18-20, Food and Nutraceutical Additives Workshop, University of Arkansas, Fayetteville, AR. For more information, go to http://www.uark.edu/ua/foodpro/Workshops/.


SEPTEMBER


4-5, ASI Food Safety Consultants Bioterrorism and Food Safety Seminar, Las Vegas, NV. For more information, contact Vicki Bodrow at 800.477.0778; E-mail: vbodrow@asifood.com.

7-9, 5th International Whey Conference, Paris, France. For more information, go to www.iwc-2008.org/home.asp.

9-12, ASTHO – NACCHO Joint 2008 Conference, Sacramento Convention Center, Sacramento, CA. For more information call 703.964.1240 or go to www.naccho.org.

14-17, 2008 TAPPI PLACE Conference, Renaissance Portsmouth Hotel, Portsmouth, VA. For more information, call 800.332.8686 or go to www.tappi.org/08place.

15, ASIS International – 54th Annual Seminar and Exhibits, Atlanta, GA. For more information, call 800.465.3717 or go to www.qmi.com.

16, Managing Food Chain Security Effectively Workshop, CCFRA Chipping Campden, Gloucestershire, United Kingdom. For more information, go to www.campden.co.uk/training/training.htm.

16-17, Upper Midwest Dairy Industry Association Annual Meeting, Holiday Inn, St. Cloud, MN. For more information, E-mail Gene Watnass at saantaw@ptel.com.

16-18, Microbiological Laboratory Logistics and Fundamentals Workshop, University of Arkansas, Fayetteville, AR. For more information, go to http://www.uark.edu/ua/foodpro/Workshops/.

16-18, New York State Association for Food Protection's 85th Annual Conference, Doubletree Hotel, East Syracuse, NY. For more information, contact Janene Lucia at 607.255.2892; E-mail: jjg3@cornell.edu.

18, Nutritional Quality of Produce Conference, CCFRA Chipping Campden, Gloucestershire, United Kingdom. For more information, go to www.campden.co.uk/training/agric10.htm.

21-24, AACC International Annual Meeting, Hawaii Convention Center, Honolulu. For more information, call 651.454.7250 or go to http://meeting.aaccnet.org.

21-24, 122nd AOAC International Annual Meeting, Dallas TX. For more information, go to www.aocan.org.

24-25, 2nd Annual China International Food Safety and Quality Conference and Expo, The Landmark Hotel & Towers, Beijing, China. For more information, go to www.chinafoodsafty.com.

24-25, Molecular Biology and Biotechnology; Workshop for Beginners, University of Arkansas, Fayetteville, AR. For more information, go to http://www.uark.edu/ua/foodpro/Workshops/.

24-25, Wisconsin Association for Food Protection Joint Educational Conference, Holiday Inn, Manitowoc, WI. For more information, go to www.wafp-wi.org.

24-26, Washington Association for Food Protection Annual Conference, Campbell's Resort, Chelan, WA. For more information, contact Stephanie Olmsted at 425.201.6471 or go to www.wafp.org.

29-1 Oct., Indiana Environmental Health Association Fall Educational Conference, Belterra Hotel and Conference Center, Belterra, IN. For more information, contact Kelli Whiting at 317.221.2256; E-mail: kwhiting@hhcorp.org.

OCTOBER

1-2, Mexico Association for Food Protection with State University of Puebla International Congress of Food Safety, Puebla, Mexico. For more information, contact Fausto Tejeda Trujillo at 52.222.455.9601; E-mail: ftejada@siu.buap.mx.

IAFP UPCOMING MEETINGS

AUGUST 3-6, 2008 Columbus, Ohio JULY 12-15, 2009 Grapevine, Texas AUGUST 1-4, 2010 Anaheim, California

546 FOOD PROTECTION TRENDS | JULY 2008
COMING EVENTS

• 7–8, Advanced HACCP Training for Meat and Poultry Producers, Athens, GA. For more information, contact University of Georgia Food Science Extension Outreach Program at 706.542.2574 or go to www.EFSonline.uga.edu.

• 9–11, Current Developments in Food and Environmental Virology Symposium, Pisa, Italy. For more information, call 39.050.2213644 or go to www.cost929-environet.org.

• 12–16, 2nd ASM Conference on Beneficial Microbes: Beneficial Host-Microbial Interactions, San Diego, CA. For more information, call ASM at 202.737.3600 or go to www.asm.org.

• 19–22, 8th Joint Meeting of the Seafood Science and Technology Society and the Atlantic Fisheries Technology Conference, Wrightsville Beach, NC. For more information, call 252.222.6334 or go to www.seafoodlab.cmas.ncsu.edu/sst_aft2008/.

• 19–22, 28th Food Microbiology Symposium “Current Concepts in Foodborne Pathogens and Rapid and Automated Methods in Food Microbiology,” University of Wisconsin-River Falls, River Falls, WI. For more information, call 715.425.3704 or go to www.uwrf.edu/food-science.


• 28–29, AIB International’s Principles of Inspecting and Auditing Food Plants, Atlanta, GA. For more information, call 785.537.4740 or go to www.aibonline.org.

NOVEMBER

• 3–6, Better Process Control School, University of Arkansas, Fayetteville, AR. For more information, go to http://www.uark.edu/depts/ifse/bpcsrev1.html.

• 5–6, Alabama Association for Food Protection Annual Meeting, Birmingham, AL. For more information, contact G. M. Gallaspy at 334.206.5375; E-mail: ggallaspy@adph.state.al.us.

• 18–21, New Zealand Association for Food Protection with New Zealand Microbiology Society Annual Meeting, Christchurch, New Zealand. For more information, contact Lynn McIntyre at 64.3.351.0015.

• 19–21, IAFP’s 4th European International Symposium on Food Safety, Lisbon, Portugal. For more information, contact the Association at 800.369.6337 or go to www.food-protection.org.

• 19–21, The ILSI Europe International Symposium on Food Packaging, Prague, Czech Republic. For more information, call 32.2.771.00.14 or go to http://europe.ilsi.org/events/upcoming/4thfoodpckg.htm.

• 20, Ontario Association for Food Protection’s 50th Annual Meeting, Mississauga Convention Centre, Mississauga, Ontario, Canada. For more information, contact Gail Seed at 519.463.6320 or go to www.ofpa.on.ca.
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**DAIRY**

- [ ] DAIRY1: The Bulk Milk Handler: Protocol & Procedures
- [ ] DAIRY2: Dairy Plant
- [ ] DAIRY9: Other Prevention Method for Determination of Raw Milk
- [ ] DAIRY10: Food Safety: Dairy Details
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- [ ] DAIRY31: Managing Milk Quality
- [ ] DAIRY105: Milk Heating Training
- [ ] DAIRY106: Milk Plant Sanitation: Chemical Solutions
- [ ] DAIRY120: Milk Plant Sanitation: Inspection Procedures
- [ ] DAIRY125: Ohio Bulk Milk Handling Video
- [ ] DAIRY130: Pasteurizer Design & Regulation
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- [ ] DAIRY140: Processing Fluid Milk
- [ ] DAIRY186: Pulse of Dairy Quality

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**ENVIRONMENTAL**

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- [ ] ED236: Allergy & Asthma Awareness
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- [ ] ED260: EPA Test Methods for Microbiological Toxicity Tests (Using Chromatographic- or Kinetic-Absorption Techniques)
- [ ] ED270: Environmental Protection Agency: Toxicity Tests (Using Endosulfan/Large Area Tests)
- [ ] ED310: FIT to Drink
- [ ] ED311: Garbage: The Movie
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- [ ] ED320: Global Warming: Hot Times Ahead
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- [ ] ED330: Kentucky Public Swimming Pool and Bath Facilities
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- [ ] ED350: Personal Protective Practices
- [ ] ED355: A Guide to Food Safety for Foodservice Establishment Employees
- [ ] ED356: Pollution, and the Environment
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**FOOD**

- [ ] FE205: A Lot on the Line
- [ ] FE206: The Amazing World of Microorganisms
- [ ] FE208: All about Food Safety
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552 FOOD PROTECTION TRENDS | JULY 2008
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