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PERIODICALS
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FOOD PROTECTION TRENDS

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JULY 2005

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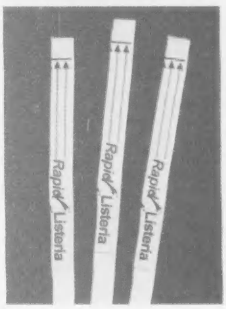

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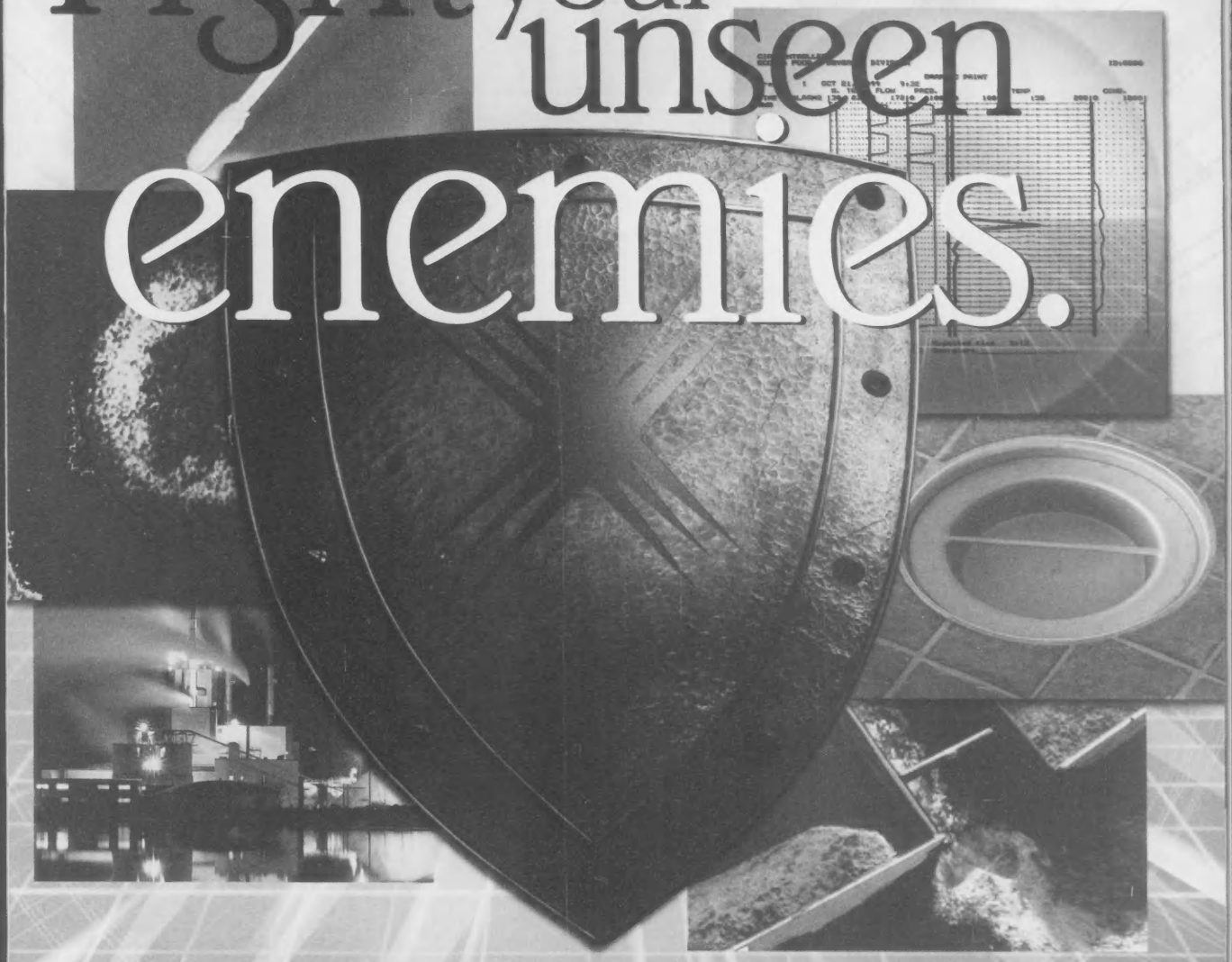

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VOLUME 25, NO. 7

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EXTRAS

BBL™ CHROMagar™ Salmonella

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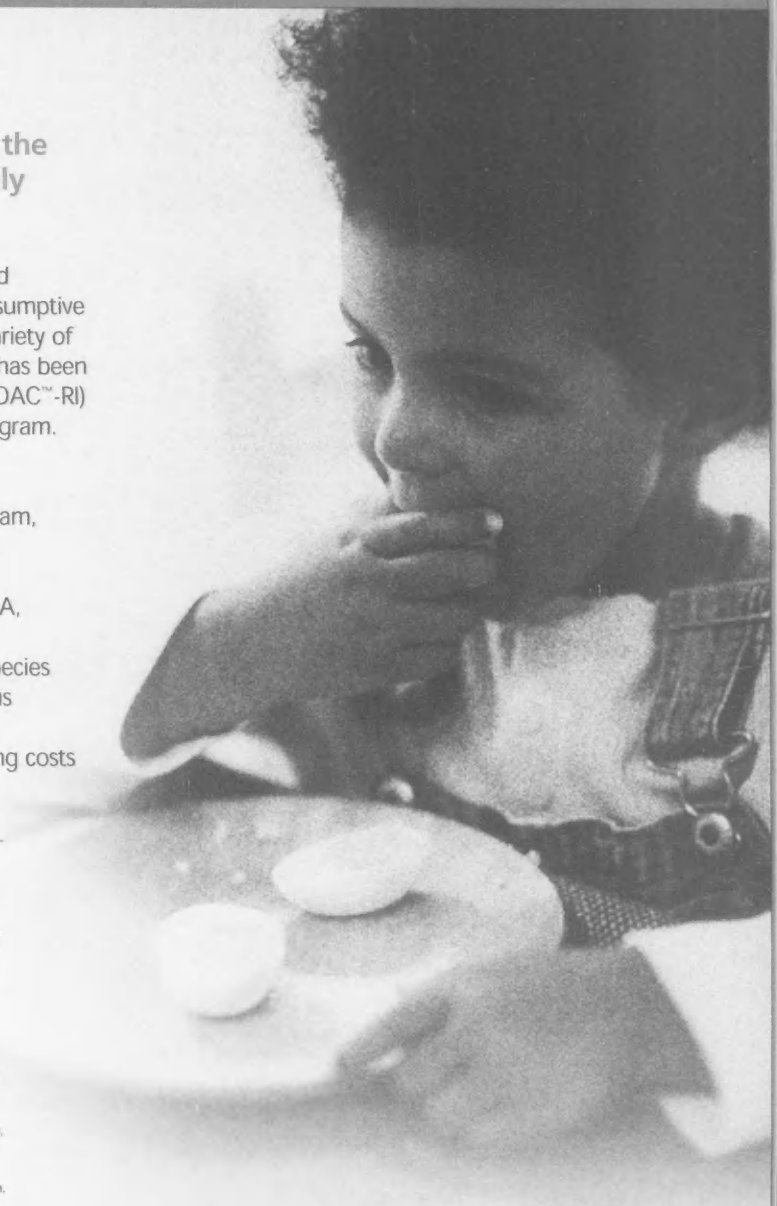

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References:

[1] Rose, Bonnie E. 2001. Isolation and identification of *Salmonella* from meat, poultry and egg products. *In* Microbiology laboratory guidebook, 3rd ed., Food Safety and Inspection Service, U.S. Department of Agriculture, Washington, D.C.

[2] U.S. Food and Drug Administration. 2003. Bacteriological analytical manual (online), AOAC International, Gaithersburg, MD.

[3] International Organization for Standards (ISO). Microbiology of food and animal feeding stuffs – Horizontal method for the detection of *Salmonella* spp., 4th Edition, ISO 6579:2002.

BBL™ CHROMagar™ Family	Cat. No.	Unit
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FOOD PROTECTION TRENDS
SCIENCE AND NEWS
FROM THE INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION

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FOOD PROTECTION TRENDS

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"A VIEW FROM WISCONSIN"

Science is the search for truth – it is not a game in which one tries to beat his opponent... We need to have the spirit of science in international affairs, to find the right solution, the just solution of international problems... Linus Pauling, chemist and 1963 winner of the Nobel Peace Prize.

In October 1911, 35 men from the United States, Australia, and Canada who were concerned with finding the "right solution" for improving the quality of milk met in Milwaukee, Wisconsin to organize the International Association of Dairy and Milk Inspectors. Although only two of the men were from outside the US (one from Canada and one from Australia), the charter members purposefully used "International" in the association's name. Like Linus Pauling, these men recognized that cooperation, searching for the truth, and sharing information about public health programs were essential for the good of all nations. The Association's name has changed several times, yet "International" has always been part of the moniker. Our historical presence in the world, current activities, and our most recent strategic plan, demonstrate that we are committed to be a truly, international association.

As we approach the 100-year anniversary of our founding, the majority of our membership is still based in the US and Canada, but our international membership has expanded to approximately 10% of the total, representing 55 other countries. Currently, we boast Affiliate Chapters in Brazil, Korea, Mexico, Portugal, and the United Kingdom, in addition to the four affiliates from Canada and over 30 chapters in the US. We are extremely pleased to work with members from New Zealand and anticipate chartering a new affiliate from that region by the August 2005 IAFP Annual Meeting. Our goal is to increase the number of affiliates from outside the US to 15 by our centennial year. Although IAFP has a priority to continue to grow our membership, we recognize that travel and budget considerations limit many professionals in our field from participating in IAFP activities, regardless of their country. Therefore, we rely heavily on our affiliates to be extensions of our mission by providing essential food safety educational programming to meet the needs of local members. Active affiliates play a vital role in the overall success of our organization and I strongly encourage all IAFP members to support their local chapters. Membership fees are very affordable to even those who pay for professional dues out of their own pocket. Joining your local affiliate will give you new opportunities to actively participate in a professional association.

By KATHLEEN A. GLASS
PRESIDENT

"The spirit of IAFP is International, and we look to our members to help us in our mission to advance food safety worldwide."

Another measure of our international component of IAFP is by our publications. If you review the affiliations of the authors in both *Journal of Food Protection* and *Food Protection Trends* you will note that countries outside of North America are very well represented, demonstrating that our journals are recognized internationally as reputable venues for scientific publications. The International Food Safety Icons were developed to provide illustrations of important food safety tasks that are understandable by food handlers regardless of their native language and culture. Revised editions of two consumer booklets, *Before Disaster Strikes...A Guide to Food Safety in the Home* and *Food Safety at Temporary Events* are now available in Spanish-language versions. All of these items are available through IAFP.

Conferences and workshops represent another major function of the Association. IAFP continues a partnership with the International Life Science Institute (ILSI) North America by providing a venue for ILSI-sponsored symposia at our Annual Meeting that focuses on emerging food safety issues and technologies and which provides a global perspective.

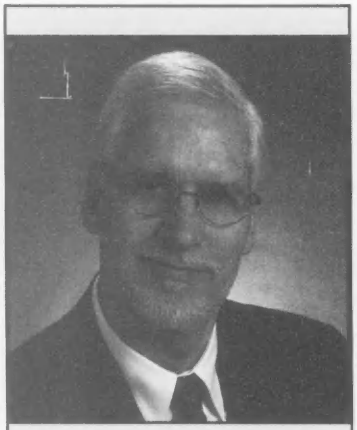
For the first time in the Association's history, IAFP will host a conference outside North America. Final program and registration information will soon be available for the conference to be held in Prague, Czech Republic, October 11–12, 2005. The inaugural IAFP European Symposium

on Food Safety will focus on recontamination issues in the food industry. The program was developed in cooperation with IAFP members from the UK, Portugal, Denmark, Canada, and the US, and with ILSI-Europe, and specifically targets the perspectives of those in countries east of the Atlantic. Be sure to look for details coming to you via E-mail and at IAFP 2005 in Baltimore and tell your colleagues about this event.

Support of international food safety activities goes beyond membership numbers and hosting conferences, however. For many years, the IAFP Foundation Fund has funded shipment of surplus *JFP* and *FPT* journals to developing countries through FAO in Rome. IAFP is continuing to pursue a relationship with the World Health Organization as a non-governmental organization. This alliance would assist in advancing food safety worldwide by increasing the recognition of our Association internationally. IAFP further recognizes individuals dedicated to promoting the ideals of the Association outside the countries of the US and Canada through the International Leadership Award. Most recently, we initiated a student travel scholarship program to attend our Annual Meeting; one scholarship is awarded to a student from Canada or the US and the other from outside these two countries. Next year we will add another scholarship specifically targeting a student from a developing nation in Latin America, Africa, or Asia, and plan to further expand the travel grant program over the next few years.

IAFP is clearly dedicated to promoting the "international" component of the Association through multiple activities, past, current and future. The spirit of IAFP is International, and we look to our members to help us in our mission to advance food safety worldwide. As always, I welcome your comments and ideas. Please feel free to E-mail me at kglass@wisc.edu and let me know your view.

"COMMENTARY"
FROM THE EXECUTIVE DIRECTOR



By DAVID W. THARP, CAE
EXECUTIVE DIRECTOR

"While the staff serves as a coordinating body for IAFP 2005, there are many other people working towards the common goal of making IAFP 2005 a very successful meeting."

July is a very busy time at the IAFP office as you might well imagine. As we prepare for IAFP 2005, with more than 1,600 attendees, 500 presentations, 100 exhibitors and the many meetings and activities, there are numerous details to watch over. Coordination of speaker presentation times, volunteer scheduling, delivery of product and program materials to the convention site are just the beginning of the details necessary for IAFP's Annual Meeting.

With our experienced staff, everything seems to come together seamlessly, but I assure you there are untold hours and hours of work and communication behind the scenes to bring this meeting together. I want to recognize the dedicated work of our staff (numbering only 10!) and thank each and every one of them for the extra efforts they put forth for the Association's Annual Meeting. There are many sacrifices incurred, the largest of which is a week away from home and family late in the summer season. We are fortunate to have staff members who have been employed by IAFP for many years, which makes the task at hand easier.

While the staff serves as a coordinating body for IAFP 2005, there are many other people working towards the common goal of making IAFP 2005 a very successful meeting. Our speakers and presenters are putting the finishing touches on their presentations. Without them, what would our meeting be? This is the focal point and main reason for bringing together more than 1,600 food safety professionals, to share the latest information on protecting the food supply! At the same time, exhibitors are preparing their displays for the exhibit hall to show their products and services to attendees. Again, this is an effort to share their information on how to protect our food supply. You may review a listing of this year's exhibitors on page 594. The program schedule begins on page 558.

Sponsors also provide a much-needed boost to the Annual Meeting revenue stream. We are indeed fortunate to have sponsorship support from many leading companies in the food safety industry. A preliminary listing of IAFP 2005 sponsors is shown on page 597. Please make it known to our sponsors that you appreciate their support of IAFP. Without them, our Annual Meeting would not be able to support some of the receptions or breaks that we have become accustomed to over the years.

Last month, I reviewed the support that Capital Area Food Protection Association (CAFPA) will provide to IAFP by serving as the Local Arrangements Committee. I just want to remind you that they will be busily working during July to coordinate their volunteer schedules and I hear they are working to gather items for a welcome pack for all attendees! The welcome pack is a major undertaking by itself. We again thank CAFPA for their efforts!

As if IAFP 2005 is not enough of a task, we have more going on at the same time! Kathy Glass mentioned in her column this month that we will host our first "European Symposium on Food Safety" October 11 and 12 of this year in Prague, The Czech Republic. Program details are now available on the IAFP Web site (look under "meeting and education"). Registration and hotel information will soon be available. If you are an IAFP Member in Europe, we encourage your attendance and please share this program with your colleagues. We hope to see many of our European Members and friends at this Symposium on Recontamination Issues in the Food Industry.

So, as we approach IAFP 2005 (August 14–17 in Baltimore), you can see that we have our hands full! We enjoy planning and coordinating the world's leading food safety meeting and most of all; we enjoy the interaction with IAFP Members at the Annual Meeting! It is wonderful to know that the pre-planning pays off and food safety professionals are able to benefit by sharing information on protecting the food supply. That not only benefits our Members, but also benefits our world society through improved health and well-being!

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ARTICLES

Food Protection Trends, Vol. 25, No. 7, Pages 510–517

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

International Association for Food Protection

Natamycin Control of Yeast Spoilage of Wine

LINDA V. THOMAS,* RICHARD E. INGRAM, HELEN E. BEVIS, PAUL BRIGHTWELL, NICOLA WILSON and JOSS DELVES-BROUGHTON

Danisco Beaminster Ltd., Innovation Department, 15 North Street, Beaminster, Dorset, DT8 3DZ, United Kingdom

SUMMARY

The polyene macrolide natamycin is used worldwide as a natural preservative, mainly for surface treatment of cheese and dried sausages. It is permitted in wine in South Africa, where it is used particularly at the bottling stage in (semi-) sweet wines or wines of low acidity, which are more vulnerable to re-fermentation. High levels of sulfur dioxide and/or sorbate levels are often used in such wines, which have raised health concerns and which also can impair wine quality.

In the present study, yeast strains associated with wine spoilage were shown to be sensitive to low natamycin levels (< 5 mg/l). In preliminary experiments with a commercial red wine (pH 3.4, 13 mg/l free sulfur dioxide, supplemented with 2% glucose), natamycin at 5 to 10 mg/l prevented growth of *Candida krusei*, *Saccharomyces bayanus* and *Zygosaccharomyces bailii*. In a large-scale experiment, the growth of a commercial *S. bayanus* strain was prevented by 5 mg/l natamycin and the preservative killed yeast cells inoculated into the wine. Natamycin degradation in the wine was faster at ambient temperature (25°C) than at the temperature of chilled wine (8°C). At 25°C the half-life was < 2 weeks and no natamycin was detectable after 3 weeks (addition level 10 mg/l), whereas the preservative remained detectable for 19 weeks at 8°C. This study confirms natamycin effectiveness in wine, demonstrating efficacy against a *S. bayanus* strain that is now implicated in wine re-fermentation spoilage. Natamycin could increase consumer safety by enabling a decrease in levels of sulfur dioxide and sorbate added to wine, with added benefits to the organoleptic quality of the wine. It could be considered as a processing aid, since at ambient storage it would achieve complete yeast kill before being degraded.

INTRODUCTION

Although wine is produced by the fermentative action of yeasts, this same metabolic activity can result in spoilage. Unwanted yeast growth can cause several wine defects: ester taints, volatile acidity, phenolic off flavors, film layers, deacidification, turbidity and re-fermentation of semi-sweet wines. This spoilage can be caused not only by contaminant yeasts but also by those used for the wine fermentation if their growth is unchecked or is re-started by addition of further nutrients. Yeast spoilage problems can result in serious economic loss and is a worldwide problem.

Yeasts causing such spoilage must survive or adapt to the harsh environment of the wine; some may even tolerate the maximum permitted levels of sulfur dioxide or sorbate. Such yeasts include the following genera: *Brettanomyces* (teleomorph: *Dekkera* spp.), *Candida*, *Hanseniaspora*, *Pichia*, *Saccharomyces*, *Torulopsis* (teleomorph: *S. exiguus* Reess), *Rhodotorula* and *Zygosaccharomyces* (*10, 17, 25*). *Z. bailii* is known for its resistance to common chemical preservatives such as organic acids as well as sulfur dioxide, and has frequently been reported as a wine contaminant (*4, 21, 25*). Strains of *S. bayanus* have been specifically selected for their ability to ferment grape juice to give wines with a desired sensory profile, as well as their ability to outcompete other yeasts. These have adapted well to the wine conditions of low pH, high acid, low sugar, ethanol, low temperature, and raised atmospheric pressure, as well as sulfur dioxide and

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sorbate *(1, 11, 16, 23)*. This organism can cause re-fermentation, particularly when sweet reserve is added to the wine prior to bottling.

Sulfur dioxide is commonly used in wine because it has both antioxidant and antimicrobial functions, but there are increasing concerns regarding its use *(12, 26)*. Sulfites can cause alterations in gut flora, providing symptoms associated with irritable bowel syndrome; there have also been reports that wine can trigger asthma attacks in persons whose sensitivity to sulfite was one factor implicated in this reaction *(30)*. A further problem is that high levels of sulfur dioxide or sorbate may impair wine flavor and odor, as well as preventing the secondary malolactic bacterial fermentation important for the development of good wine flavor.

The natural antifungal natamycin (formerly known as pimaricin) is a polyene macrolide produced by *Streptomyces natalensis*. It is approved as a food preservative worldwide, mainly for surface treatment of cheese and dried sausages *(24, 28, 29)*. In the United States, natamycin has GRAS status and is allowed in cheese; more recently its use has been extended to yogurt, cottage cheese, sour cream, cream cheese, salad dressing and soft tortillas *(13,14)*. Authorizations are broader in South Africa (where it was discovered) and include use in wine, alcoholic fruit beverages and grape-based liquors at a maximum level of 30 mg/l. Natamycin is usually added after fermentation is completed, the wine has been racked and free sulfur dioxide levels have been adjusted to 37 mg/l. The wine is then filtered and natamycin added (at 5 to 10 mg/l) prior to bottling. It is used particularly in semi-sweet wine to reduce secondary fermentation and can be employed when chemical preservatives such as sorbate and sulfur dioxide fail to control the growth of spoilage yeasts.

The present study was initiated to investigate natamycin activity against a range of wine spoilage strains, including those previously not studied. The study was considered timely because of the recent re-confirmation of natamycin safety and concerns about use of high levels of sulfur dioxide.

MATERIALS AND METHODS

Yeast strains

The strains, all of which were from the Danisco culture collection, were: *Candida krusei* H66, *Dekkera bruxellensis* CBS6055, *Hanseniaspora uvarum* CBS 5074, *Saccharomyces bayanus* IOC 18-2007, *S. bayanus* H106, and *Zygosaccharomyces bailii* CRA229. The strains were stored on beads at -80°C and were resuscitated by plating on Malt Extract agar (MEA, Oxoid) or Glucose Yeast Extract agar (OGYEA without the addition of oxytetracycline supplement, Oxoid) at 25°C. *S. bayanus* IOC 18-2007 (deposited at the Collection de Levures d'Intérêt Biotechnologique de l'INA de PARIS-GRIGNON) was supplied by Geoffrey Taylor (Corkwise) and was a lyophilized culture from l'Institut Oenologique de Champagne (Epernay, France). This culture, described as *Saccharomyces bayanus* Killer, has developed tolerance to high alcohol levels, low pH, pressure, and preservatives, thus becoming a major spoilage problem in wine.

Natamycin sensitivity testing

Natamycin was tested as Natamax™-G (Danisco), a 50% blend of natamycin with glucose produced specifically for use in wine. Natamycin sensitivity testing was conducted by making a high potency stock solution of natamycin in methanol. This was then diluted in water to make stock solutions with a range of natamycin potencies. These were added (1 ml) to 8.9 ml of Sabouraud Liquid Medium (SLM, Oxoid) to give the following natamycin concentrations: 0, 1.25, 2.5, 5, 10, 20 mg/liter. The test strains were grown overnight in SLM at 25°C. This gave an approximate viable count of 10^7 CFU/ml. The cultures were diluted in Maximum Recovery Diluent (MRD, Oxoid) to give a count of approximately 10^5 CFU/ml. This was added (100 µl) to the SLM/natamycin test broths to give a final test level of approximately 10^4 CFU/ml. Control broths, which contained no natamycin but which contained the highest concentration of methanol present in the natamycin tests, were also inoculated. This was to ascertain whether any growth inhibition observed could be attributed to natamycin rather than to any methanol carried over from the stock solution. Broths were checked on a daily basis by visual observation of turbidity, gas production or precipitation. The minimum inhibition concentration (MIC) was determined by control of growth (with no change for 3 days) for a minimum of 7 days at 25°C.

Preliminary spoilage trials in red wine inoculated with yeasts

Preliminary trials were set up to investigate the growth and natamycin control of spoilage yeasts in an inexpensive red wine with added glucose (BDH) or sweet reserve. Sweet reserve was obtained from Martin Fowkes (Three Choirs Vineyard, Newent, Gloucestershire, UK). Red wine (Valpolicella, Alpha Zeta, 11.5% alcohol, bottled 2000 by Cortegiara, Italy) was purchased from a local wine merchant. Both were analyzed for levels of free and bound sulfur dioxide and reducing sugars (Corkwise Ltd., Ockley, Surrey, UK). The red wine contained 13 mg/l free sulfur dioxide, and 83 mg/l bound sulfur dioxide (a total sulfur dioxide content of 96 mg/l). Reducing sugars were undetectable (< 1 g/l) and the pH was 3.39. The sweet reserve contained 120 mg/l free sulfur dioxide and 331 mg/l bound sulfur dioxide (a total sulfur dioxide content of 451 mg/l). Reducing sugars were 174.0 g/l and the pH was 3.45.

Test strains were grown overnight in SLM broth at 25°C. These were then subcultured to a 1:1 mix of red wine with SLM and incubated again at 25°C. The cultures were passaged in the wine broth for an additional two times to allow the strains to become adapted to the more adverse growth conditions. Growth became visible (by evident turbidity and gas production) after 5 to 10 days in the wine broth. Finally the culture was inoculated in red wine containing 20 g/l glucose. Glucose (BDH) had been prepared as a 40% (w/w) aqueous solution, which was filter sterilized (0.2 µm filters) and added to the wine to produce a 20 g/l glucose wine mixture. Natamycin (as Natamax™ G) was added to the wine/glucose mixtures to prepare a series of duplicate tests containing 0, 2.5, 5 and 10 mg/l natamycin. The 'trained' yeasts were inoculated into the glucose-containing wine to give two inoculum levels, of approximately 10^5 and 10^4 CFU/ml. Immediately after inoculation, the control tube not containing natamycin was tested by viable count enumeration to determine the actual inoculum level. Tests were incubated at 25°C and examined daily for evidence of yeast growth. An uninoculated control tube was also incubated.

In another experiment, sweet reserve was added to the wine. Glucose and water were first added to the sweet reserve to boost the reducing sugar levels and reduce the sulfur dioxide concentration. This mixture was added to the red wine to give final concentrations of 20 g/l sugar and 14.88 mg/l free sulfur dioxide. *S. bayanus* IOC 18-2007 was trained to grow in the wine by passaging in Glucose Peptone Yeast Extract agar (Oxoid) made in wine, then in SLM broth mixed 1:1 with wine. This was inoculated into a series of natamycin-containing tests using the red wine dosed with sweet reserve and glu-

TABLE 1. Minimum inhibitory concentrations of natamycin against a range of yeasts associated with wine spoilage

Test strain	Minimum inhibitory concentration of natamycin (mg/l)
Candida krusei H66	1.25
Dekkera bruxellensis CBS6055	2.5
Hanseniaspora uvarum CBS5074	1.25
Saccharomyces bayanus IOC 18-2007	2.5
S. bayanus H107	1.25
Zygosaccharomyces bailii CRA229	1.25

Tests were conducted in Sabouraud Liquid Medium for 7 days at 25°C

TABLE 2. Natamycin control of growth of spoilage yeasts in red wine containing 20 g/l glucose incubated at 25°C

Test strain	Inoculum	Days until visible growth observed in the presence of natamycin (mg/l)			
	(CFU/ml)	(0)	(2.5)	(5)	(10)
S. bayanus ICO 18-2007	3.0×10^3	7	> 50	> 50	> 50
	3.4×10^4	3	30	> 50	> 50
Candida krusei H66	2.4×10^3	7	> 50	> 50	not done
	1.9×10^4	5	25	39	> 50
Zygosaccharomyces bailii CRA229	1.8×10^3	7	> 50	> 50	> 50
	2.2×10^4	5	25	39	> 50

cose. Tubes were incubated at 25°C and examined daily for signs of growth.

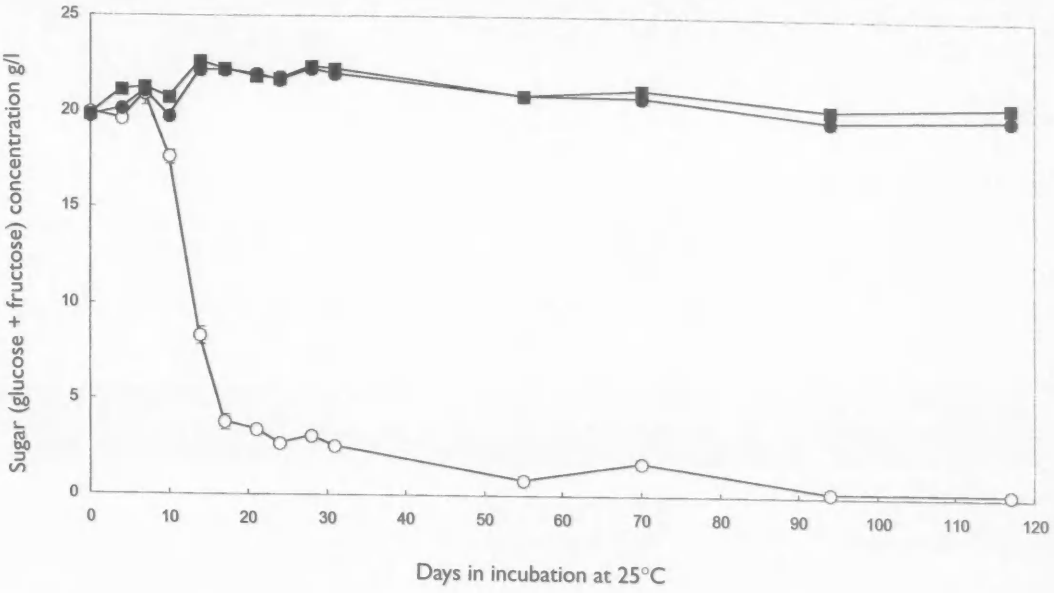
Full scale spoilage trial monitored by HPLC analysis of sugar levels in wine

A large-scale experiment was undertaken to investigate the growth and control by natamycin of *S. bayanus* IOC 18-2007 in red wine with addition of sweet reserve and glucose. The strain was first trained by sequential inoculation and growth in the presence of wine. Glucose and water were added to the sweet reserve as before. This was added to 6 liters of red wine to give final sugar levels of 20 g/l and 14.9 mg/l free sulfur dioxide. The wine was filtered (Filterite® Varafine™ VCSG Series capule 0.65 µm filters, USF Sitz Filterite Ltd., Ledbury, Herefordshire, UK) and then was divided into 2-liter aliquots. Natamycin (as Natamax™ G) was added directly to the wine in the required amount. The wine was decanted into sterile 500 ml Duran bottles to prepare triplicate samples containing 0, 5 and 10 mg/l natamycin. The bottles were filled to the brim so as to have minimal headspace. Each bottle was inoculated with 0.75 ml of an overnight broth culture. Samples (1 ml) were taken at regular intervals and analyzed by reverse phase HPLC, and viable cells were enumerated by appropriate dilution and spread plating on Glucose Peptone Yeast Extract agar (Oxoid) at 25°C.

HPLC analysis

Samples were stored in glass vials at 4°C in the dark for a maximum of 4 days until chromatographic analysis was performed. Before HPLC injection, samples were filtered (0.45 µm filter, Bibby Sterilin). Duplicate samples were analyzed from triplicate samples. Analyses were performed on an isocratic HPLC pumping system (Gilson 305) equipped with a vacuum degasser (CS161 50), an autosampler (Gilson 231XL/401C fitted with Rheodyne 20 µl loop), a manometric module to control pressure fluctuations (Gilson manometric module 805) and a refractive index detector (LDC Analytical refractoMonitor – IV) using Gilson Unipoint 2.10 software. A reverse phase Supelcosil LC-NH_2 column (250 × 4.6 mm, Supelco) was used with a Guard column kit. The system operated at ambient temperature at a flow rate of 2 ml/min. The elution was performed by use of a mobile phase of 33% acetonitrile (HPLC grade, BDH). Standard solutions were a mixture of 10 g/l D-(+)-glucose (99.5% anhydrous purity, Sigma) and 10 g/l D-(-)-fructose (99% purity, Sigma) as well as individual solutions of both sugars at 20 g/l.

FIGURE 1. Natamycin control of the growth of a spoilage yeast. HPLC analysis of glucose and fructose levels in wine inoculated with *Saccharomyces bayanus* IOC 18–2007, incubated at 25°C. Sugar levels dropped in wine not containing natamycin, indicating yeast growth. Results are the average of three different samples, with standard deviation shown. Natamycin added at 0 mg/l (O), 5 mg/l (•), and 10 mg/l (■)



Investigation of the cidal effect of natamycin

Natamycin (as Natamax™ G) was added directly to 200 ml of red wine at a concentration of 10 mg/l natamycin. Serial doubling dilutions of the wine were performed to prepare test levels of 1.25, 2.5 and 5 mg/l natamycin. The wine samples were distributed as 9.9 ml volumes and inoculated with 100 µl of overnight SLM broth culture of yeast strains. The samples were incubated at 25°C, and viable cells were enumerated by sampling after 24 h.

In a second experiment, the test strains were grown for 48 h in SLM broth with 10% methanol, pH 4.5, prior to the experiment. Wine was prepared with addition of 2% glucose and 10 ppm natamycin. Further tests were prepared as already described to make 2% glucose wine containing 0, 1.25, 2.5, 5 and 10 mg /l natamycin.

Analysis of natamycin levels in wine over time

The residual natamycin content was measured by use of a horizontal agar plate diffusion procedure *(24, 27)*, using *S. cerevisiae* ATCC9763 as test organism. A natamycin standard solution in methanol was first prepared, from which a range of natamycin concentrations were then prepared in the red wine. Wine samples were tested neat in quadruplicate.

RESULTS

Natamycin sensitivity of yeast strains implicated in wine spoilage

Minimal inhibitory concentrations were determined as control of growth for a minimum of 7 days, with no change in the tests for a minimum of 3 days. Results are shown in Table 1. All the strains were sensitive to low levels of natamycin, confirming previous studies of natamycin efficacy.

Preliminary yeast spoilage trials in wine

In table 2 are shown the results of the first experiment investigating the control of spoilage yeasts by natamycin in red wine containing 20 g/l glucose. Low levels of natamycin controlled the growth of the spoilage yeasts, which, in the absence of natamycin, visibly spoiled the wine within 7 days. The dose-dependent effect of natamycin is shown in these results. In the second trial of red wine containing sweet reserve and glucose, *S. bayanus* IOC 18-2007 was inoculated at 2.3×10^3 and 1.7×10^5 CFU/ml. Growth was evident in the wine after 11 days at the lower inoculum level and after 7 days at the higher inoculum level. By the end of the trial period (29 days) no growth was evident in any of the tubes containing natamycin. The minimum test level was 2.5 mg/l natamycin.

Large scale yeast spoilage trial of natamycin in wine

S. bayanus IOC 18-2007 was the only strain to grow successfully in the large scale trials. In this test there was very limited headspace (to mimic wine in a wine bottle); thus sulfur dioxide levels would not have decreased as fast as in the small-scale tests. Initial counts in the wine samples averaged 2.4×10^4 CFU/ml. After 7 days incubation at 25°C there was visible evidence of yeast growth in all three control samples not containing natamycin. Viable count enumeration confirmed that, after 10 days, all three control bottles contained > 10^6 CFU/ml. The trial was finished after 117 days. During this time there was no sign of any yeast growth in samples containing natamycin. Furthermore, no viable cells were detected after the first 7 days incubation. The HPLC analysis results (Fig. 1) show that sugar levels remained steady in the wine containing natamycin. In the control wine without natamycin addition, sugar levels

TABLE 3. The cidal effect of natamycin on yeast strains in red wine

Test strain (inoculum level)	Natamycin level mg/l	Viable cells after 24 h at 25°C CFU/ml
Saccharomyces bayanus IOC 18-2007 (1.4×10^5 CFU/ml)	0	3.0×10^1
	1.25	3.0×10^1
	2.5 – 10	< 10
Zygosaccharomyces bailii CRA229 (6.3×10^4 CFU/ml)	0	8.3×10^3
	2.5 – 10	8.0×10^3
	5	1.7×10^3

TABLE 4. The cidal effect of natamycin on yeast strains in red wine supplemented with 2% glucose

Test strain (inoculum level)	Natamycin level mg/l	Viable cells after 25 days at 25°C CFU/ml
Saccharomyces bayanus IOC 18-2007	0	1.4×10^6
	1.25 – 2.5	< 10
(2.6×10^6 CFU/ml)		
Zygosaccharomyces bailii CRA229	0	1.8×10^4
(1.2×10^5 CFU/ml)	1.25	$> 10^3$
	2.5	1.0×10^3
	5	2.0×10^1
	10	< 10

dropped rapidly after only a few days incubation and most of the sugar was consumed within 2 weeks.

Natamycin cidal activity in wine and buffer

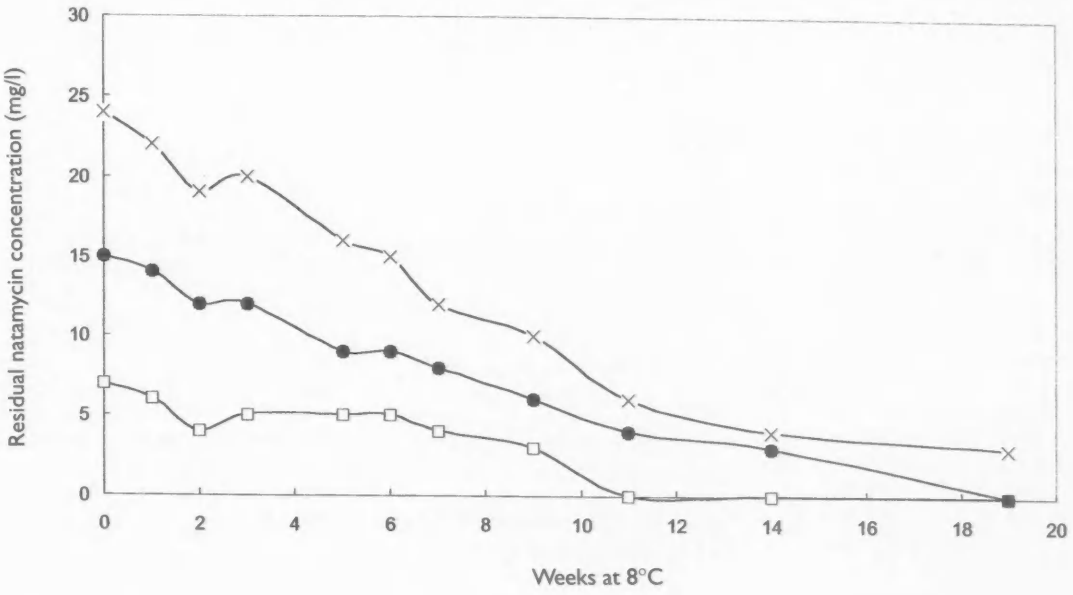
The results of the first experiment are shown in Table 3. Within 24 h, the wine alone (without natamycin addition) had a cidal effect on some of the yeasts (*C. krusei* H66, *D. bruxellensis* CBS6055, *H. uvarum* CBS5074, *S. bayanus* H106). This could have been due to a combination of low pH, alcohol, and sulfur dioxide. *S. bayanus* IOC 18-2007 and *Z. bailii* CRA229 proved, unsurprisingly, to be the most resistant strains to these conditions. The added hurdle of 2.5 mg/ml natamycin reduced counts of *S. bayanus* IOC 18-2007 to undetectable levels after 24 h, but after one day natamycin had not reduced the counts of *Z. bailii* (Table 3).

In the second experiment, which was monitored over a longer period and which included 2% glucose, after one day and for the remaining 25-day period of the test, viable cells could not be detected in any tests (with or without natamycin) inoculated with *D. bruxellensis* CBS6055. Cells of *C. krusei*, *H. uvarum* and *S. bayanus* H107 were detected at intermittent periods at low levels in tests with no added natamycin, but no cells were detected after day 1 for any tests with added natamycin. The results after 25 days incubation at ambient temperature for *S. bayanus* IOC18-2007 *and Z. bailii* CRA229 are shown in Table 4. Higher levels of natamycin were needed to completely kill *Z. bailii*. However, it should be noted that none of the strains, apart from *S. bayanus* IOC 18-2007, were able to grow in the large-scale experiments, where sulfur dioxide levels would have been more stable. This indicates that the combined effect of natamycin with sulfur dioxide was very effective at killing and controlling the yeasts. In this cidal experiment, *S. bayanus* IOC 18-2007 cells appeared to be rapidly killed by the combination of low natamycin levels and the other wine components.

Natamycin stability in red wine

The bioassay results showing the retention of natamycin in red wine stored at 8°C and 25°C are shown in Fig. 2. Degradation of natamycin was much more

FIGURE 2. Analysis of residual natamycin levels in wine stored at 8°C. Natamycin added at 5 mg/l (V), 10 mg/l (•), and 20 mg/l (X)



rapid at ambient temperature than at chilled temperature. The half-life of natamycin was 1 to 1.5 weeks at 25°C. After less than 3 weeks at this temperature, no natamycin was detected in wine to which 10-ppm natamycin had been added, in contrast to a detection period of 19 weeks at 8°C. These results are in accordance with previous observations of natamycin degradation in wine *(2, 3)*.

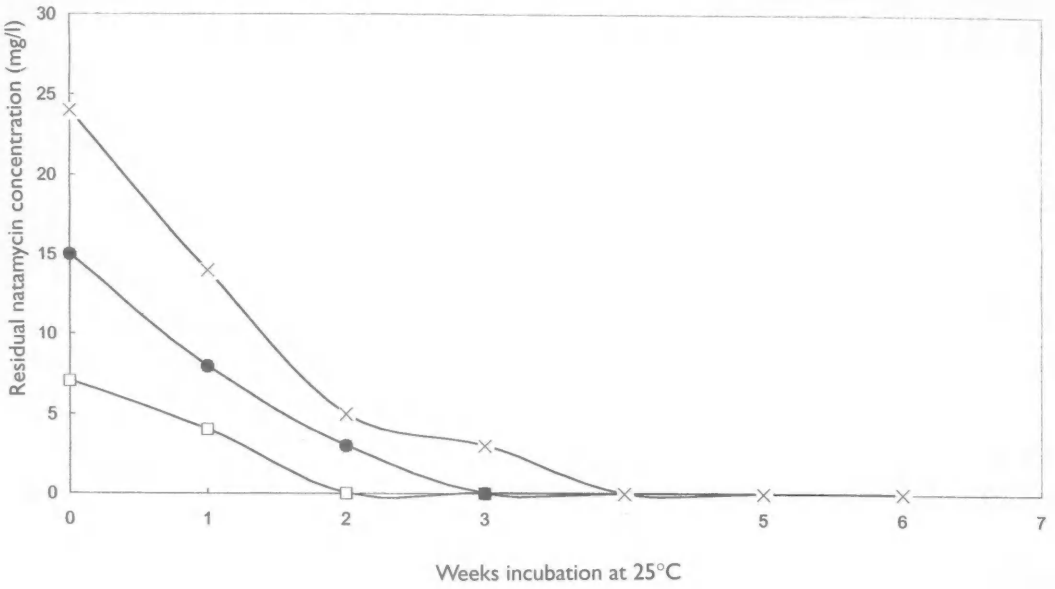
DISCUSSION

Previous studies in Germany in the 1970s and in Italy in the 1980s investigated the use of natamycin as a wine preservative, reporting its benefits in allowing reduction of sulfur dioxide levels and its degradation in acid *(2, 3, 5, 6)*. For example, one study showed that natamycin at 5 mg/l in combination with < 100 mg/l sulfur dioxide prevented refermentation in sweet wines inoculated with *S. cerevisiae*, in which the maximum possible addition of sulfur dioxide alone could not prevent the yeast spoilage. Prevention of yeast inhibition of malolactic fermentation by *Leuconostoc oenos (19)*, and control of *Brettanomyces*, a yeast found in 25% of bottled red wines of Pinot noir, that is directly responsible for production of volatile phenols *(15)*, have also been reported. The present study presents experimental data in a red wine and demonstrates activity against a commercial wine strain of *S. bayanus* that is difficult to control with current permitted levels of sulfur dioxide and sorbate. Natamycin is effective at much lower concentrations than the concentrations required for preservatives such as sorbate and benzoate. In combination with the adverse effects of components of the wine (sulfur dioxide, high acid, high ethanol), low natamycin levels would achieve total kill of any contaminating cells within a short period of time. This confirms results of previous studies showing that natamycin activity in both wine and juice depends on temperature and the type of beverage *(22)* and is enhanced in combination with other hurdles found in wine: ethanol, anerobiosis, low pH and sulfur dioxide *(3, 6)*.

There has been debate regarding natamycin use in wine. An early study *(9)* raised concerns that it could result in development of resistance and morphological changes in yeasts, but these suggestions were convincingly refuted by others *(18)*, who criticized the experimental procedure and argued that fungi do not develop natural resistance to natamycin because of its mode of action. This point was supported by a survey in cheese warehouses in which natamycin had been used for up to 9 years, where no change in the composition of the contaminant microflora was shown *(8)*. It was also reasoned that extremely low natamycin concentrations are used in wine, and these levels decrease because of its decomposition. The present study demonstrated both that low levels of natamycin are effective and that it is rapidly degraded in wine, particularly at ambient temperature, although contaminant yeast cells will be destroyed before natamycin levels become ineffective.

Prior to acceptance of natamycin worldwide as a food preservative, its potential as a preservative in juice and wine was critically assessed. Doubts raised regarding its safety and concerns about the ability of strains to develop cross-resistance *(31)* have also been countered. Natamycin has a complete dossier of toxicological data and an extensive history of safe use in and on food products. It has been used for years in South Africa as a wine preservative with no known problems. Full safety testing was conducted on natamycin in order to allow its use as a food preservative worldwide. Demonstration of its very low oral toxicity led to approvals for its use by the FDA and the WHO Acid degradation of natamycin leads

FIGURE 3. Analysis of residual natamycin levels in wine stored at 25°C. Natamycin added at 5 mg/l (V), 10 mg/l(•), and 20 mg/l (X)



to the formation of mycosamine, aponatamycin and di-natamyinoldediol, compounds that have no antimicrobial activity and no known safety problems *(7, 20)*. Natamycin's mechanism of action is specifically antifungal: disruption of a fungal membrane component, ergosterol, which is not present in bacteria. Consequently, it has no potential to transfer resistance to, or enable the development of antibiotic resistance of, any bacterium. In 2002, the World Health Organization and the Food and Agriculture Organization "JECFA" committee re-evaluated natamycin upon a specific request to assess the issue of antibiotic resistance *(32)*. The resulting monograph reviewed all aspects of the toxicity and safety of natamycin and its degradation products (including new data not previously evaluated) and reached very positive conclusions.

Natamycin could be used to reduce levels of sulfur dioxide in wine – a measure that is desirable both in terms of public health and in terms of wine quality. It would be particularly useful in the production of sweet wines, in which current levels of sulfur dioxide are sometimes ineffective and re-fermentation is a particular problem. It should, however, always be borne in mind that good wine-making remains the most effective way to avoid microbial spoilage. Preservatives such as natamycin should never be viewed as a means to offset sloppy, unhygienic winemaking practices.

ACKNOWLEDGMENTS

We wish to thank Geoffrey Taylor of Corkwise Ltd. (Ockley, Surrey, UK) for valuable advice and discussions regarding experimental planning. We also wish to thank Martin Fowkes of Three Choirs Vineyard (Newent, Gloucestershire, UK) for technical advice and supply of sweet reserve.

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In Memory of...

Harold Wainess
Highland Park, IL

IAFP extends our deepest sympathy to the family and friends of Harold Wainess who passed away on June 12, 2005.

Harold was a recognized expert in food processing and packaging sanitation with over 60 years experience as a consultant to the food and dairy industries. In 2003, he retired as president of Harold Wainess & Associates, Inc., which he founded in 1952. For eleven years prior to this, he was a milk and food consultant with the U.S. Public Health Service working in the Chicago Regional Office.

Over the years Mr. Wainess served on many committees including committees with the International Dairy Federation (IDF), 3-A Sanitary Standards, the International Association for Food Protection (IAFP) and the Associated Illinois Milk, Food and Environmental Sanitarians (AIMFES).

Harold served as Secretary of the U.S. National Committee of the IDF from 1980 until 1997, was president of AIMFES from 1971 to 1973 and received many awards for his service to the profession. Some examples include Mr. Wainess' recognition as an IAFP Honorary Life Member in 2004 and in 1984 he was named Sanitarian of the Year by IAFP. He also received the P.E. Riley Award from AIMFES and was named as their Honorary Life Member in 1992.

Mr. Wainess began his Membership with IAFP in 1942. IAFP will always have sincere gratitude for his contributions to the Association and the profession.

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International Association for Food Protection

The Internet as a Useful Adjunct during Foodborne Outbreak Investigations

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SUMMARY

During a foodborne outbreak investigation in Nevada during 2001, raw oysters were identified as a potential vehicle. Irregularities in record keeping prevented traceback of specific shipments of oysters; however, the Internet provided information useful in locating the source of the oysters. In addition, harvest site closure notices posted on the Internet revealed inconsistencies in the dating of oyster tags at the processor. The Internet provides access to a wealth of information available at Web sites of federal, state, and local agencies, as well as commercial food producers. This information can be useful during outbreak investigations.

INTRODUCTION

The Internet has served as a tool in conducting outbreak investigations *(4, 10, 11)*. Surveys e-mailed to exposed persons or posted on Web sites *(9)* offer the advantage of rapid delivery and remove the need for data entry. Chat rooms have also been used as a method of partner notification *(7)*. In addition, the Internet provides access to a wealth of information available at federal, state, and local websites. This information can be useful during outbreak investigations. We present the following report as an example of how information on the Internet provided crucial information about a food processing company during a foodborne outbreak investigation.

METHODS AND MATERIALS

In July of 2001, the Clark County Health District Office of Epidemiology (OOE) notified the Centers for Disease Control and Prevention that 18 persons had developed vomiting and diarrhea on June 23 and 24 after dining in a specific restaurant in a hotel-casino complex located in Las Vegas, Nevada. Initial reports indicated that all ill persons had consumed Brand X raw oysters at Restaurant A on June 22. We reviewed all complaints of foodborne illness submitted to OOE from the public in June 2001, examined hotel complaint records, reviewed discharge diagnoses at local urgent care centers, and analyzed stool culture results on specimens submitted by OOE during June. To identify cases, we then conducted hypothesis-generating interviews and developed a standardized questionnaire based on the results.

A cohort study was designed to identify risk factors for illness among persons who ate at Restaurant A on June 22. Cohort members were identified by OOE complaint reports, the hotel-casino complex's complaint reports and credit card receipts, and meal companions. A case was defined as an acute gastrointestinal illness with vomiting or diarrhea (three or more loose stools in a 24-hour period) that developed within 72 hours in a person who ate food at Restaurant A on June 22.

In addition, we inspected the kitchen and serving area of Restaurant A, reviewed its food handling procedures, and interviewed kitchen staff who had worked on the days when the exposure was likely to have occurred.

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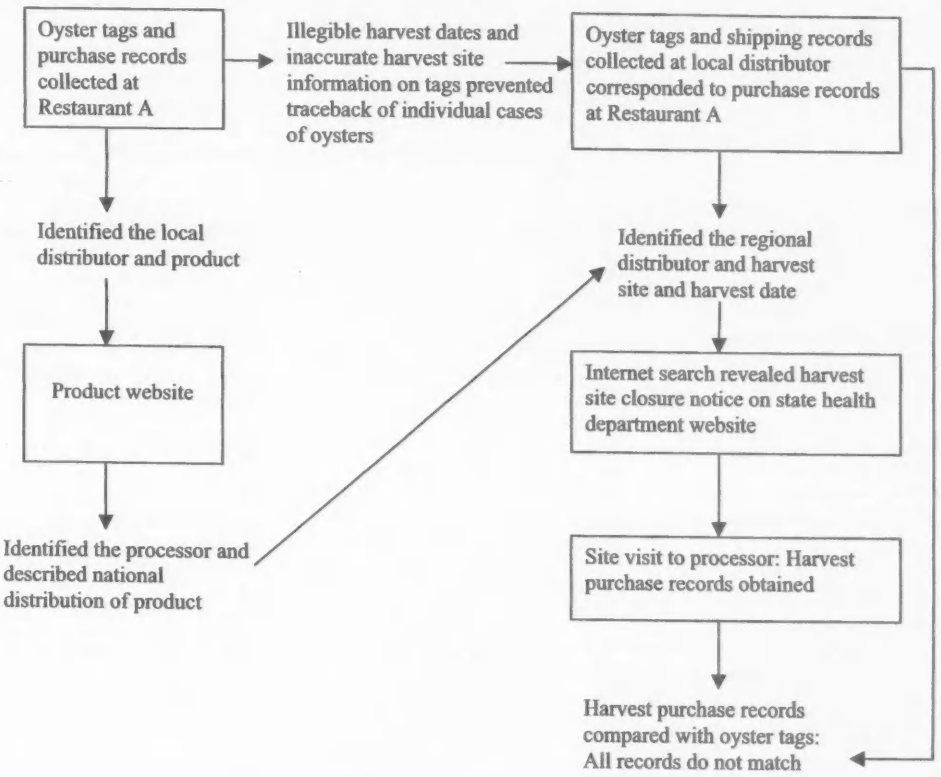
FIGURE 1. Oyster traceback: Information sources and flow during a foodborne outbreak investigation, Las Vegas, Nevada, 2001



Shipping records and oyster tags were collected from Restaurant A and the relevant distributor. We used the Internet to search for information on the oyster distributor and processor, as well as for additional information such as weather advisories and oyster harvest site closure notices.

RESULTS

Outbreak investigation

A total of 19 patients and 27 well patrons were enrolled in our retrospective cohort study. The most frequently reported symptoms among the 19 enrolled patients were nausea (100%), diarrhea (84%), vomiting (79%), abdominal cramps (79%), body aches (73%), and fever (63%). The date of diarrhea onset ranged from June 23 through 27, 2001, with most patients exhibiting this sympton beginning on June 23 and 24. The median incubation was 35 hours (range 4–45 hours). The median duration of illness was 72 hours (range 9–216 hours). Eight patients (42%) received medical attention, four (21%) received intravenous fluids, and three (16%) received antibiotics. None of the patients required hospitalization. Of the five stools submitted for culture by patients, no enteric pathogens were isolated; however, norovirus testing was not conducted.

Analysis of the cohort data indicated that consumption of raw oysters accounted for the most cases (71%) and was significantly associated with illness (RR 4.3, 95% CI 1.7–10.9). On univariate analysis, it was seen that four other food items were consumed by fewer cases, but were also statistically associated with illness; Maine lobster halves (RR 4.5, 95% CI 1.2–17.2), cocktail sauce (RR 4.1, 95% CI 1.1–15.5), snow crab legs served cold (RR 3.4, 95% CI 1.1–10.1), and precooked, breaded, and deep fried shrimp (RR 3.1, 95% CI 1.4–6.6).

Investigation of the food preparation areas of Restaurant A revealed that the implicated seafood items were all prepared in the same area, primarily by one employee. Raw oysters were found stored on trays directly above the cold crab legs, which were served without reheating. Sixteen of the 28 kitchen employees were interviewed, including the employee who had prepared the majority of the implicated seafood items; all denied recent illness.

Oyster traceback

Because initial patient complaints to OOE reported oyster consumption, a traceback of Brand X raw oysters was initiated by the Food and Drug Administration (FDA) shortly after the investigation began. Each case of oysters (also known as shellstock) should be shipped with a tag that identifies the original certified dealer, the harvest site, and the harvest date for the oysters in that case. This tag allows the State Shellfish Control Authority (SSCA) to determine the original source of the oysters if a cluster of illness is associated with their consumption. The SSCA in the state where the oysters had been harvested has the responsibility to determine if the harvest area of the implicated oysters should be closed and whether to recall other cases of oysters harvested from the same area during the same time frame. To retain harvest information at the point of sale, certified shellstock shippers are

TABLE 1. Web sites containing useful information on foodborne outbreaks

CDC[a]	http://www.cdc.gov/foodborneoutbreaks	Information on outbreak investigations, national surveillance data, specimen collection information
MDA[b]	http://www.mda.state.mi.us/FPAdvisor/FPAdvisorHelp.htm	Search engine that matches clinical symptoms to etiologic agents
FDA[c]	http://www.foodsafety.gov/~fsg/fsgpath.html	Gateway to government food safety information
FDA	http://www.fda.gov/opacom/7alerts.html	Recall notices on FDA-regulated products
USDA[d]	http://www.fsis.usda.gov/factsheets/fsis_food_recalls/index.asp	Recall notices on USDA-regulated products
FDA	http://www.cfsan.fda.gov/seafood1.html	Seafood information and resources
CSTE[e]	http://www.cste.org	Provides links to state and local health departments

[a]Centers for Disease Control and Prevention
[b]Michigan Department of Agriculture
[c]United States Food and Drug Administration
[d]United States Department of Agriculture
[e]Council of State and Territorial Epidemiologists

permitted to transfer information from the shipper's tags onto their own tags. If new tags are applied, the original tags must be kept on file for a minimum of 90 days.

In this outbreak, oyster tags recovered from Restaurant A did not clearly indicate the date of the oyster harvest. All Brand X oysters served at Restaurant A around the time of the outbreak were purchased from Local Distributor A, who printed the oyster tags found at Restaurant A. Management at Local Distributor A indicated that water-soluble ink was mistakenly used for the date stamp, resulting in smeared, illegible dates.

The harvest site listed on the tags collected at Restaurant A was legible, but all tags indicated the same harvest site. According to receiving records, the amount of shellstock shipped to Local Distributor A from the same harvest site as listed on the tags recovered from Restaurant A was less than the amount sold to Restaurant A, indicating that harvest site information on the oyster tags recovered from Restaurant A had been transferred incorrectly to the new tags. Local Distributor A reported that the employee responsible for transferring harvest information had mistakenly used the same harvest site stamp on all Brand X shellstock received in June, regardless of the information recorded on the original tags. Therefore, it is unknown which harvest sites were implicated in this outbreak. As a result of recording errors, SSCA was unable to complete the traceback. Figure 1 displays the information available for the oyster traceback.

A search for Brand X oysters on the Internet identified the processor of this brand, Processor A. The website of Processor A described the national distribution of the product, including certified shellstock shippers of Brand X oysters. One of those, Regional Distributor A, was identified in shipment records at Local Distributor A. The website of the Regional Distributor A indicated that they sold exclusively Brand X oysters and received oysters directly from the original certified shellstock dealer, Processor A. Thus, Processor A was the likely supplier of the implicated oysters.

We then searched the Internet for information on harvest sites used by Processor A. Storms that produce heavy rain may be associated with increased fecal coliform contamination of oyster beds. To protect the health of the shellfish consuming public, the SSCA monitors rain events and relies on water quality sampling and the requirements of their shellfish harvest management plans to determine when oyster beds should be closed to harvest. Oyster beds closed by the SSCA remain closed for harvest until fecal coliform levels decline to acceptable levels. Because of this association, we searched the Internet for weather advisories for harvest sites and dates recorded on the original oyster tags printed by Processor A. We located a state health department notice of closure for the harvest site on the date listed on one of the oyster tags printed by Processor A. As a result, local health officials visited Processor A and reviewed their harvest records. The record review yielded another inconsistency. Some oyster tags printed by Processor A, and found at Local Distributor A, indicated that oysters were harvested on a date on which no harvesting should have occurred, according to harvest purchase records.

DISCUSSION

We investigated an outbreak of gastroenteritis among persons who had eaten at a restaurant and conducted a traceback of the implicated food. Clinical data suggested norovirus as the likely etiologic agent; stool cultures were negative for routine bacterial pathogens, vomiting was reported in ≥ 50% of patients, and the median incubation period was within 24–48 hours *(6)*. However, the median duration of illness was 72 hours, which is greater than the upper limit of 60 hours suggested by Kaplan et al. *(6)*. Because most patients were well by the time they were identified as part of the cohort, norovirus shedding in stool would have resolved *(1)*; therefore, confirmatory testing was not conducted.

Because raw oysters were significantly associated with illness, accounted for the largest proportion of cases, and have been previously implicated as a vehicle of norovirus outbreaks *(2, 3, 8)*, we examined the origin, processing and distribution of the oysters served at the restaurant. Problems with record keeping at multiple points during the processing, distribution, and sales prevented accurate and timely identification of the harvest site of the implicated raw oysters.

In the absence of official harvest tag information, we gathered relevant information from publicly available sites on the Internet. Information located on the Internet identified Processor A as the sole source of Brand X oysters served at the restaurant. Harvest site closure information also available on the Internet indicated several important inconsistencies in the harvest tags. Harvest information can be crucial to the successful investigation of foodborne illness. It was useful to attempt to corroborate private shipping records with publicly available harvest information located on the Internet. The information gathered during the traceback investigation was provided to Local Distributor A, Regional Distributor A, and Processor A to encourage them to maintain accurate records.

During this investigation, the Internet provided important background information on Processor A and on the oyster industry in general. Gathering product information from the Internet should be considered during any foodborne outbreak investigation. Other websites provided reference information, which was easily accessed in the field.

A variety of seafood specific information is available on the websites of FDA, http://www.cfsan.fda.gov/seafood1.html. Individual State Shellfish Control Authority websites are also an invaluable resource, particularly for locality-specific information such as harvest site closure information. The website of the Council of State and Territorial Epidemiologists, http://www.cste.org, provides links to state and local health department websites where Shellfish Control Authorities are located.

Additional websites with useful resources that we used during this and other foodborne outbreak investigations are listed in Table 1. The website of the Foodborne and Diarrheal Diseases Branch of the Centers for Disease Control and Prevention, http://www.cdc/gov/foodborneoutbreaks, provides sample questionnaires, specimen collection instructions, forms for outbreak reporting, and pathogen-specific clinical and epidemiologic information. The Michigan Department of Agriculture website, http://www.mda.state.mi.us/FPAdvisor/FPAdvisorHelp.htm, provides free access to the Food Poisoning Advisor, a search engine that matches clinical symptoms to etiologic agents. The websites of the United States Food and Drug Administration, http://www.fda.gov/opacom/7alerts.html, and the United States Department of Agriculture, http://www.fsis.usda.gov/factsheets/fsis_food_recalls/index.asp, provide access to current food recalls.

This outbreak is an example of how the Internet can be a valuable tool to investigators. However, it is important to note that resources posted on the Internet were not the sole source of information; rather, the resources complemented data gathered during the field investigation. Information posted on the Internet is not subject to the same scrutiny as published manuscripts; therefore, the accuracy and source of the information should always be considered, and primary references of cited publications should be reviewed.

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Use of a GMP/GHP HACCP Checklist to Evaluate the Hygienic Status of Traditional Dry Sausage Workshops

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SUMMARY

The purpose of this work was to evaluate the hygienic status and the feasibility of implementing a self-control system in ten traditional dry sausage workshops in Catalonia (Spain). A Good Manufacturing and Hygienic Practice checklist based upon HACCP principles was incorporated into a questionnaire. It included topics related to pre-requisites of a self-control system, critical points of the process and the efficiency of the hygiene program used at their facilities. In addition, analyses of spoilage/pathogen flora in environmental samples and products, as well as measurements of temperature and relative humidity, were carried out at several facilities. After the questionnaire had been completed, traditional workshops were ranked. All workshops studied presented adequate infrastructures for implementation of a self-control system. In general, cold rooms and mixing machines were classified as "ultraclean" (0–2 × 10^2 *Enterobacteriaceae* CFU/100 cm^2) and no pathogens were detected in them. Stuffing machines received a "not clean" denomination (> 10^3 *Enterobacteriaceae* CFU/100 cm^2), with *Listeria monocytogenes* present in 20% of these. Pathogen concentrations of dry sausages from all workshops studied were below pre-established limits (*Salmonella* and *Escherichia coli* verotoxigenic (VTEC): not detected in 25 g; *L. monocytogenes*: < 100 CFU/g; *Staphylococcus aureus*: < 500 CFU/g). All producers reached a "sufficient" classification according to the criteria established, although some aspects (high temperature, low humidity of meat reception/storage areas, excessive time for casing desalting, and presence of *L. monocytogenes* in some machines) should be corrected. A systematic application of this kind of HACCP checklist could help small producers to improve the hygienic quality of their facilities and products.

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INTRODUCTION

Food quality, rather than quantity, is now the priority in Europe. High quality could be assured by sustainable agricultural production, which should also take into account the concerns of consumers, particularly with regard to food quality, food safety and traditional/organic production methods.

In the meat sector, the recent BSE crisis and recurring food poisoning cases have undermined public confidence in intensive and industrial meat production. Consumers are therefore turning to "traditional" products, and the growth in sales of natural and organic foods is clear evidence of this. Traditional fermented dry sausages account for a significant part of this domain.

Production of traditional dry sausages relies on natural "contamination" by environmental flora. This contamination occurs during slaughter and increases during manufacture. Each workshop has a specific house flora, composed of useful microorganisms responsible for the fermentation and flavor of sausages, as well as spoilage and pathogenic flora. The few studies that have been conducted on traditional meat products have shown that hygienic shortcomings can lead to a production loss of up to 25%, with serious economic consequences *(22, 28)*. It is crucial, therefore, to enable traditional producers to manufacture products that are safe and standardized while retaining their typical sensory qualities.

The implementation of the Hazard Analysis and Critical Control Points (HACCP) concept in food production facilities is internationally recognized as an effective way to ensure the safety of food products *(32)*. HACCP systems involve a proactive rather than a retroactive approach. For maximum preventive effect, Quality Assurance (QA) programs need to cover the whole production chain, from "farm to fork", thereby including all aspects of the process, from the rearing of the animals to food preparation practices of the final consumer. QA programs aim to control, prevent or eliminate problems, and ideally should start with the eradication of microbial pathogens from farm animals. Continuous monitoring of the whole production process ensures that control measures can be introduced promptly and effectively in response to either new hazards or altered risks, so that their impact can be eliminated or minimized before product safety and quality are compromised *(4)*.

To adopt the HACCP concept for controlling hazards in food products efficiently, food manufacturers need to apply the prerequisite program, or Good Manufacturing Practices (GMP), to their process. The prerequisite program covers the controlling of premises, transportation and storage, equipment, personnel, sanitation, pest control and recall procedure *(8)*. A good prerequisite program can reduce the number of critical control points in the HACCP plan, which increases the efficiency of the HACCP program.

The specific aim of the present study was to define the hazards associated with manufacture of traditional dry sausages by gathering and evaluating information on processing conditions to define the critical control points (CCPs). The evaluation of each traditional sausage workshop was performed through use of a Good Manufacturing Practices and Good Hygienic Practices (GMP/GHP, HACCP) checklist according to an HACCP plan adapted for use by small producers.

Identification of the hazards and quantitative assessment of risks associated with dry sausages will provide traditional producers with validated control measurements and critical limits at process steps (Critical Control Points) for the manufacture of safe products.

MATERIALS AND METHODS

Checklist for auditing GHP/GMP, HACCP

In previous work, a study of the typology of traditional dry sausage producers in Catalonia (Spain) was undertaken. After statistical analysis consisting of a multifactorial (MFCA) and a cluster analysis (CA), four groups were obtained *(23)*. According to the size of each cluster, 2 or 3 workshops were selected from each of the four groups, in order to obtain ten representative workshops (C01 to C10) to be studied in this work.

Based on the United States Food and Drug Administration recommendations for HACCP plans *(2, 25)*, a questionnaire, with 105 questions, was established. It was administered by a direct interview with the owner of each workshop. This questionnaire consisted, basically, of two parts. The first part was related to the prerequisites for a self-control system based on the HACCP plan (building and facilities, sanitary facilities, equipment, hygiene and sanitation, production and process controls). The second part evaluated some critical points of the process and the efficiency of the hygienic program used in the workshop equipment (equipment, hygiene and sanitation, production and processing controls), protocols for microbial content evaluation, and measurements of temperature/humidity. Points were derived from the questionnaire, allowing the workshops to be ranked. The maximum possible total scores were 61 and 50 points for the first and second parts of the questionnaire, respectively. Workshops exhibiting scores of 30 points or more for each part were classified as "Sufficient" based on the criteria established, taking into account that not all the questions had the same importance.

Regarding microbiological criteria, two parameters were agreed upon: Hygienic markers (for surfaces) and pathogen content (for surfaces and final products).

Enterobacteriaceae was selected as the hygienic marker for environment and machines according to DOCE (2001) *(14)*. The established criteria in this work were as follows: (i) "ultraclean": $< 2 \times 10^2$ CFU/100 cm^2, (ii) "clean": 3-9 $\times$ 10^2 CFU/100 cm^2 and (iii) "not clean": $> 10^3$ CFU/100 cm^2.

The pathogens assessed were *Salmonella* spp., *Staphylococcus aureus, Listeria monocytogenes* and *Escherichia coli* verotoxigenic (VTEC). For safety evaluation of products, the criteria limits were established as follows *(17, 35)*: (i) *Salmonella* spp.: absence in 25 g of final product, (ii) *E. coli* (VTEC): absence in 25 g, (iii) *S. aureus*: < 500 CFU/g, (iv) *L. monocytogenes*: < 100 CFU/g.

Physical analyses

Temperature and relative humidity measurements were carried out using a Testostor 175-Data Logger (Testo GmbH & Co. Lenzkirch, Germany).

Sampling procedures

Environmental surfaces: Mincing, mixing and stuffing machines; knives; cutting tables; and walls of the cold storage room were selected for microbial analyses. A total of 500 cm^2 of each cleaned surface was sampled by use of a 40 $\times$ 40 cm cloth wet with neutralizing solution (Laboratoires Humeau, La Chapelle sur Edre, France). Buffered peptone water (BPW) (AES Laboratoires, Bruz, France) was the diluent solution. The initial environmental suspension (IES) was prepared by pummeling the swab (40 $\times$ 40 cm cloth) with 25 ml of diluent. Serial dilutions were

TABLE 1. Results (%) obtained in GMP/GHP checklist by the workshops on Part I: Buildings and Facilities

	Very Good	Yes/Good	No/Not Good
- Approval by competent authorities	0	100	0
- Water supply with treatment	0	100	0
- Open windows: fine mesh to keep out insects	0	100	0
- Sufficient ventilation to minimize odors/vapors/ prevent water condensation	0	100	0
- Lights in processing areas equipped with proper covers	0	100	0
- Materials used in the construction/easy cleaning	0	90	10
- Electric fly traps?	0	90	10
- Selection and separation of solid trash	0	90	10
- Waste treatment	0	90	10
- Walls and floor material's conservation	20	80	0
- No existence of cross paths	0	70	30
- Walls and floor hygiene level	20	70	10
- Existence of foot washing device	0	0	100

then prepared in BPW and plated onto the appropriate culture media as described below.

Meat products: Depending on the size of sausages, 3 to 4 dry sausages (approximately 500 g) of the same batch, without casings, were pooled and mixed, to obtain a representative meat sample. For *Enterobacteriaceae, S. aureus, L. monocytogenes, Salmonella* and *E. coli* VTEC determinations, a sample of 25 g was diluted in 225 ml of BPW and blended for 1 min in a stomacher (Model 400 Cooke Laboratories, Alexandria, VA, USA). For *L. monocytogenes* quantification, a meat sample of 20 g was diluted with 40 ml of BPW (1:3) and blended in a stomacher for 1 min. When necessary, a serial dilution was performed.

Microbial analysis

Spoilage flora and pathogens were enumerated by classical microbial procedures, using selective media. Presence and absence of *L. monocytogenes, Salmonella* and *E. coli* VTEC were also investigated by polymerase chain reaction PCR. The same selective culture media were used for both environmental and meat samples.

Enterobacteriaceae: Appropriate dilutions of meat and environmental samples were plated on Crystal Violet neutral Red Bile Glucose agar (VRBG) from Merck (Darmstad, Germany). The plates were incubated for 24 h at 37°C. After colony enumeration, biochemical confirmation was performed with an oxidase test (Merck, Darmstad, Germany). Only oxidase-negative colonies were taken into account for final enumeration.

S. aureus: Baird-Parker medium supplemented with RPF (bioMérieux, France) was used according to ISO 6888,2 (1999) *(6)*. Duplicates of 1 ml of appropriate dilutions were plated and incubated for 24–48 h at 37°C. Black colonies with a halo were enumerated as *S. aureus* and confirmed by PCR.

Listeria monocytogenes: To quantify after 1 h of resuscitation at room temperature, duplicates of 0.5 ml of meat and environmental sample dilutions were plated onto ready-to-use Aloa plates (AES Laboratoires, Bruz, France) validated by AFNOR *(12)* and incubated for 24–48 h at 37°C. Blue colonies with a white halo were enumerated as *L. monocytogenes* and confirmed by PCR. For presence/absence determination, 24-h pre-enriched cultures in BPW (2 ml) were subjected to a secondary enrichment for 48 h at 37°C on 18 ml of Fraser broth (Difco, Detroit, MI, USA) and confirmed by PCR.

Salmonella: A 24-h enrichment at 37°C was performed on IES and meat suspensions in BPW before plating. Semi-solid Rappaport Vassiliadis (MSRV) agar plates (Oxoid, Basingstoke, Hampshire, England) were spotted with three drops (approx. 100 µl) of the pre-enriched cultures and incubated for 20–22 h at 42°C. If a halo was visible around the inoculation spot, a loopful from the edge of the halo was streaked onto Brilliant Green Agar (BGA) (Difco, Detroit, MI, USA). Pink-red colonies with a red halo were confirmed by PCR.

E. coli VTEC: An enrichment of IES and meat samples in BPW for 24 h at 37°C was performed. The enriched culture was streaked onto McConkey agar (Difco, Detroit, MI, USA) and incubated for 24 h at 37°C. Red colonies with a bile-salt precipitate were confirmed by PCR. For presence/absence determination, an enrichment of IES and meat samples on Trypticase Soy Broth + novobiocin (Difco, Detroit, MI, USA) was carried out for 24 h at 37°C and confirmed by PCR.

PCR ANALYSIS

PCR pre-treatment

For PCR determination from sample, 2 ml of the enriched cultures were dissolved in 300 µl of 6% Chelex® 100 (BioRad), incubated at 56°C for 20 min, boiled for 8 min and cooled on ice. Samples were centrifugated at 14,000 rpm for 5 min and the supernatants used for PCR reaction.

TABLE 2. Results (%) obtained in GMP/GHP checklist by the workshops on Part I: Sanitary facilities

	Very Good	Yes/Good	No/Not Good
- Establishment in compliance of some Code of Hygiene Good Practices	0	100	0
- Hand-washing facilities adequate and sufficient	0	100	0
- Effective hand-cleaning/sanitizing preparations	0	100	0
- Presence of hand drying devices	0	100	0
- Presence of garbage cans	0	100	0
- Toilets	0	100	0
- Toilets, urinals and rest areas kept clean	30	70	0
- Pest Control: control plan conducted by a specialized enterprise	0	40	60
- Rest areas	0	30	70

TABLE 3. Results (%) obtained in GMP/GHP checklist by the workshops on Part I: Production and process controls

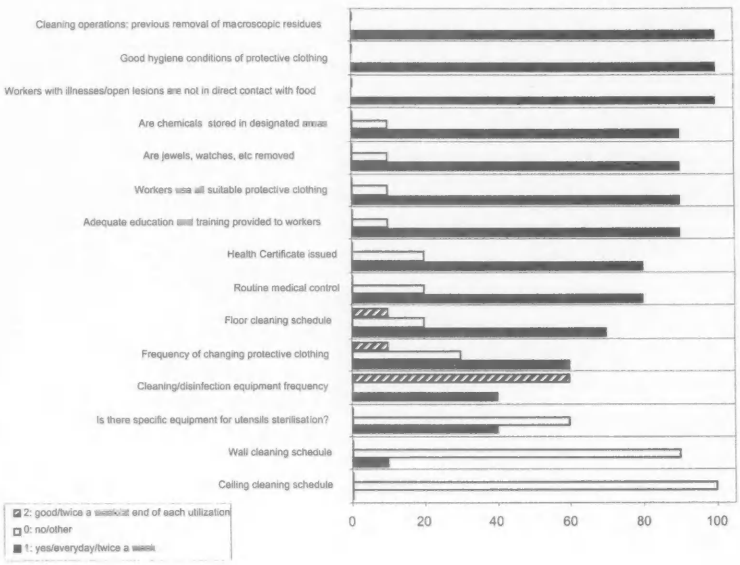
	Yes	No
- Are food additives stored in designated areas?	100	0
- Are raw materials and ingredients checked on their "best before" date?	90	10
- Are there specific demands on raw material characteristics?	90	10
- Is there a regular monitoring of the process's time and temperature?	90	10
- Is there an operative process control system?	70	30
- Is there handling of other meat species, apart from pork and beef?	60	40
- Is there a sampling analyses control plan?	60	40
- Are records kept on raw materials and other ingredients received?	50	50
- Is a record kept with this information?	50	50
- Is there some kind of documentation control?	50	50
Are relevant documents kept in a specific record?	40	60

For colony confirmation, the presumptive pathogen colonies were resuspended in 30 µl of sterile distilled water and 2–5 µl of this suspension was added to the PCR reaction mix.

For *L. monocytogenes*, *Salmonella* and *E. coli*, a PCR amplification protocol from Simon et al. *(37)*, Rahn et al. *(33)* and Abdulmawjood et al. *(1)*, respectively, and validated under the European Project FOOD-PCR *(15)*, was applied with the corresponding internal amplification controls. *S. aureus* confirmation was carried out using the PCR protocol developed by Martineau et al. *(29)*.

A 20 µl aliquot of each PCR product was subjected to 1.5% (w/v) agarose gel electrophoresis containing 0.1 µg/ml ethidium bromide (Sigma) for 45 min at 100 V. The amplicon visualization was performed by use of a UV transilluminator (Pharmacia, LKB).

FIGURE 1. Percentage of workshops fulfilling aspects of GMP/GHP HACCP checklist. Part I: Hygiene and Sanitation



RESULTS

Building and facilities

A high percentage of workshops were considered to be satisfactory (Table 1). All evaluated enterprises had approval from appropriate authorities. The facilities were easy to clean; walls and floors were in good or very good state; and the visual hygiene aspect was excellent (90%), although 30% contained areas where raw and finished products cross paths. Furthermore, in none of the facilities was a foot washing device used, although some of them had one.

Sanitary facilities

The majority of facilities had a good level of sanitation (Table 2). All of them operated in compliance with some code of good hygiene practices. They had enough wash-hand equipment, with cleaning or sanitizing products. Most (70%) kept toilet and urinal areas clean. Only 40% followed a pest control plan conducted by a specialized enterprise.

Personnel hygiene and sanitation

In general, these aspects achieved the highest points in the majority of facilities. Routine medical control; suitable protective clothing; education and training of workers; storage of chemicals in designated areas; frequency of cleaning of floors and walls; and personnel hygiene and sanitation achieved maximum points in more than 80% of facilities. However, the majority of facilities do not have a ceiling cleaning schedule and only 40% used specific sterilization equipment (Fig. 1).

Production and process control

All facilities stored food additives in designated areas. In 60%, pork was not the only raw meat processed. An efficacious process control system was followed by 70% of producers. In addition, a sampling analysis control plan (generally every month on final product and surfaces, using classical or rapid tests) was applied by 60%. On the other hand, the absence of a plan for calibration control by a specialized enterprise was noted in 70%, and lack of documentation control in 50%, of facilities (Table 3).

CCP check action

The beginning of the process was under control in all the facilities. Also, rules regarding the meat and batter temperature, the "best before" date and the storage temperature of ingredients were usually respected, although, in 80% of cases, temperature and relative humidity (RH) in reception areas were not adequate (temperature higher than 12°C and RH below 85%). On the other hand, recorded temperature of carcasss/trimmings storage and resting rooms was correct (< 7°C), although humidity values were below 85% in 90% of facilities studied. Such low humidity could cause extensive dehydratation of carcasses or trimmings before utilization. Finally, excessive time (more than 4 h) for the casing desalting process was recorded (60%), although the process was carried out at an appropriate temperature (< 7°C) (Fig. 2).

Hygienic quality of environment and products

Regarding the microbiology of the environmental samples, walls of cold rooms earned an "ultraclean" classification (90%), as indicated by the fact that the *Enterobacteriaceae* content was below established criteria, although *L. monocytogenes* was detected in one facility. The mixing machines were also classified as "ultraclean" in 70% of cases. Likewise, knives (50%), mincing machines (40%) and cutting tables (30%) presented *Enterobacteriaceae* content below the criterion (200 UFC/100 cm^2), although in some of them, *L. monocytogenes* was detected. The highest rate of *Enterobacteriaceae* ("not clean") as well as the presence of pathogens were observed in stuffing machines, which proved to be the most contaminated equipment, with 70% of facilities obtaining a "not clean" or a "clean" (plus pathogen) classification. Moreover, in 20% *L. monocytogenes* was detected. Regarding hygienic classification of the final products, even though pathogens were detected in some samples, all the facilities achieved the maximum value, 8 points, indicating tolerable levels of pathogens according to the established criteria (Fig. 3).

All ten facilities studied recorded a "sufficient" score, 30 or more points for each of the two parts, C04 having the highest total score (92 points). C07 and C05 achieved the lowest scores, with 68 and 70 points, respectively (Table 4). However, some aspects and critical points, should be improved, as has been described

DISCUSSION

In order to guarantee the safety of food products based on HACCP principles *(9, 16)* Spanish legislation mandated the implementation of a self-control system for food industries in 1993. Total responsibility lies with the enterprises. The role of the administration is to verify that the industries implement and maintain, effectively, an effective self-control system *(3)*.

FIGURE 2. Percentage of workshops fulfilling aspects of GMP/GHP HACCP checklist. Part II: Critical Control Points - Check Action

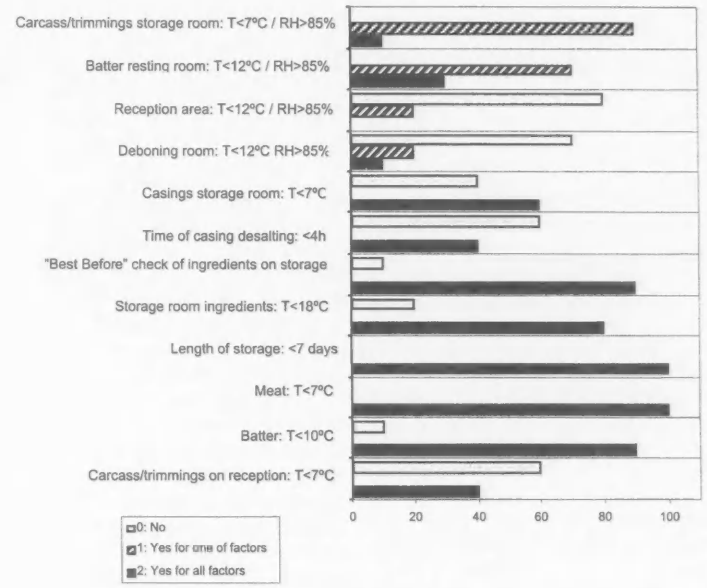
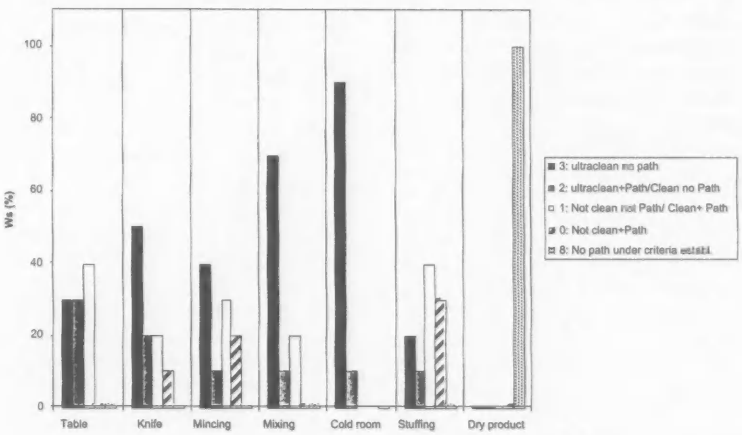


FIGURE 3. Percentage of workshops (Ws) fulfilling aspects of GMP/GHP HACCP checklist. Part II: Hygienic quality of environmental samples and products



A considerable number of "traditional factories" that exist in Spain have not standardized the manufacturing processes, and accordingly implementation of an HACCP system is more complicated. Moreover, the additional operating expenses caused by implementation of such a system impose economic difficulties on this type of enterprise.

The present work is intended to assist traditional workshops in Catalonia in applying the GMP/GHP checklist correctly. The checklist is well suited to this kind of factory, to reduce or minimize incorrect food handling practices. Such malpractices are considered, in the national epidemiological reports, to be the principal factors responsible for appearance of food poisoning outbreaks *(10, 13, 18, 24, 40)*. Based on the results obtained from this GMP/GHP checklist, we can assume that the traditional enterprises studied are able to implement a self-control system, and have thus fulfilled the majority of aspects treated. Even though the scores obtained exceeded the minimum pre-set marks (30 points), a strict adherence to Good Manufacturing Practices should be obligatory to guarantee a better safety margin for traditional dry sausages. For this reason, some aspects have to be subjected to corrective actions.

The "farm to fork" food strategy of the HACCP system involving all stages of the food chain has a clear purpose, which is to limit the hazards or risks associated with each step of the process. The purpose of this GMP/GHP checklist is also to minimize microbial contamination of the environment and raw materials and consequently to improve the safety of the final product. An item to be corrected in the Catalonian facility, is the relative lacks of specific equipment for sterilization of knives and other utensils. As stated elsewhere *(19)*, knives bore a lower contamination charge after ultraviolet (UV) light sterilization, compared to conventional disinfection procedures. Our work confirmed this observation; better hygiene marks were recorded for knives ("ultraclean" without pathogens) among facilities using UV sterilization equipment (30%). Likewise, the existence of cross paths, present in 30% of analyzed factories, is a risk to be taken into account. When building organization is not designed to avoid cross paths, the risk of microbial contamination of products with raw materials, personnel or instruments becomes likely. In this sense, foodborne pathogens such as *S. aureus*, which are ubiquitous and sometimes found on human/animal skin, could contaminate food through poor handling practices or existence of cross paths, or when temperature abuse occurs so as to lead to growth and enterotoxin formation *(5)*. Likewise, *L. monocytogenes*, widely distributed in the environment *(26, 27, 39)*, may enter abbatoirs with animals, but contamination of red meat often occurs because of the environment in which these foods are produced rather than from the animals themselves. Cross-contamination and recontamination may occur on transport vehicles and pieces of equipment that are difficult to dismantle and that thus continue to contaminate meat despite cleaning; they can also originate from the hands of workers and during cleaning operations *(5)*. Salvat et al. *(34)* reported that as many as 68% of environmental samples in a curing plant were positive for *L. monocytogenes* and that even after cleaning, 17% of the samples remained positive. In our study, *L. monocytogenes* was detected

TABLE 4. Scores obtained after GMP/GHP HACCP checklist application

	Workshops									
	C01	C02	C03	C04	C05	C06	C07	C08	C09	C10
Part I[1]	46	48	46	**50**	**38**	47	**38**	48	44	40
Part II[2]	39	38	37	**42**	**32**	37	**30**	38	42	39
Total score[3]	85	86	83	**92**	**70**	84	**68**	86	86	79

[1]Maximum 61 points; [2]: Maximum 50 points; [3]: Maximum 111 points

Criterion: Sufficient: 30 or more points for each of the two parts, Part I and Part II

in 10% of the 60 environmental samples after cleaning. Recent European investigations have reported 12–16% *Listeria*-positive isolation in industrial fermented meat products *(11, 21)*. In our study, *L. monocytogenes* was found in 1 out of 10 dry sausages analyzed, although in facilities where cross paths were found, no *L. monocytogenes* was detected, but *S. aureus* was counted in some instruments and in one final product. Nevertheless, in all facilities the pathogen concentration was below the pre-established acceptable limits agreed in this study.

According to HACCP principles, poor control of critical points, along with low hygiene status of the working environment and equipment, creates the probability of failures in the safety of final products. In fact, when facilities recorded pathogens on their final products, a direct or indirect relation with other tested parameters was observed: In three out of four facilities in which final products, carried pathogens, the temperature in reception and storage areas was high. Time-temperature abuse, reported as one of the major factors leading to food contamination during food preparation and storage, results in the survival, growth and production of toxins by pathogens *(30)*. In addition, in one facility, *S. aureus* was present in most of the pieces of equipment sampled. On the other hand, we can confirm the direct relation of final products carrying *S. aureus* with the presence of this pathogen in the initial periods of maturation (data not shown).

A real improvement of the hygienic status of facilities could be achieved if a higher percentage of traditional industries routinely implemented a sampling analysis control plan, testing microbial content of environmental and meat samples. Among enterprises studied, 60% carried out this practice.

Finally, records of control, monitoring, calibration and corrective actions should be kept, as these must be consulted during the process of verification *(4)*. Only 50% of enterprises studied implement this practice, a proportion that must be increased.

Little work has been reported on the implementation of this type of GMP/GHP checklist *(7, 32)*. However, studies about critical control point identification have been more frequently reviewed, maybe because it is the first step needed for the implementation of an HACCP plan *(30, 31, 36, 38)*. In various fermented products such as cheese, sausage or beverages the establishment of a manufacturing flow diagram is crucial for the determination of critical control points. Key points in the process flow diagram that constitute a likely source of contamination are relatively easy to establish: In general, as also recorded in the present work, reception and storage conditions of raw materials, weighing of ingredients, preparation of the batter (or liquor for beverages) and fermentation each constitute one of the generic critical control points for all food manufacturing processes *(20, 31)*. In consequence, they must be tested during the HACCP application.

Results obtained from this HACCP checklist application could help producers improve the hygienic quality of their facilities and products. The final consequence of this process should be an increase in traditional dry sausage quality. From a more global point of view, this work presents the basis for evaluating the hygienic quality of traditional food industries through the systematic application of this kind of checklist that will facilitate the implementation of an adequate HACCP plan.

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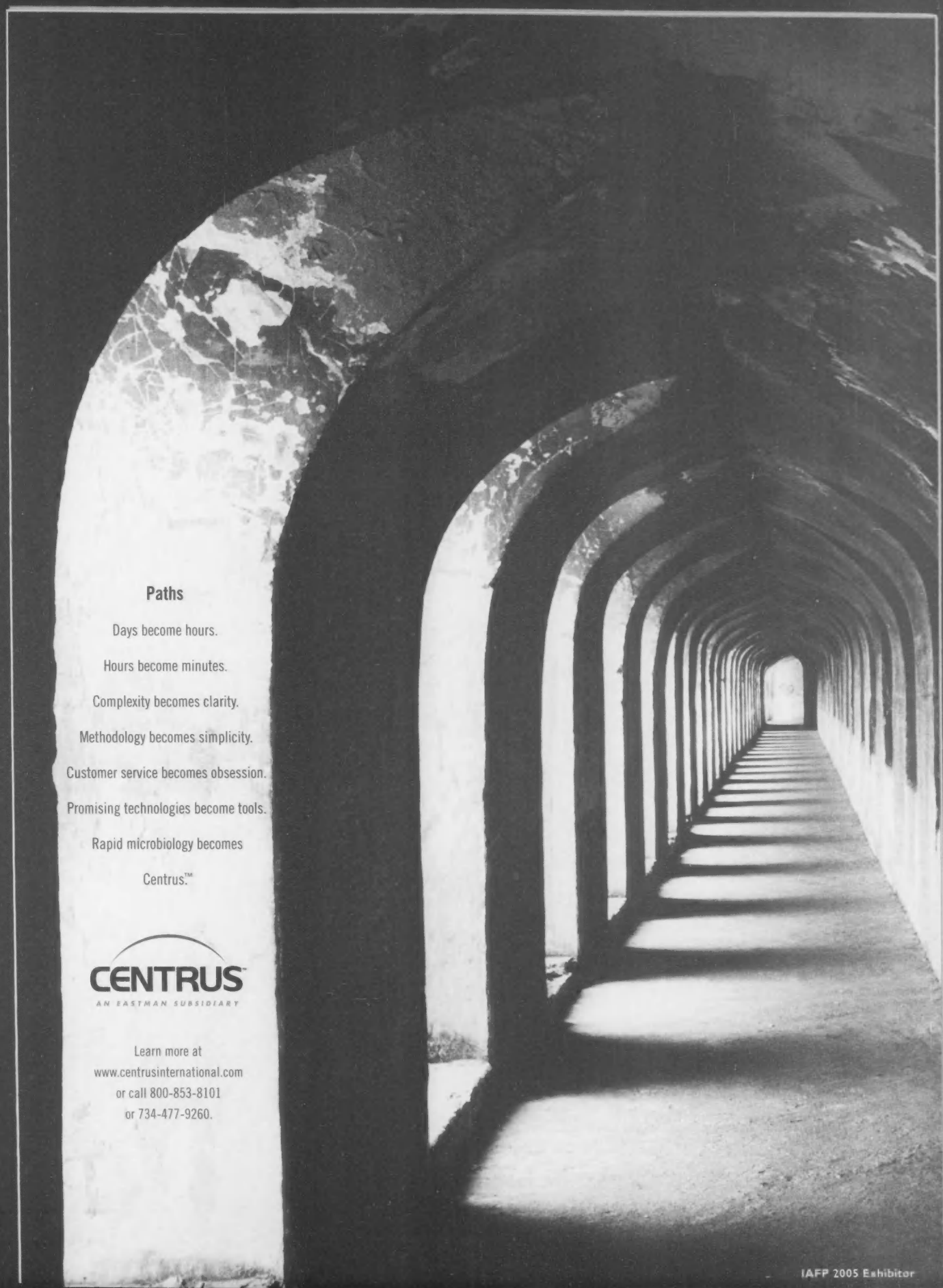
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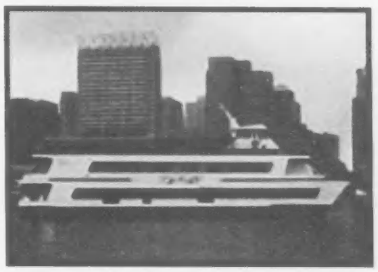

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Call for Symposia

IAFP 2006

August 13-16

Calgary, Alberta, Canada

The Program Committee invites International Association for Food Protection Members and other interested individuals to submit a symposium proposal for presentation during IAFP 2006, August 13–16, 2006 in Calgary, Alberta, Canada.

WHAT IS A SYMPOSIUM?

A symposium is an organized, 3 1/2 hour session emphasizing a central theme relating to food safety and usually consists of six 30-minute presentations by each presenter and a 30-minute break. Short symposia with three or four 30-minute presentations are also possible. Innovative approaches such as roundtable question-and-answer sessions or open format concepts will also be considered.

Symposia may include a discussion emphasizing a scientific aspect of a common food safety and quality topic, issues of general interest relating to food safety and microbiological quality, a report of recent developments, an update of state-of-the-art methodologies, or a discussion of basic and applied research in a given area. The material covered should include current work and the newest findings. Symposia will be evaluated by the Program Committee for relevance to current science and to Association Members. Proposals may be prepared by individuals, committees, or professional development groups (PDGs).

SUBMISSION INSTRUCTIONS

To submit a symposium proposal, read all information on this page, pay close attention to the "Symposia Selection Procedure" on the next page, then complete the "Symposium Proposal" on page 536. Follow all instructions for making a submission. Your suggested presenters need not be confirmed at this stage, only identified.

SYMPOSIUM PROPOSAL DEADLINE

Proposals may be sent to the Association office no later than August 5, 2005 or be presented to the Program Committee at its meeting on Sunday, August 14, 2005 in Baltimore, Maryland.

The Program Committee will review submitted symposia at the conclusion of IAFP 2005 to decide which symposia will be selected for further development. Organizers will be notified as to the status of their proposal by September 30, 2005. Accepted symposia are required to be finalized and sent to the IAFP office by February 8, 2006. The Program Committee has the final decision whether symposia will be accepted for presentation at IAFP 2006. The organizer will be notified of the final results by March 31, 2006.

PRESENTERS WHO ARE NOT MEMBERS

International Association for Food Protection does not reimburse invited presenters for travel, hotel, or other expenses incurred during the Annual Meeting. However, invited presenters who are not Association members will receive a complimentary registration. Presenters who are Association Members are expected to pay normal registration fees.

ASSOCIATION FOUNDATION SPONSORSHIP

The International Association for Food Protection Foundation has limited funds for travel sponsorship of presenters. After final acceptance of the symposium (March 2006), symposia organizers may make requests in writing to the Program Committee Chairperson. Requests are reviewed on an individual and first-come-first-served basis. The maximum funding grant will be $500 per presenter ($750 if outside North America). Organizers are welcome to seek funding from other sources and the Association will provide recognition for these groups in our program materials. Organizers are asked to inform the Association if they obtain outside funding.

SYMPOSIA SELECTION PROCEDURE:

The primary focus of the symposia selection procedure is to provide a balanced educational program for attendees of the IAFP Annual Meeting. To achieve this goal, symposia may be combined or modified by the Program Committee, as appropriate, to prevent overlap of topics among competing symposia. During this process, the top symposia proposed by groups and individuals will be selected for further development.

Guidelines for tentative acceptance:

1. Proposed symposia must be pertinent to IAFP members and PDGs. Priority will be given to symposia that address one or more of the following program areas:
   - Safety and Microbial Quality of Foods (Dairy, Meat and Poultry, Seafood, Produce, Water)
   - Viruses and Parasites, Retail Food Safety, Epidemiology and Public Health
   - Non-Microbiology Food Safety Issues (food toxicology; allergens; chemical contaminants)
   - General-Applied (advances in sanitation, lab methods, quality assurance, food safety systems)
   - General-Food Protection for the Future (risk analysis; emerging pathogens; biotechnology; predictive models, etc.)
   - Other pertinent food protection topics may be considered if space is available
2. In addition to addressing pertinent program areas, symposia accepted for further development should:
   - Be new, emerging and/or address areas not covered in last 2 years
   - If covered in last 2 years, provide new information that warrant another symposium
3. Symposium submissions must include:
   - Titles that clearly convey the topics to be covered
   - Topics that are unique to prevent overlap of basic information among speakers
   - Names of suggested speakers from a variety of backgrounds, such as industry, regulatory, academic researchers, or consumer perspective (as appropriate)
   - Suggested speakers who are knowledgeable and good communicators
4. Special consideration will be given to symposium submissions that:
   - Are directly applicable or provide viable safety options for food manufacturers, including small to medium size manufacturers
   - Bring an international (outside of North America) focus or viewpoint to the meeting
   - Attract/involve students
   - Attract/involve local affiliate members who would not otherwise attend the annual meeting (e.g., regional specialties like shellfish issues for New Orleans)
   - Would attract members of a new PDG or program area that IAFP is trying to develop or encourage
5. Other considerations for selecting symposia for further development
   - Proposals must be submitted to the Program Committee by Sunday, August 14, 2005
   - The Program Committee reserves the right to limit the number of sessions devoted to a single program area to provide a balanced program
   - If relevant topics are proposed by more than one submission, the Program Committee will make the final decision to combine or modify symposia as appropriate to avoid overlap of topics among competing symposia
   - Due to space and time limitations, only the top proposals (as modified by the Program Committee) will be selected for further development as either full sessions (consisting typically of six 30-minute presentations or round table discussions) or short sessions (consisting typically of three or four 30-minute presentations or round table discussions)
   - Three sessions will be reserved for symposia sponsored by our partner, International Life Science Institute North America (ILSI, N.A.). The ILSI N.A. symposia address topics that are of general interest to IAFP meeting attendees, focus on emerging food safety issues and technologies, and provide a global perspective
   - Additional sessions may be added at the discretion of the Program Committee to accommodate emerging issues
6. Final decisions on symposia selection will be made at the February 2006 Program Committee Meeting.
   - Accepted symposia are required to be finalized with speakers confirmed and sent to the IAFP office by February 8, 2006. Only fully developed symposia will be considered.

WHO TO CONTACT:

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International Association for Food Protection
6200 Aurora Ave., Suite 200W
Des Moines, IA 50322-2864, USA
Phone: 800.369.6337; 515.276.3344
Fax: 515.276.8655
E-mail: bbrannen@foodprotection.org

Symposium Proposal

IAFP 2006

August 13-16

Calgary, Alberta, Canada

Title: _____

Organizer's Name: _____

Committee or PDG Submitting Proposal: _____

Address: _____

Phone: _____ Fax: _____ E-mail: _____

Topic — Suggested Presenter, Affiliation (Example: 1. HACCP Implementation — John Smith, University of Georgia)

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

Suggested Convenors: _____

Topic Area:

- ❒ Food Safety/Microbial Quality (list commodities) _____
- ❒ Foodborne Viruses and Parasites
- ❒ Retail Food Safety
- ❒ Epidemiology and Public Health
- ❒ Food Safety (Non-Microbiology Issues)
- ❒ General – Advances in Technology Applications
- ❒ General – Emerging Issues
- ❒ Other _____

Provide a short statement describing the relevance of the symposium to IAFP attendees and how this symposium is unique compared to topics previously presented at IAFP 2005 and IAFP 2004.

Signature of Organizer: _____

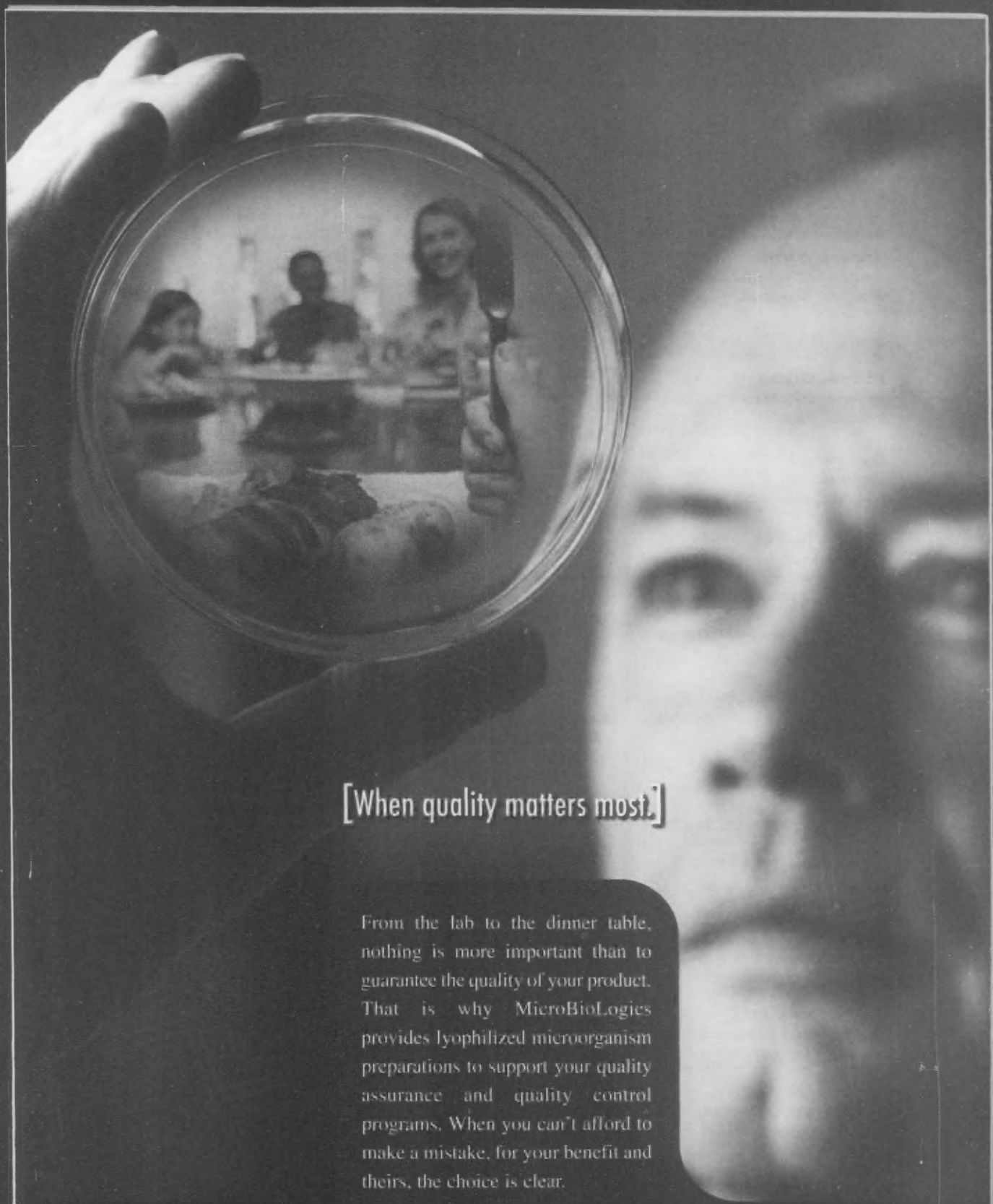
Submit by August 5, 2005 to:

IAFP — Symposium Proposal
6200 Aurora Ave., Suite 200W
Des Moines, IA 50322-2864, USA

Submit in person on August 14, 2005 to:
Program Committee — IAFP 2006
Baltimore, Maryland

or Contact:

Bev Brannen
International Association for Food Protection
6200 Aurora Ave., Suite 200W
Des Moines, IA 50322-2864, USA
Phone: 800.369.6337; 515.276.3344
Fax: 515.276.8655
E-mail: bbrannen@foodprotection.org



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CanBiocin Inc.
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Cheongju, Chungbuk

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University of Georgia
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Sudeep Jain
University of Georgia, Griffin

HAWAII

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Diageo Global Supply
Plainfield

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Iowa State University, Ames

Catherine A. Strohbehn
Iowa State University, Ames

Myrna Ver Ploeg
Maytag Dairy Farms, Newton

KENTUCKY

Matthew T. Rhodes
Louisville Metro Health Dept.
Louisville

LOUISIANA

Allison M. Dumas
Louisiana State University
Baton Rouge

NEW MEMBERS

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Hannaford Supermarkets
Scarborough

Xujian Qiu
University of Maine, Orono

MARYLAND

James A. Lindsay
USDA-ARS-NPS, Beltsville

Bobby Love
Phillips Foods, Baltimore

MICHIGAN

Gyung-Jin Bahk
Michigan State University
East Lansing

MISSOURI

Jim Fry
Springfield-Greene Co. Health Dept.
Springfield

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Raleigh

Kristin Bjornsdottir
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Willie J. Taylor
University of Tennessee
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Jason L. Dickhaut
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Joemel M. Quicho
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WISCONSIN

Scott J. Stieber
Marathon Cheese Corp.
Marathon

NEW SUSTAINING MEMBERS

Donald A. Santeler
Polar Tech Industries
Genoa, IL

David G. Goins
Q Laboratories, Inc.
Cincinnati, OH

UPDATES

Silliker, Inc. Appoints Division Vice President of Operations and Director of Testing Laboratory; and Technical Director

Craig D. Scorah has been named division vice president of Operations for Silliker, Inc. Scorah will direct the organization's California, Texas, and Georgia laboratories and reports to David J. Evanson, vice president of operations and analytical services.

From 1991 to 2000, Scorah served in several laboratory management capacities for Silliker, including laboratory director of its Minnetonka, MN, testing facility, before joining the corporate management team of BioControl Systems in Bellevue, WA.

A graduate of Texas A&M University with a master's degree in food science, Scorah most recently served as a private food safety and hygiene consultant for companies in Europe.

Mamatha Whitwell was appointed as laboratory director of its Grand Prairie, TX, testing facility. She is responsible for managing scientific operations, quality systems, and staff to help food companies in the southwest assure the safety and quality of their products. She reports to Norm Corlett, division vice president of operations for Silliker, Inc.

Whitwell has served a succession of laboratory and client service management roles since joining the Grand Prairie lab in 2000, including senior microbiologist and client service supervisor. Most recently, she served as client service manager. A graduate of the University of Texas at Arlington, Whitwell holds a bachelor's degree in biology.

"Mamatha's vast range of experience gives her unique and personal insights into the expectations and needs of our clients," said Corlett. "She exemplifies our commitment to providing our valued clients with responsive, reliable service and expert consultation."

Jeffery L. Lucas was appointed as technical director at Silliker's corporate headquarters in Homewood, IL. In his new role, he will provide auditing, consulting and training services to clients of the food testing and consulting company. He reports to Rena Pierami, division vice president of technical services.

A member of the Silliker organization since 1997, Lucas most recently served as laboratory director of its Grand Prairie, TX, testing facility. A graduate of Auburn University with a bachelor's degree in animal and dairy science, Lucas possesses over two decades of diverse experience in the meat, poultry, and food testing industries. He is currently pursuing a master's degree in agriculture from Texas A&M University.

"Over the past few years, Jeff has increasingly worked with us on a host of important projects," said Pierami. "From HACCP consultations to highly demanding and complex foodborne illness investigations, he has consistently delivered exemplary services to our clients."

FKI Logistex Appoints Two to Expand Presence in Canadian Manufacturing Sector

FKI Logistex® announces the appointments of Glen Chambers as regional director and Paul Swietlinski as business development manager for the Canadian operations of its North American manufacturing systems unit. Chambers and Swietlinski, along with veteran operations manager Gord Adams, give FKI Logistex a dedicated presence to serve the Canadian manufacturing sector.

In his new role, Chambers will focus on expanding the company's strategic position as a material handling integrator in the Canadian marketplace, emphasizing palletizing solutions for manufacturing companies. Chambers reports to Martin Clark, director of international and newspaper operations, FKI Logistex Manufacturing Systems North America.

"Glen's expertise and first-hand knowledge of the Canadian market, along with his impeccable profesionallism, will be a valuable asset for FKI Logistex as the company expands and strengthens its business operations there," says Clark. "Under Glen's direction, FKI Logistex will be able to leverage its strengths and capabilities to meet Canada's growing demand for efficient palletizing solutions."

Prior to joining FKI Logistex, Chambers held positions with General Conveyor, a manufacturer of conveyors and palletizers, and with Mathews Conveyor, now part of FKI Logistex.

Swietlinski will concentrate his business development efforts on strengthening ties with existing FKI Logistex customers in Canada and on developing new sales opportunities for palletizing solutions in the Canadian manufacturing sector. He joins FKI Logistex after positions with General Conveyor, Comptrol, and Chronos/Howe Richardson. Swietlinski reports to Chambers.

UPDATES

Chr. Hansen New Appointees in Mexico Sales and North America Engineering

Fernando Calleja is appointed sales director for Chr. Hansen in Mexico. Mr. Calleja has several years of experience with key food companies, holding positions as sales and marketing director and in general management. He has also been responsible for sales and development of market strategies and distribution networks. Mr. Calleja received his degree in textile engineering from the National Polytechnical Institute (E.S.I.T.) in Mexico City, and holds various business diplomas.

Max Clausen joins Chr. Hansen in Milwaukee as engineering manager for North America. He transferred from Chr. Hansen in Denmark, and will be responsible for the development and administration of the engineering staff, as well as oversee multiple engineering projects at all Chr. Hansen facilities in North America. Mr. Clausen has over 16 years of engineering experience with an emphasis in project management and optimization of drying, formulation, and fermentation plants in the dairy, animal health and pharmaceutical industries. He has engineering experience in several countries including France, Spain, Switzerland, Germany, Italy, and Yugoslavia.

International Association for Food Protection® NEWS

County of San Diego Selected 2005 Crumbine Award Winner

The County of San Diego Department of Environmental Health has been selected as the recipient of the 2005 Samuel J. Crumbine Consumer Protection Award for Excellence in Food Protection.

The Crumbine Award, named for one of the United States most renowned public health sanitarians, is celebrating its 50th anniversary in 2005. The award is 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.

"San Diego clearly provided an excellent program submittal that involved an industry and public input process creating a clear vision with effective program planning. Their model truly exemplifies that environmental leadership that Samuel J. Crumbine would be proud of," stated David F. Ludwig, division manager at Maricopa County, AZ, Environmental Health and chair of the 2005 jury.

"I am very pleased that the County of San Diego's innovative food safety program has been selected for this prestigious recognition," said Gary Erbeck, director of San Diego's Department of Environmental Health. "It is a testament to the vision, dedication and hard work of our environmental health professionals to prevent and reduce the incidence of foodborne illness."

San Diego will receive the Crumbine Award at the Annual Education Conference of the National Environmental Health Association, June 25–29 in Providence, RI. Award presentations will also be made at the annual meetings of the National Association of County and City Health Officials, July 12–15 in Boston, MA and the International Association for Food Protection, August 14–17 in Baltimore, MD.

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 Inc., International Association for Food Protection, International Food Safety Council, National Association of County and City Health Officials, National Environmental Health Association, National Sanitation Foundation International and Underwriters Laboratories Inc.

Cryptosporidium Outbreak after a Visit to a Wildlife Centre in Northeast Scotland: 62 Confirmed Cases

By April 25, 62 confirmed cases of *Cryptosporidium parvum* infection were reported from an outbreak linked to visits to a wildlife centre in Perthshire, Scotland since March 25. None of the patients are seriously ill, although six children were admitted to hospital and are now recovering. Lambs, poultry, chicks, rabbits, cattle, ducks and other species were at the wildlife centre. A temporary "petting area" had been set up, where adults and children could touch young animals. There were no handwashing facilities next to the petting area, although disinfectant hand cream dispensers were available. Animal petting has now ceased at the centre. About 4,000 people may have visited the centre between March 25 and April 18 when the outbreak was detected. At least one case was in a visitor from the south of England. It is possible that other non-Scottish residents have been affected.

An outbreak control team is continuing detailed epidemiological, environmental, veterinary and microbiological investigations in an effort to identify the source of the infection. General practitioners and hospitals in the region have been alerted and encouraged to submit stool samples from possible cases and to report cases to the local public health authorities.

In addition there has been widespread coverage in Scottish media (newspapers, radio and television). Members of the public have been encouraged to visit their general practioner if affected, or to contact the NHS Scotland telephone helpline for more information. The outbreak control team met for the fourth time on April 25 and reinforced its advice to the public, issued after their first meeting on April 19, to observe strict hygiene and to use thorough handwashing with soap and water to protect against infection after contact with animals, animal feces or people with the infection.

Further cases of *Cryptosporidium* infection that may be related to this outbreak should be reported

to Christopher McGuigan at NHS Tayside (telephone +44 (0)1382 596987). A detailed questionnaire is available to capture the wildlife centre related exposure history in potential cases.

Governmental Administrative Actions, Biotechnology, Bioterrorism, Food Labeling, Food Safety, Nutrition and Risk Assessment

The FDA published in the May 20, 2005 *Federal Register*, a notice seeking public comments within 60 days on "program priorities" in the Center for Food Safety and Applied Nutrition (CFSAN) for fiscal year (FY) 2006. As part of its annual planning, budgeting, and resource allocation process, CFSAN is reviewing its programs to set priorities and establish work product expectations. The FY 2005 workplan contained three lists of activities, as follows: The 'A-list,' the 'B-list,' and a 'Priority Ongoing Activities' list. Our goal is to complete fully at least 90 percent of the 'A-list' activities by the end of the fiscal year, September 30, 2005. Activities on the 'B-list' are those we plan to make progress on, but may not complete before the end of the fiscal year. Items in the 'Priority Ongoing Activities' list illustrate some of the many priority activities the Center performs on a regular basis in addition to those identified on our 'A' and 'B' lists. CFSAN intends to issue a progress report on what program priority activities already have been completed to date in the summer of FY 2005, as well as any adjustments in the workplan (i.e., additions or deletions) for the balance of the fiscal year. FDA is requesting comments on what program priorities CFSAN should consider establishing for FY 2006. FDA intends to make the FY 2006 workplan available in the fall of 2005. The format of the FY 2006 workplan will be identical to the FY 2005 plan. The FDA Program Priorities Workplan for 2005 is posted at <http://www.cfsan.fda.gov/~dms/cfsand04.html.

Outbreak of Norovirus Infection Associated with the Consumption of Frozen Raspberries

An outbreak of gastrointestinal illness in students who ate in a secondary school canteen in the administrative department of Haute-Loire, central France was reported to the local health authorities on March 23, 2005. The school has 30 teachers and 334 students, of whom 298 ate lunch at the school canteen. On March 24, using a standardized questionnaire, students and teachers were asked about recent gastrointestinal illness, and food and drink consumption. A case was defined as a student or teacher at the school who had diarrhea or vomiting accompanied by at least one other symptom (nausea, abdominal pain, vomiting or diarrhea) since March 21, 2005.

Students who reported recent gastrointestinal illness were asked to submit stool specimens for laboratory testing. A review of food handling procedures was carried out in the school restaurant, and samples of the meals served on March 21 and 22 were tested for common foodborne pathogens. Of the 270 students and teachers interviewed, 75 (28%) met the case definition. Of the 75 cases, 69 (92%) reported abdominal pain, 59 (79%) vomiting, 53 (71%) nausea, 38 (51%) diarrhea and 15 (20%) fever. None of the ill students or teachers were admitted to hospital, and all recovered. Duration of illness ranged from less than 1 day to 2 days. Incubation periods, calculated as the time interval between lunch on the March 21 and onset of symptoms, ranged from 12 hours to 56 hours, with a mean of 36 hours and a median of 37 hours.

Consumption of raspberries with fromage blanc (a fresh cheese similar to quark or cottage cheese), a dessert served at lunch on March 21, was significantly associated with illness (relative risk (RR) 3.3; 95% confidence interval (CI) 1.5-7.5), and was reported by 69 of 74 cases (93%) for whom questionnaires were answered completely. The consumption of fromage blanc alone was not associated with illness (RR 1.8; 95% CI 0.4-9.0). Five of the 6 stool specimens submitted by the students tested positive for norovirus genogroup I genotype 5 (Musgrove virus, a genotype not previously identified in France). Bacteriological cultures of the food samples tested negative for *Escherichia coli*, *Staphylococcus aureus*, *Clostridium* sp., *Bacillus cereus* and *Salmonella*. The first analyses of the raspberries for norovirus, from an unopened package from the same producer as those consumed by the cases, were negative. Further analyses are ongoing.

The raspberries, purchased deep frozen, had been mixed with the fromage blanc in a blender while still frozen. The mixture was scooped with a spoon into bowls by a staff member in the canteen. The staff member then used his hands to put a frozen raspberry on each dessert. None of the staff in the restaurant reported gastrointestinal illness in the week before the outbreak.

Freezing allows viruses to survive in berries for a long time. Transmission of viruses such as hepatitis A by contaminated berries have been reported in the literature.

Outbreaks of norovirus infections attributed to raspberries have been documented in Canada in 1997 and Finland in 2002 and 2003.

The investigation strongly suggests that this outbreak of gastrointestinal illness was due to norovirus infection, with contaminated raspberries as the most likely vehicle of infection. The absence of illness in the restaurant staff before the outbreak, and the lack of association between illness and the consumption of other food items prepared by the same staff, suggest that the raspberries had been contaminated before their preparation in the restaurant. However, the hypothesis that the raspberry desserts were contaminated during their preparation cannot be excluded. The raspberries had been imported from outside France. If the raspberries had been contaminated before being frozen and packaged, similar outbreaks may occur in other countries. If norovirus contamination on the raspberries is confirmed, or if other outbreaks related to this product are reported, the supplier and country of origin of the raspberries will be made available through the Rapid Alert System for Food and Feed (RASFF, http://europa.eu.int/comm/food/food/rapidalert/index_en.htm).

Information on other outbreaks that may be linked to consumption of raspberries can be reported to Emmanuelle Espie at the Institut de Veille Sanitaire in France (e.espie@invs.sante.fr).

BAC Down!: Government Officials Back National Food Safety Campaign to Educate on Proper Home Refrigeration

The Partnership for Food Safety Education has launched a national campaign to educate consumers about the importance of maintaining household refrigerator temperature at 40°F or below. The campaign is in part a response to the revised *Listeria monocytogenes* Risk Assessment (September 2003) released by the Food and Drug Administration and the United States Department of Agriculture that revealed proper refrigeration could reduce by two-thirds the risk of listeriosis, the illness caused by a pathogen associated with foods not chilled properly.

"The Risk Assessment says no other measure in the home comes close to this level of effectiveness in reducing cases of foodborne illness caused by *Listeria*," says Robert E. Brackett, Ph.D., director of FDA's Center for Food Safety and Applied Nutrition (CFSAN). "Raising awareness of proper refrigeration temperatures will help us achieve our goal of reducing foodborne illness." Dr. Brackett was the keynote speaker at the launch of the consumer education initiative during the Food Marketing Institute's annual convention in Chicago, IL.

Dr. Merle Pierson, acting USDA under secretary for food safety also attended the May launch. "In 2004 we experienced important declines in the number of cases of foodborne illness caused by *Listeria*. There is no question that this effort by the Partnership for Food Safety Education to educate consumers about proper refrigeration temperatures will help us continue that decline and better protect public health," he said. A recent national study reveals that only 30% of consumers have heard they should use a refrigerator thermometer to monitor temperature and only 20% say they actually use one.

According to Tim Hammonds, chairman of the Partnership for Food Safety Education, "The Partnership has a tremendous opportunity to build on the successful FightBAC!® campaign to educate consumers to make sure their refrigerator temperature is at 40°F or below and that they should monitor the temperature using a refrigerator thermometer. Retailers across the country are joining the Partnership's effort by putting programs in place to help educate consumers about this important food safety recommendation. The message from retailers to consumers is: proper refrigerator temperatures help consumers keep safe food that lasts longer."

Food Thermometers Assure Better, Safer Burgers

You can't judge a burger by its color. Research done at Washington State University has verified that judging the doneness and safety of a cooked hamburger patty by its color isn't a reliable test. Hamburgers that are brown all the way through can still harbor dangerous, even deadly, bacteria. "For years people have been told that when a hamburger is brown throughout, it's done," says Val Hillers, retired WSU extension food safety specialist. "But research found that a quarter of the burgers tested had not reached a safe internal temperature even though they were brown throughout." Hillers says that variations in the meat can result in some burgers remaining pink in the middle although they are cooked to a safe temperature and others appearing to be brown inside when they are not completely cooked.

"Short of cooking them until they resemble charcoal, the best way to assure that burgers and other thin cuts of meat have been cooked to a safe temperature is to

test them with a food thermometer," Hillers says. "Using a food thermometer means you can be sure your meats have reached a safe temperature without overcooking them." With the summer barbeque season fast approaching, a number of grocery stores in Washington and Idaho will help deliver that message to consumers, according to Hillers. Haggen Foods and Top Food stores in Washington state, and Albertson's stores in Idaho, will feature displays and place information cards in their meat sections on the proper use of food thermometers, especially when grilling.

The information will focus on instant-read food thermometers that work best with thin meats such as hamburger patties and chicken breasts, according to Sandy McCurdy, University of Idaho Extension food safety specialist. McCurdy and Hillers teamed up to research food thermometer use and availability, and consumer attitudes about using them. With their team they developed educational materials on the importance and proper use of food thermometers, including a series of recipe cards that will be available in the participating stores.

"With burgers and other thin meats it's best to insert the thermometer probe from the side so that it's deep enough to get an accurate reading," says Hillers. "And even though they are called 'instant read' you need to allow 10 to 30 seconds to get an accurate temperature reading."

There are two types of instant-read food thermometers commonly available, dial and digital, according to McCurdy. And, she says, "advances in technology mean the cost of thermometers is coming down. Dial thermometers are now available for as little as $3.99 and up to about $19. I prefer the digital thermometers but they're a little more expensive, running from about $9 up to about $30. It's really a minor investment when you consider the safety of the food you feed your family." Additional information about food thermometer use is available for order from WSU Extension. Materials include recipes with directions for using a thermometer when cooking hamburger patties, pork chops, chicken breast, sausage patties and ground turkey patties.

A brochure with additional information about using food thermometers and a video illustrating proper thermometer use are also available by going to http://pubs.wsu.edu/ and entering "thermometer" in the search box.

Finding the Source of *Campylobacter*

Reducing the pathogenic bacterium *Campylobacter* on poultry farms and in processing plants begins with finding its sources, one of which is the birds' lungs, Agricultural Research Service (ARS) scientists report. Microbiologists Mark Berrang and Richard Meinersmann and animal physiologist Richard J. Buhr at the ARS Richard B. Russell Agricultural Research Center in Athens, GA studied *Campylobacter* before and after chicken carcasses were scalded to remove feathers, an integral step in poultry processing.

Bacteria can contaminate live chickens during production or transport, or carcasses during scalding. In either case, *Campylobacter* would contaminate respiratory air sacs and could then contaminate the abdominal cavity.

In a commercial processing plant, researchers collected 10 carcasses on each of three days, before and after scalding. They rinsed the entire carcasses and respiratory tracts and took samples for *Campylobacter*, *E. coli* and other bacteria. The results showed the same type of *Campylobacter* were in the carcass and respiratory tract samples. Also, the number and type of *Campylobacter* in the respiratory tracts remained the same before and after scalding. This suggests the respiratory tract is an important source of *Campylobacter* contamination in the interior of the carcass before scalding. According to Berrang and colleagues, the airborne bacteria could be inhaled by the live birds during production or transport, meaning significant levels of the bacteria were already in their respiratory tracts before processing.

Overseeing the US Food Supply: Steps Should be Taken to Reduce Overlapping Inspections and Related Activities

GAO has issued many reports documenting problems resulting from the fragmented nature of the federal food safety system — a system based on 30 primary laws. This testimony summarizes GAO's most recent work on the federal system for ensuring the safety of the US food supply. It provides (1) an overview of food safety functions, (2) examples of overlapping and duplicative inspection and training activities, and (3) observations on efforts to better manage the system through interagency agreements. It also provides information on other countries' experiences with consolidation and the views of key stakeholders on possible consolidation in the United States.

USDA and FDA have primary responsibility for overseeing the safety of the US food supply; the Environmental Protection Agency (EPA) and the National Marine

Fisheries Service also play key roles. In carrying out their responsibilities, these agencies spend resources on a number of overlapping activities, particularly inspection/enforcement, training, research, and rulemaking, for both domestic and imported food. For example, both USDA and FDA conduct similar inspections at 1,451 dual jurisdiction establishments — facilities that produce foods regulated by both agencies. To better manage the fragmented federal system, these agencies have entered into at least 71 interagency agreements — about a third of them highlight the need to reduce duplication and overlap or make efficient and effective use of resources. The agencies do not take full advantage of these agreements because they do not have adequate mechanisms for tracking them and, in some cases, do not fully implement them. Selected industry associations, food companies, consumer groups, and academic experts disagree on the extent of overlap, on how best to improve the federal system, and on whether to consolidate food safety-related functions into a single agency. However, they agreed that laws and regulations should be modernized to more effectively and efficiently control food safety hazards. As GAO recently reported, Canada, Denmark, Ireland, Germany, The Netherlands, New Zealand, and the United Kingdom also had fragmented systems. These countries took steps to consolidate food safety functions — each country modified its food safety laws and established a single agency to lead food safety management or enforcement of food safety legislation.

State Government Campaign Promotes Benefits of Fish for Pregnant Women and Their Children

Women now have access to reliable information on safe levels of fish consumption during pregnancy after the launch of a major NSW Government education campaign. The campaign aims to dispel myths about mercury levels in fish while also highlighting the positive nutritional benefits that many species provide. NSW Minister for Primary Industries, Ian Macdonald, said mercury in fish was not an issue for the general population, but pregnant and breastfeeding women, and women who are planning to get pregnant may want to limit their intake of a few species known to display higher levels of mercury. High levels of mercury can potentially impact the development of the central nervous system in unborn babies and young children.

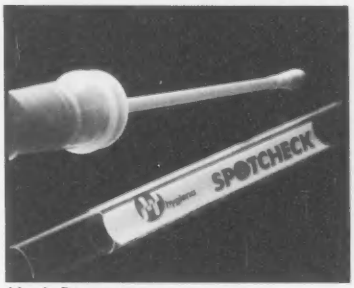
"A recent survey commissioned by the NSW Food Authority revealed 44 per cent of women aged 18 to 40 did not know which fish they should limit during pregnancy and breastfeeding," Mr. Macdonald said. "About 85,000 women in NSW give birth every year. Based on the survey results, nearly 15,000 either stop eating fish or dramatically cut their consumption because of concerns over mercury. As a result, those 15,000 women are missing out on essential nutrients, such as omega-3 fatty acids, that help with the development of a child's nervous system. This campaign is about sorting fact from fiction — and making sure women are armed with information they need to make the best possible choices for themselves and their young children."

Mr. Macdonald launched a wallet card for women planning pregnancy and those caring for young children. The card features scientific advice on how to safely include fish as part of a balanced diet. "The card features recommended intakes of certain fish that may contain elevated mercury levels, such as shark (flake), billfish (broadbill, swordfish and marlin), orange roughy (deep sea perch), and catfish. There is no reason to cut consumption of any other type of fish beyond the normal recommended guidelines," Mr. Macdonald said.

The NSW Food Authority has produced 500,000 wallet cards, which outline how many servings per week of various fish species are safe for pregnant and breastfeeding women.

"These cards help ensure all women can get benefits found in fish, including omega-3 fatty acids, Vitamin B12, iodine and high quality protein," Mr. Macdonald said.

INDUSTRY PRODUCTS



Hardy Diagnostics

*spot*check™ & *spot*check-Plus from Hardy Diagnostics

The new *spot*check™ hygiene monitoring swab is the first hygiene monitoring device that requires no instrument while giving results comparable to ATP systems. *spot*check™ detects glucose which is contained in all major food types. Results can be read in 60 s, turning bright green when residue is present. *spot*check™ is an easy-to-use, simple to interpret device that allows you to demonstrate due diligence. *spot*check™ works well with companies processing bakery products, chicken, eggs, potato products, food dressing and sauces, raw vegetables, root vegetables, fruits, juices, soft drinks, and most raw meats.

*spot*check Plus™ is the same as *spot*check™ but detects both glucose and lactose which is found in dairy products such as milk, cheese, and yogurt. *spot*check Plus® is designed specifically for hygiene monioring in the dairy indusry.

Hardy Diagnostics
800.266.2222
Santa Maria, CA
www.hardydiagnostics.com

PBI Dansensor America's Quality of Metallized Film is Quickly Validated by Water Vapor and Oxygen Transmission on Rate Testers

Metallized film, with its highly regarded moisture and oxygen-barrier properties and relative low-cost economy, can be quickly and easily tested on LYSSY Moisture Vapor Transmission and Oxygen Permeation testers available from PBI Dansensor to validate barrier performance properties prior to material use at both point of receipt of the material and when material is taken from storage to ensure that barrier properties have not become compromised by oxidation or moisture.

Since metallized film material kept in storage is subjected to a range of temperature and humidity conditions that can warp the film and result in a weakening of the barrier properties and physical aesthetics, it is important that metallized film rolls be tested prior to its use.

When used as a component of a fast-to-market packaging development strategy, the LYSSY tester provides speed, ease-of-use and accuracy for measuring permeability.

Quick-yielding LYSSY test results present packaging engineers and metallized film formulators with early and frequent moisture vapor transmission and oxygen transmission rates they can use to test and evaluate barrier protection performance.

The self-contained LYSSY tester provides continuous scanning within a controlled, enclosed temperature/humidity environment that is less sensitive to ambient temperature, humidity or physical space limitations than other test methods.

PBI Dansensor America Inc.
201.251.6490
Glen Rock, NJ
www.pbi-dansensor.com

Flowserve Adds Two Models to Limitorque PT Series of Worm Gear Operators

The new additions to the PT series are the PT-12 and PT-14, rated at 880 ft-lb and 1,600 ft-lb respectively, designed to provide added versatility for torque and operating time requirements. The new PT-12 and PT-14 models, like the larger worm gear operators in the PT product line, are constructed with a rugged cast-iron housing for weatherproof, submersible or buried service applications.

Dependable, efficient and economical, the Limitorque PT is optimized for motorized valve operation and is the first such device on the market specifically designed for that function. While the PT can be used for manual valve operation, motorized valve control using the PT offers superior process control.

Used in tandem with the industry-leading Limitorque MX, L120 or SMB electric actuators, the PT provides a dependable and cost-effective

Be sure to mention, "I read about it in *Food Protection Trends*"!

flow control solution for quarter-turn applications. Available in a wide range of operational speeds and with output torques up to 135,000 ft-lb (183,050 Nm), the PT delivers extraordinary valve control and consistent performance by combining common worm gear operator technology with a state-of-the-art design.

Central to the design of the PT is its highly efficient one-piece rolled worm and shaft. Unnecessary parts have been eliminated to improve performance, and a careful evaluation of the operator's components has led to standardized parts across all torque ranges. Optional spur gear attachments facilitate the economical use of smaller actuators with the PT.

Available with ductile iron worm gears or bronze alloy worm gears for AWWA and modulating applications, the PT can be installed in the harshest environments, including low temperature applications to -50°C. When coupled with Flowserve Limitorque electric actuators, the PT will provide years of trouble-free service.

"The addition of these two worm gear operators to the product line allows us to more effectively meet customer application requirements in the expanding market for smaller quarter-turn valves," says Dave Montgomery, product manager, Flowserve Flow Control, Limitorque Actuation Systems.

Flowserve Flow Control, Inc.
434.845.9711
Dallas, TX
www.flowserve.com

Iwaki America Inc.

High-efficiency, Uniquely Engineered Magnetic Drive Pump from Iwaki America

Iwaki America Inc. offers a premier line of non-metallic centrifugal pumps with unique features.

Expertly engineered with a unique internal cooling circuit, double-bearing system and inner rotating assembly, the WMD and MD line of Iwaki pumps provide high efficiencies and improve the life-cycle costing of any system.

The unique internal cooling circuit uses a hollow rotating spindle which creates a positive, forced cooling path, lubricating bearing surfaces and providing a low pressure escape to the eye of the impeller through the hollow spindle. The unique double bearing system allows the cooling circuit liquid to continually wash front and rear radial bearings, extending bearing life.

The inner rotating assembly of alumina ceramic or SiC spindles are bored, turned and highly polished and form the center of the driven rotating assembly. Balance holes traditionally employed only in large process pumps are expertly engineered into the impellers of the WMD and MD pumps. Radial bearings of high lubricity fluoropolymer minimize mechanical losses typical of conventional mag drive pumps. Available high purity SiC radial bearings handle the most aggressive or ultrapure chemistries. The WMD and MD line offers maximum flows to 35.6 and maximum head of 67 feet.

These highly efficient pumps are compact, offer higher pressure and longer life than traditional offerings. They are well-suited for laser, chiller and blood analyzer applications as well as any process, re-circulation or transfer application. They can handle both aggressive or high purity requirements.

Iwaki America Inc.
508.429.1440
Holliston, MA
www.iwakiamerica.com

A Novel "Pathatrix Pooling Strategy" from Matrix MicroScience Has Gained AOAC-RI Approvals for Its *Salmonella* and *Listeria* Product Range

Matrix MicroScience has gained AOAC-RI approval for its new range of Pathatrix Pooling products for the testing of *Salmonella* and *Listeria*.

Pathatrix Pooling is unique in that it relies on "post-enrichment pooling" as opposed to conventional pre-enrichment sample pooling, the key point being that the Pathatrix pooling approach maintains 100% sample in-

tegrity and traceability. A number of significant benefits that the Pathatrix Pooling Strategy provides to all microbiological laboratories can be summarized;

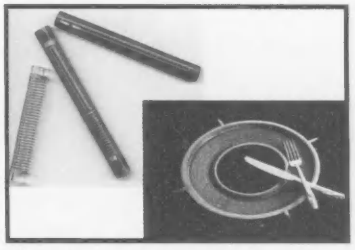
- Increased sample throughput, i.e., up to 5 times
- Substantial cost reduction, i.e., >60%
- Significant labor savings, i.e., >60%
- Compatible with a wide range of end-point detection technologies
- Original sample integrity maintained 100%

The Pathatrix Pooling principle relies on the pooling of up to 5 × 50 ml sub-samples to create a single 250 ml composite sample, which can be analyzed by a range of end-point detection technologies. In this way, negative samples can be screened out very efficiently and if a positive pooled sample is obtained, then the original post-enriched samples, where complete sample integrity has been maintained, can be very quickly re-analyzed to achieve rapid results. In addition to routine analysis this can be a very effective tool for contamination incidents and/or positive release scenarios.

As the majority of companies find that 98% + of all routine food samples tested for pathogens are negative, this new technique offers great opportunities for cost savings, increased laboratory efficiency and the ability to increase the number of sample tested with the current laboratory facilities. For example, a company who carries out approximately 100,000 analyses a year and is using a molecular detection method could save $400,000+ / annum by using the Pathatrix Pooling method.

The *Salmonella* & *Listeria* Pathatrix Pooling products are AOAC-RI approved for a variety of food types, including difficult sample matrices. The Pathatrix Pooling Kits offer a unique approach to pathogen testing for all food-testing laboratories.

Matrix MicroScience Inc.
303.277.9613
Golden, CO
www.matrixmsci.com



Chromalox

Chromalox Introduces Advanced Thick Film Heating Capability in Partnership with Ohmcraft, Inc.

Chromalox®, a manufacturer of precision heat and control products, is proud to announce a partnership with Ohmcraft® to provide advanced thick film heating capability. The agreement between the two companies provides Chromalox as the exclusive seller and Ohmcraft as the exclusive manufacturer of thick film heating products and solutions.

Chromalox thick film heaters and sensors provide the best possible combination of heat transfer, thermal efficiency, and temperature uniformity in applications where there is a need to save space in a product design, and offer a unique solution to a variety of applications where traditional heating methods fall short. Applications abound in semiconductor manufacturing, medical equipment, laboratory and analytical equipment, plastics processing, food processing, gas/fluid heating and digital printing and copiers. The advantages to using Chromalox thick film heaters over traditional heating methods include:

- More direct surface contact ensures optimum heat transfer
- Lower mass designs provide very fast thermal response for excellent operating efficiency
- Fused termination points ensure strong, trouble-free connections
- Low-profile, compact design minimizes space constraints in OEM applications
- Advanced printing technology allows application of thick film to more surface shapes than any other manufacturer
- Much finer heating patterns for tighter thermal profile tolerances
- More flexible heater circuit design allows for variable heat output
- Higher temperature and watt density designs than typical resistance wire-based heaters

Chromalox thick film heaters and sensors are constructed of a substrate, a base dielectric material, and a thick film printed resistor. They can be printed on a variety of metal, ceramic, glass, and plastic substrates. Chromalox has a wider range of patterning available than anyone in the

industry with the ability to pattern on flat, cylindrical, concave, obtuse, and non-linear surfaces – even on the inside of a tube! Operating temperatures of up to 500°C can be achieved, if necessary. Thermal profiles of less than ±1°C are possible in many applications. Watt densities of up to 500 W/in2 are available, with typical watt densities below 100 W/in2. Customized control solutions designed for each application can range from mechanical sensors, thermostats, and thermal fuses to printed RTDs and electronic PID control schemes.

Chromalox, Inc.
800.443.2640
Pittsburgh, PA
www.chromalox.com

FMC FoodTech Provides Optical Sorting Equipment

For processors of rice, grains, coffee, dry beans, nuts, fruits, vegetables, and more, an economic but effective sorting solution is of great importance. FMC FoodTech's line of optical sorting equipment provides the results that these processing professionals demand.

FMC FoodTech offers four optical sorting machines; the DueyTronic, Guardian, HueTronic and PanaTronic Optical Sorters. Each machine provides unique advantages to its customers, including reliability, cost of ownership and ease of use. Additionally, each sorter is designed for low-cost operation maintenance, using easily replaceable, non-proprietary components when possible. FMC FoodTech's optical sorters can provide solutions for all conditions, whether a low or high capacity machine for a wet or dry environment is required. Additionally, FMC FoodTech can work with customers to create a finance solution that meets their needs.

Please consider FMC FoodTech's optical sorting equipment when covering sorting solutions for your readers in the future.

FMC FoodTech
800.246.2034
Newberg, OR
www.fmctechnologies.com

MDS Nordion Introduces New Quadura Food Irradiation System

System designed to address quarantine security requirements and continued concerns around food safety. MDS Nordion has introduced the Quadura™ system, a new pallet food irradiator that is designed for importers and exporters of exotic fruits and vegetables. The system provides an economical and environmentally friendly disinfestation treatment to satisfy the quarantine security requirements of international markets.

"Most tropical fruits cannot be treated by conventional methods and irradiation affords a new treatment for these fruits and an opportunity for many countries, particularly developing countries, to expand their export markets," said Dr. Ralph Ross, former deputy assistant administrator for the US Agricultural Research Service and deputy director of science and technology in USDA-APHIS-PPQ.

"Irradiation is an alternative to methyl bromide, the universal chemical fumigant now under international regulatory scrutiny. The new Quadura irradiator represents the most advanced system available for these purposes. Export markets are critical to the long-term growth of the fruit industry in the Philippines," said Dr. Hernani Golez, director of the bureau of plant industry for the Philippine government. "We need to take advantage of the newest technology in order to provide a high quality product that meets stringent import regulations in these markets, and do it in a cost-effective manner to maintain competitiveness." The Quadura systems' design features four stations that can independently process pallets of food. This allows growers and processors to administer multiple pallet-specific treatment doses simultaneously to fruit, vegetables, meat and poultry to eliminate quarantine pests and pathogens while guaranteeing product quality and maintaining continuous processing operations. Fully automated, the Quadura's full pallet processing will maximize operational flexibility, reduce downtime and achieve operational efficiency.

"Quadura's patented technology enables growers to irradiate a variety of produce already packaged on pallets, the standard packaging and transportation system for fruit," says John Corley, senior vice president, Ion Technologies at MDS Nordion. "Seamless integration of the Quadura system into the packaging and transportation process will reduce product handling, which can damage fruit, and decreases costs associated with current disinfestation techniques."

At the same time, with rising concerns about the safety of the food supply, the Quadura system answers the demand for additional food-safety assurance by eliminating foodborne pathogens such as *E. coli* and *Listeria* in meat, poultry and other foods.

MDS Nordion
800.465.3666
Ottawa, Canada
www.mds.nordion.com

Be sure to mention, "I read about it in *Food Protection Trends*"!

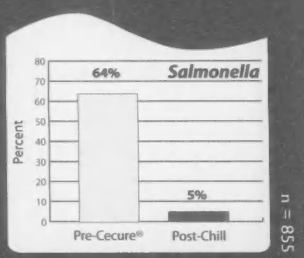
REAL RESULTS.

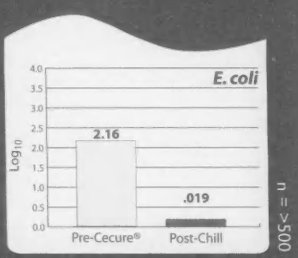
REAL WORLD. REAL VALUE.

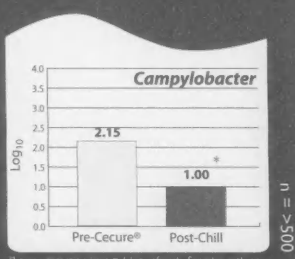
from the fastest growing food safety company in the world.

safe foods® CORPORATION

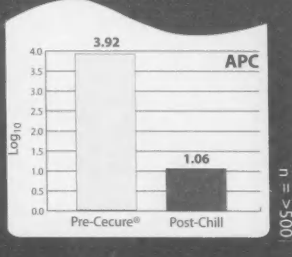
Over 800 carcasses sampled in multiple "challenged" commercial applications: Salmonella positives post-chill: <6% using a single pre-chill point of application!







*Lower detection limit = 1 log10 cfu/mL. Samples with no detectable colonies are reported as 1 log10 cfu/mL



REALResults

While Cecure's active ingredient, cetylpyridinium chloride ("CPC"), has a broadly documented history of being a superior antimicrobial, it's now delivering unparalleled results in commercial use in the poultry industry. What's truly remarkable is that this extraordinary performance is being delivered from a single pre-chill point of application.

A single pre-chill point of application *can* produce both online reprocessing efficiencies and remarkable post-chill performance!

REALWorld

The question now being asked is, "How many chemicals and how many points of application do I want to pay for and manage to put 'clean' birds in my chiller and get 'clean' birds out? Especially when I can have it all with a simple, single pre-chill antimicrobial at a very competitive price, and get online reprocessing and peace of mind from knowing that I have the only pre-chill and post-chill performance guaranteed to meet present and future industry standards."

REALValue

That peace of mind is now available because Safe Foods stands behind Cecure® with a unique contractual performance standard: "Carcasses treated by the Cecure® system shall meet or exceed pre-chill and post-chill microbiological standards as presently are or may be established by the USDA". If Cecure® doesn't meet the standards – now or in the future - you may elect to terminate your contract and Safe Foods will remove the Cecure® system.

Cecure® is delivered via the state-of-the-art, fully-automated Cecure Application System™, capable of producing required application documentation for HACCP records and export requirements, and making Cecure® the most environmentally friendly antimicrobial available on the market today. All from the company with a reputation for delivering the best customer support and highest level of customer satisfaction in the industry. *Who's* saying you can't have it all?

Cecure® CPC Antimicrobial REAL Results

www.SafeFoods.net

1-866-9-Cecure

IAFP 2005 Award Winners

BLACK PEARL

Sponsored by Wilbur Feagan and F & H Food Equipment Company, Springfield, MO

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FELLOWS

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Robert E. Brackett
Joseph F. Frank
Gale Prince
Jenny Scott
Susan S. Sumner

HONORARY LIFE MEMBERSHIP

Ron Case
Wilbur Feagan
Roy E. Ginn
John H. Silliker

HARRY HAVERLAND CITATION

Sponsored by Zep Manufacturing Co., Atlanta, GA

Harold Bengsch

HAROLD BARNUM INDUSTRY

Sponsored by Nasco International, Inc. Fort Atkinson, WI

Catherine Nnoka

EDUCATOR

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FOOD SAFETY INNOVATION

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To be determined

FPA FOOD SAFETY

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San Diego Department of Environmental Health
San Diego, California

AFFILIATE AWARDS:

C. B. SHOGREN MEMORIAL

Ontario Food Protection Association

BEST ANNUAL MEETING FOR AFFILIATES

Missouri Milk, Food and Environmental Health Association

BEST EDUCATIONAL CONFERENCE FOR AFFILIATES

Florida Association for Food Protection

BEST COMMUNICATION MATERIALS FOR AFFILIATES

British Columbia Food Protection Association

MEMBERSHIP ACHIEVEMENT FOR AFFILIATES

Metropolitan Association for Food Protection

Committee Meetings

Sunday, August 14

Baltimore Marriott Waterfront

TIMES	COMMITTEE MEETING	ROOM
7:00 a.m. – 10:00 a.m.	Affiliate Council	Harborside A
8:00 a.m. – 5:00 p.m.	Committee on the Control of Foodborne Illness	Iron
9:00 a.m. – 11:00 a.m.	Applied Laboratory Methods	Laurel CD
9:00 a.m. – 11:00 a.m.	Food Safety Network	Kent C
9:00 a.m. – 11:00 a.m.	Viral and Parasitic Foodborne Disease	Kent B
10:00 a.m. – 12:00 p.m.	3-A Committee on Sanitary Procedures	Kent A
10:00 a.m. – 12:00 p.m.	*JFP* Management	Laurel AB
10:00 a.m. – 12:00 p.m.	Microbial Risk Analysis	Essex C
10:00 a.m. – 12:00 p.m.	Retail Food Safety and Quality	Essex AB
11:00 a.m. – 12:00 p.m.	Awards	Laurel CD
11:00 a.m. – 12:00 p.m.	Constitution and Bylaws	Kent B
11:00 a.m. – 12:00 p.m.	Nominating	Kent C
12:00 p.m. – 1:30 p.m.	Student	Harborside B
1:00 p.m. – 3:00 p.m.	Audiovisual Library	Kent A
1:00 p.m. – 3:00 p.m.	Fruit and Vegetable Safety and Quality	Laurel CD
1:00 p.m. – 3:00 p.m.	Past Presidents'	Essex C
1:00 p.m. – 3:00 p.m.	Seafood Safety and Quality	Kent B
2:00 p.m. – 4:00 p.m.	Dairy Quality and Safety	Kent C
2:00 p.m. – 4:00 p.m.	*FPT* Management	Harborside A
2:00 p.m. – 4:00 p.m.	Meat and Poultry Safety and Quality	Essex AB
2:00 p.m. – 4:00 p.m.	Water Safety and Quality	Laurel AB
3:00 p.m. – 5:00 p.m.	Food Hygiene and Sanitation	Kent A
3:00 p.m. – 5:00 p.m.	Food Toxicology and Food Allergens	Kent B
3:00 p.m. – 5:00 p.m.	Foundation Fund	Laurel CD
3:00 p.m. – 5:00 p.m.	Outreach Education	Essex C
4:00 p.m. – 5:00 p.m.	Program	Harborside B

Note: The Membership Committee will meet on Saturday, August 13 from 3:00 p.m. – 4:30 p.m.

The IAFP Committee Meetings are open for everyone to attend!

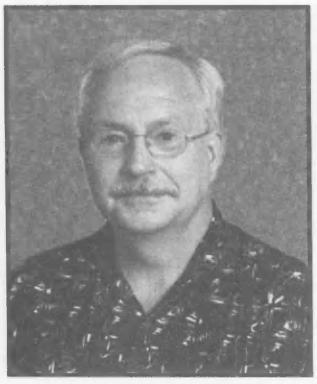
Ivan Parkin Lecture

Sunday, August 14
7:00 p.m. – 8:00 p.m.

Food Safety 2005: Results Come Easy – Answers are Elusive

Presented by

Douglas L. Archer, Ph.D.
Professor and Past Chair
Food Science and Human Nutrition Department
University of Florida
Gainesville, Florida, USA



Dr. Douglas L. Archer will present "Food Safety 2005: Results Come Easy – Answers are Elusive" as the Ivan Parkin Lecture on Sunday evening, August 14 at IAFP 2005.

Dr. Archer is a professor and Past Chair of the Food Science and Human Nutrition Department, Institute of Food and Agricultural Sciences at the University of Florida, Gainesville. He received a B.A. degree in Zoology in 1968, a M.S. degree in Bacteriology in 1970 from the University of Maine and a Ph.D. degree in Microbiology in 1973 from the University of Maryland.

Dr. Archer served as Deputy Director, Center for Food Safety and Applied Nutrition, US Food and Drug Administration (FDA) in charge of research, regulatory and policy activities of programs including foods, food additives and food labeling; dietary supplements; seafood, cosmetics and colors. He was a Commissioned Officer in the United States Public Health Service (USPHS) and was appointed Assistant Surgeon General in July 1990. He received numerous awards including five citations for excellence, three Meritorious Service Medals and the Distinguished Service Medal. Other awards included the 1988 Tanner Memorial Award from the Institute of Food Technologists and the J. C. Frazier Memorial Award from the University of Wisconsin in 1992. Dr. Archer retired from the USPHS on January 1, 1994.

Dr. Archer also served as Chairman of the FAO/WHO Codex Alimentarius Committee on Food Hygiene from 1984 to 1994. He is the past US Associate Editor for Food Control where he now serves on the Editorial Board, and since 1990 has been a member of the WHO Expert Advisory Panel on Food Safety.

Dr. Archer is a member of the International Association for Food Protection and the Institute of Food Technologists and also serves as an advisor to the FDA and the WHO. Dr. Archer has authored or co-authored more than 80 scientific publications and given hundreds of presentations to scientific organizations, trade organizations and consumer groups.

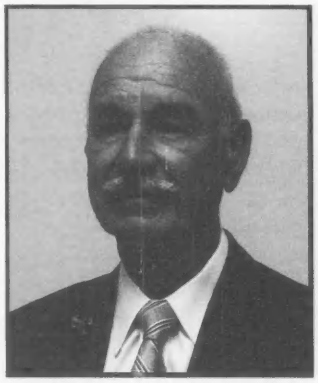
John H. Silliker Lecture

Wednesday, August 17
3:45 p.m. – 4:30 p.m.

Managing the Safety of Internationally Traded Food

Presented by

Michiel van Schothorst, Ph.D.
Retired Vice President, Food Safety Affairs
Nestlé
Vevey, Switzerland



Dr. Michiel van Schothorst will present "Managing the Safety of Internationally Traded Food" as the John H. Silliker Lecture on Wednesday, August 17, 2005.

Dr. van Schothorst studied Veterinary Medicine and obtained his Ph.D. at the University of Utrecht (NL). He began his career as a food microbiologist at the National Institute of Public Health in The Netherlands where he became Head of the Laboratory for Zoonosis in 1975. From 1965 to 1980 Dr. van Schothorst was Secretary-Treasurer of the World Association of Veterinary Food Hygienists (WAVFH).

In 1980, Dr. van Schothorst continued his career at the Nestlé Head Office in Vevey, Switzerland where he was appointed Head of Quality Assurance in 1985. In 1992 he was nominated Vice President of Food Safety Affairs until he retired in 2002.

Dr. van Schothorst was elected to become the first professor and European Chair in Food Safety Microbiology at the University of Wageningen (NL) in 1997. In addition he has been active in developing Quality Assurance and Food Safety programs and promoting the HACCP concept through textbooks, publications, lecturing and training.

Dr. van Schothorst was a member of the Permanent Food Safety Advisory Panel of the World Health Organization from 1986-2002, participating in the Codex Food Hygiene Committee from 1968-2002. He was also a member of the International Commission on Microbiological Specifications for Foods (ICMSF) from 1973-2003 and Secretary from 1992-2003.

Dr. van Schothorst participated in many FAO/WHO expert meetings on Food Safety and Public Health, and plays an active role in the WHO/ICD Food Safety training programs such as "Food Safety for Nutritionists and other Health Workers," "HACCP" and "Microbiological Risk Assessment". He is author or co-author of more than 140 scientific publications or chapters in scientific books.

IAFP 2005 Preliminary Program

SUNDAY, AUGUST 14
7:00 – 8:00 p.m.

OPENING SESSION — *Harborside Ballroom*

Ivan Parkin Lecture – Food Safety 2005: Results Come Easy – Answers are Elusive

Dr. Douglas L. Archer, Professor and Past Chair, Food Science and Human Nutrition Dept., University of Florida, Gainesville, FL, USA

Cheese and Wine Reception will follow in the Exhibit Hall.

MONDAY, AUGUST 15
8:30 a.m. – 12:00 p.m.

S01 Laboratory Response to Food Bioterrorism: How Prepared are We?

Harborside C

Sponsored by ILSI N.A.

Organizer: Catherine Nnoka
Convenors: Genevieve B. Gallagher, Laurie S. Post, and Bala Swaminathan

8:30 Food Bioterrorism Response Plan and National Laboratory Capacities — ARTHUR P. LIANG, CDC, Atlanta, GA, USA

9:00 State and Local Public Health Laboratory Capabilities and the Role of These Laboratories in Responding to Food Bioterrorism — JAMES L. PEARSON, Virginia Division of Consolidated Laboratory Services, Richmond, VA, USA

9:30 State Department of Agriculture Laboratory Capabilities and the Role of These Laboratories in Responding to Food Bioterrorism — NATHAN L. RUDGERS, National Association of State Departments of Agriculture, Washington, D.C., USA

10:00 Break

10:30 Federal Food Regulatory Agency Laboratory Capability — ROBERT L. BUCHANAN, FDA-CFSAN, College Park, MD, USA

11:00 The Food Emergency Response Network (FERN) — PATRICK C. MCCASKEY, USDA-FSIS, Athens, GA, USA

11:30 Industry Perspectives — RUSSELL S. FLOWERS, Silliker, Inc., Homewood, IL, USA

S02 Microbiological Predictive Models: Development, Use and Misuse

Harborside DE

Organizer: Carl S. Custer
Convenors: Carl S. Custer and Robert J. Hasiak

8:30 USDA-ARS Pathogen Modeling Program and ComBase – Making Data Available for Universal Use — MARK TAMPLIN, USDA-ARS, Wyndmoor, PA, USA

9:00 Development of Accurate Cooling Models to Meet Regulatory Performance Standards — DONALD SCHAFFNER, Rutgers University, New Brunswick, NJ, USA

9:30 Verifying and Improving the Use of Microbial Pathogen Computer Models for Validating Thermal Processes in the Meat Industry — BRADLEY MARKS, Michigan State University, East Lansing, MI, USA

10:00 Break

10:30 An Industry Perspective of the Uses Microbiological Modeling Provides to Meat and Poultry Processors — LEE JOHNSON, ConAgra Food–Culinary, Omaha, NE, USA

11:00 Use and Misuse of Predictive Models – The Regulatory Perspective — ROBERT HASIAK, USDA-FSIS-OPPED-TSC, Omaha, NE, USA

11:30 Getting the Most Out of Predictive Models — TOM ROSS and TOM MCMEEKIN, University of Tasmania, Hobart, Tasmania, Australia; and IAN JENSON, Meat and Livestock Australia, North Sydney, NSW, Australia

S03 Food Allergens: Concerns for the Packaged Food and Food Service Industries

Harborside A

Organizer: Anne Munoz-Furlong
Convenors: Anne Munoz-Furlong and Frank Yiannas

8:30 Food Allergens – Why are They a Concern? — GALE PRINCE, The Kroger Company, Cincinnati, OH, USA

Note: Unauthorized video, still photography or audio recording will not be allowed.

Subject to change

9:00 Food Allergens – Consumer Perspective — ANNE MUNOZ-FURLONG, The Food Allergy & Anaphylaxis Network, Fairfax, VA, USA

9:30 FDA Approach to Food Allergens — ELIZABETH HARDEN, FDA-CFSAN, College Park, MD, USA

10:00 Break

10:30 Allergen Control Strategies for the Food Industry — MARK MOORMAN, Kellogg Company, Battle Creek, MI, USA

11:00 Managing Food Allergens at Food Service — FRANK YIANNAS, Walt Disney World Company, Lake Buena Vista, FL, USA

11:30 Thresholds and Detection Methods — SUE HEFLE, University of Nebraska, Lincoln, NE, USA

S04 Global Water Quality Concerns

Harborside B

Organizer: Susan McKnight
Convenors: Louise M. Fielding and Susan McKnight

8:30 The Food Safety Impact of Water Emergencies on the Food Industry — LOUISE FIELDING, University of Wales Institute, Cardiff, Cardiff, South Wales, UK

9:00 Issues with Water Recycling in the Food Industry — LEON GORRIS, Unilever, Sharnbrook, Bedford, UK

9:30 Waterborne Disease Outbreaks and Its Impact on Food — CHRISTOPHER R. BRADEN, CDC, Atlanta, GA USA

10:00 Break

10:30 Water on the Move – Trains, Planes and Cruise Ships – A Global Problem — DEAN DAVIDSON, FDA, Arlington, VA, USA

11:00 The Importance of Source Water Protection for Food Processing — MICHAEL BRODSKY, Brodsky Consultants, Thornhill, ON, Canada

11:30 Impact of Distribution Systems on Ingredient Water Quality — ADRIAN PETERS, University of Wales Institute, Cardiff, Cardiff, South Wales, UK

S05 Recent Regulatory Changes and Issues Affecting Your Dairy Operation

Essex ABC

Sponsored by: IAFP Foundation Fund

Organizer: Dennis Gaalswyk
Convenors: Don Breiner and Dennis Gaalswyk

8:30 The Complex World of Dairy Regulations – An Overview — RON SCHMIDT, University of Florida, Gainesville, FL, USA

9:00 2005 NCIMS Conference Update — MARLENA BORDSON, Illinois Department of Public Health, Springfield, IL, USA

9:30 Recent Regulatory Decisions from USDA — PHILLIP WOLFF, USDA, Manassas, VA, USA

10:00 Break

10:30 IDFA and Codex Impact on Dairy Regulations — ALLEN SAYLER, International Dairy Foods Association, Washington, D.C., USA

11:00 The Bioterrorism Preparedness Act Regulations – Compliance for Suppliers, Transporters, Processors and Importers — LOUIS CARSON, FDA-CFSAN-DHHS-OCD-OFSDO, College Park, MD, USA

11:30 Panel Discussion

T01 Produce Technical Session

Laurel ABC

Convenors: To be determined

T1-01 8:30 DSC An Examination of Media Reporting Trends of Produce-related Food Safety — BENJAMIN CHAPMAN and Douglas Powell, University of Guelph, Guelph, ON, Canada

T1-02 8:45 DSC Microbial Safety Evaluation of Organic and Conventional Fresh Produce at the Pre-harvest Stage — AVIK MUKHERJEE, Dorinda Speh, Aaron Jones, Lue Xiong, Kathleen Buesing, and Francisco Diez-Gonzalez, University of Minnesota, St. Paul, MN, USA

T1-03 9:00 Results of Microbial Baseline Study of Ontario Grown Fresh Fruits and Vegetables — LINDSAY ARTHUR and Sandra Jones, Ontario Ministry of Agriculture and Food, Guelph, ON, Canada

T1-04 9:15 *Salmonella enterica* and Enterohemorrhagic *Escherichia coli* O157:H7 Survival on Produce is Altered by the Presence of Epiphytic Bacteria — MICHAEL COOLEY and Robert Mandrell, USDA-ARS, Albany, CA, USA

T1-05 9:30 DSC Evaluation of Steam Blanching for *Salmonella* Enteritidis Reduction on Almond Surfaces — SU-SEN CHANG, John Reyes, Joseph R. Powers, and Dong-Hyun Kang, Washington State University, Pullman, WA, USA

T1-06 9:45 DSC Migration of *Salmonella* Enteritidis PT 30 through Almond Hulls and Shells — MICHELLE D. DANYLUK, Maria T. Brandl, and Linda J. Harris, University of California-Davis, Davis, CA, USA

10:00 Break

T1-07 10:30 DSC Inactivation of Bacteria, Yeasts and Molds on Palletized Highbush Blueberries Using Chlorine Dioxide Sachets — IULIANO POPA, Eric J. Hanson, Annemiek Schilder, Ewen C.D. Todd, and Elliot T. Ryser, Michigan State University, East Lansing, MI, USA

T1-08 10:45 DSC Variability of Virus Attachment Patterns to Butterhead Lettuce — EVERARDO VEGA, Jeannon Smith, Jay Garland, Anabelle Matos, and Suresh D. Pillai, Texas A&M University, College Station, TX, USA

T1-09 11:00 Evaluation of Hepatitis A Virus Inactivation by High Pressure Processing in Strawberry Purée and Sliced Green Onions — DAVID H. KINGSLEY, Dallas G. Hoover, and Dongsheng Guan, USDA-ARS-MFSRU, Dover, DE, USA

T1-10 11:15 Survey of Biosecurity Practices in Produce Operations in the Southeast — KAREN W. SIMMONS, Mark A. Harrison, William C. Hurst, Judy A. Harrison, Jeffrey Brecht, Keith R. Schneider, Amy Simonne, and James W. Rushing, University of Georgia, Athens, GA, USA

T1-11 11:30 Impact of Regulations on Juice-associated Outbreaks — JAZMIN VOJDANI and Robert Tauxe, CDC, Atlanta, GA, USA

T1-12 11:45 Lethality of Vanillic Acid toward *Escherichia coli* O157:H7 in Unpasteurized Apple Juice — PASCAL DELAQUIS, Kwan Deog Moon, Peter Toivonen, Susan Bach, Kareen Stanich, and Leanne Harris, Agriculture and Agri-Food Canada, Summerland, BC, Canada

P01 Pathogens Poster Session

Grand Foyer West

8:00 a.m. – 12:00 p.m.
Authors present 9:00 a.m. – 11:00 a.m.
Convenors: To be determined

P1-01 DSC Detection of *Listeria monocytogenes* Associated Febrile Gastroenteritis during Investigations of Foodborne Outbreaks — LORRAINE MCINTYRE, Joe Fung, Carol Shaw, Ana Paccagnella, Monika Naus, Laura MacDougall, and Judith L. Isaac-Renton, BC Centre for Disease Control, Vancouver, BC, Canada

P1-02 DSC Modeling the Growth/No Growth Interface of *Listeria monocytogenes* in Ready-to-Eat Products as a Function of Lactic Acid Concentration and Dipping Time and Storage — YOHAN YOON, Ifigenia Geornaras, Ioanna M. Barmpalia, Patricia A. Kendall, Keith E. Belk, John A. Scanga, Gary C. Smith, and John N. Sofos, Colorado State University, Fort Collins, CO, USA

P1-03 DSC Comparison of Growth Kinetics of *Listeria monocytogenes* Ribotypes Linked to Listeriosis at the Low-temperature Range — AMIT PAL, Theodore P. Labuza, and Francisco Diez-Gonzalez, University of Minnesota, St. Paul, MN, USA

P1-04 DSC Growth and Stress Resistance Variation of *Listeria monocytogenes* Strains from Clinical, Food, Animal and Environmental Sources — ALEXANDRA LIANOU, Jarret D. Stopforth, Yohan Yoon, Martin Wiedmann, and John N. Sofos, Colorado State University, Fort Collins, CO, USA

P1-05 Competitive Aerobic Growth between *Listeria monocytogenes* and *Pseudomonas aeruginosa* in Broth or Spoilage Flora in Milk — ANTONIO J. DE JESÚS and Richard C. Whiting, FDA-CFSAN, College Park, MD, USA

P1-06 The Behavior of *Listeria monocytogenes* in Ham Salad and Potato Salad as Affected by the Mayonnaise pH and Storage Temperature — CHENG-AN HWANG, ERRC-ARS-USDA, Wyndmoor, PA, USA

P1-07 Subtyping *Listeria monocytogenes* from Bulk Tank Milk Using Automated Repetitive Element-based PCR — JO ANN S. VAN KESSEL, Jeffrey S. Karns, Lisa Gorski, and Michael L. Perdue, USDA-ARS, Beltsville, MD, USA

P1-08 DSC Characterization of *Listeria monocytogenes* Isolated from Deli Meats and Retail Chickens — YIFAN ZHANG, Emily Yeh, Yuelian Shen, Grace Hall, Jennifer Cripe, Arvind Bhagwat, and Jianghong Meng, University of Maryland, College Park, MD, USA

P1-09 Pulsed-field Gel Electrophoresis and Serotyping of *Listeria monocytogenes* Isolated from Ready-to-Eat Foods — STEFANIE GILBRETH, Jeff Call, F. Morgan Wallace, Virginia Scott, Yuhuan Chen, and John Luchansky, USDA-ARS-ERRC, Wyndmoor, PA, USA

P1-10 Ultraviolet Light for the Inactivation of *Listeria monocytogenes* in Recycled Chill Brines — JOELL EIFERT, Susan Sumner, Robert Reinhard, Wafa Birbari, and John Russell, Virginia Tech, Blacksburg, VA, USA

P1-11 Mutations in CRP/FNR Family of Regulatory Genes in *Listeria monocytogenes* Do Not Alter the Heat Resistance of the Pathogen — DARRELL O. BAYLES and Gaylen A. Uhlich, USDA-ARS-ERRC, Wyndmoor, PA, USA

P1-12 Prevalence of *Listeria* Species in Street-vended, Ready-to-Eat Foods in Alexandria, Egypt — MOUSTAFA EL-SHENAWYA and Mohamed El-Shenawyb, National Research Center, Cairo, Egypt

P1-13 Impact of Antibiotic Stress on Acid and Heat Tolerance and Virulence Factor Production of *Escherichia coli* O157:H7 — REHA ONUR AZIZOGLU and MaryAnne Drake, North Carolina State University, Raleigh, NC, USA

P1-14 Survival of Lineage I and II Isolates of *Escherichia coli* O157:H7 in Acid — Yaqin Li, Robin McKellar, Mansel Griffiths, and JOSEPH A. ODUMERU, University of Guelph, Agriculture and Agri-Food Canada, Guelph, ON, Canada

P1-15 Blade-tenderization of Beef Subprimals Inoculated with *Escherichia coli* O157:H7 — Jeffrey E. Call, Randall K. Phebus, Harshavardhan Thippareddi, and JOHN B. LUCHANSKY, USDA-ARS, Wyndmoor, PA, USA

P1-16 DSC Characterization of Cytolethal Distending Toxin-producing *Escherichia coli* — SUPAKANA NAGACHINTA and Jinru Chen, The University of Georgia, Griffin, GA, USA

P1-17 DSC Identification of Shiga Toxin 2d Variants in *Escherichia coli* Isolated from Animals, Food and Humans — SHENGHUI CUI and Jianghong Meng, University of Maryland, College Park, MD, USA

P1-18 Fecal Shedding of Non-O157 Shiga Toxin-producing *Escherichia coli* and *Escherichia coli* O157 in Fattening Pig at Slaughter in Switzerland — CLAUDIO ZWEIFEL, Martin Kaufmann, Sandra Schumacher, Lothar Beutin, and Roger Stephan, Vetsuisse Faculty University of Zurich, Zurich, Switzerland

P1-19 Prevalence of Shiga Toxin-producing *Escherichia coli* in Dairy Cattle — HUSSEIN S. HUSSEIN, Toshie Sakuma, Laurie M. Bollinger, Mark R. Hall, and Edward R. Atwill, University of Nevada-Reno, Reno, NV, USA

P1-20 DSC Attachment of Shiga Toxigenic *Escherichia coli* to Beef Muscle and Fat Tissue — LUCIA RIVAS, Narelle Fegan, and Gary A. Dykes, Food Science Australia, Brisbane, QLD, Australia

P1-21 DSC Simultaneous Examination of Oxidative Stress Response and Virulence Gene Expression in *Escherichia coli* O157:H7 Exposed to Hydrogen Peroxide — KEVIN ALLEN and Mansel Griffiths, University of Guelph, Guelph, ON, Canada

P1-22 Production of Autoinducer-2 in *Escherichia coli* O157:H7 Inoculated Fresh Beef or Purge and Interaction with Level of Natural Flora — YOHAN YOON and John N. Sofos, Colorado State University, Fort Collins, CO, USA

P1-23 The Most Common Non-beef Foods Linked to *Escherichia coli* O157:H7 Outbreaks — CAROLINE SMITH DEWAAL and Giselle C. Hicks, Center for Science in the Public Interest, Washington, D.C., USA

P1-24 DSC The Effects of Anaerobic Incubation and Organic Acids on the Survival of *Escherichia coli* O157:H7 at pH 3.2 — KRISTIN BJORNSDOTTIR and Fred Breidt, North Carolina State University, Raleigh, NC, USA

P1-25 DSC Sources of Beef Contamination with *Escherichia coli* O157:H7 from Feedlot to Harvest Floor — C. A. SIMPSON, K. Childs, W. Warren-Serna, K. E. Belk, J. N. Sofos, J. A. Scanga, and G. C. Smith, Colorado State University, Fort Collins, CO, United States

P1-26 Molecular Characterization of *Escherichia coli* O157:H7 Isolates from Dairy Farms in the Northwestern United States — PHILIPUS PANGLOLI, F. Ann Draughon, Stephen P. Oliver, Dale D. Hancock, and Daniel Rice, The University of Tennessee, Knoxville, TN, USA

P1-27 Phenotypic and Genotypic Traits of Non-O157 Shiga Toxin-producing *Escherichia coli* (STEC) Isolated from Ruminants in Switzerland — CLAUDIO ZWEIFEL, Jesus E. Blanco, Miguel Blanco, Jorge Blanco, and Roger Stephan, University of Zurich, Zurich, Switzerland

P1-28 Comparison of Ribotype Patterns with the Presence of Pathogenic Genes from a Diverse *Escherichia coli* O157:H7 Population — DARÍO PÉREZ CONESA, Carl A. Doane, Harold A. Richards, Philipus Pangloli, John R. Mount, and F. Ann Draughon, University of Tennessee, Knoxville, TN, USA

P1-29 DSC Inactivation of *Escherichia coli* O157:H7 in Apple Cider with Elevated Temperature Storage and Dimethyl Dicarbonate — FAITH M. JOHNSON, Ashley S. Pedigo, and David A. Golden, The University of Tennessee, Knoxville, TN, USA

P1-30 DSC Antibiotic Resistance Profiles and Cell Surface Components of Salmonellae of Poultry Origin — SUDEEP JAIN and Jinru Chen, University of Georgia, Griffin, GA, USA

P1-31 Cross-protection of *Salmonella* Typhimurium Heat Shocked by Acid and Oxidative Stressors — JUNG-PIL CHOI, Young-Duck Lee, Bo-Youn Moon, Eun-Ju Kim, Bong-Soo Noh, Jong-Hyun Park, Kyungwon University, Songnam-Si, Kyunggi-Do, Republic of Korea

P1-32 Survival of *Escherichia coli* O157:H7, *Salmonella* spp. and *Listeria monocytogenes* in Cranberry Juice Concentrates — ELENA ENACHE and Yuhuan Chen, Food Products Association, Washington, D.C., USA

P1-33 Nalidixic Acid Resistance Increases Sensitivity of *Salmonella* to Ionizing Radiation in Buffer and in Orange Juice — BRENDAN A. NIEMIRA, USDA-ARS-ERRC, Wyndmoor, PA, USA

P1-34 Death of *Salmonella*, *Escherichia coli* O157:H7, and *Listeria monocytogenes* in Salad Dressings — LARRY R. BEUCHAT, Jee-Hoon Ryu, Barbara B. Adler, and M. David Harrison, University of Georgia, Griffin, GA, USA

P1-35 DSC Distribution of *Salmonella enterica* from Aquatic Reservoirs in Florida — MASOUMEH RAJABI, Marjorie Richards, Mickey Parish, and Anita Wright, University of Florida, Gainesville, FL, USA

P1-36 Competitive Exclusion Bacteria to Reduce *Salmonella* Colonization of Poultry — GUODONG ZHANG, Li Ma, and Michael P. Doyle, University of Georgia, Griffin, GA, USA

P1-37 DSC Prevalence and Persistence of Select Foodborne Pathogens in the Turkey Processing Environment — CHRISTINA N. STAM, Doris H. D'Souza, Sophia Kathariou, Patricia A. Curtis, Richard J. Meinersmann, and Lee-Ann Jaykus, North Carolina State University, Raleigh, NC, USA

P1-38 DSC Distribution of *Escherichia coli* O157 and *Salmonella* spp. on Hide Surfaces, the Oral Cavity, and Feces of Feedlot Cattle — TYLER P. STEPHENS, Guy H. Loneragan, Thomas W. Thompson, Ambika Sridhara, Loree A. Branham, Shankaralingam Pitchiah, and Mindy M. Brashears, Texas Tech University, Lubbock, TX, USA

P1-39 DSC Use of Commercial Household Steam and Steam/Vacuum Cleaning Systems to Control Microbial Quality of Meats — SUVANG TRIVEDI, A. Estes Reynolds, and Jinru Chen, University of Georgia, Griffin, GA, USA

P1-40 Effect of Refrigerating Delayed Shipments of Raw Ground Beef on the Detection of *Salmonella* Typhimurium — NEELAM NARANG, Mark L. Tamplin, and William C. Cray, USDA-ARS-ERRC, Wyndmoor, PA, USA

Monday a.m. continued

P1-41 Survival of *Salmonella* in Hog Manure during Storage — Katia Arrus, RICHARD HOLLEY, Greg Blank, Kim Ominski, and Mario Tenuta, University of Manitoba, Winnipeg, MB, Canada

P1-42 Microbiological Validation of a Prosciutto Ham Process for *Salmonella* spp. and *Listeria monocytogenes* — Vikas Gill, LARRY FRANKEN, Randall Phebus, and James Marsden, Kansas State University, Manhattan, KS, USA

P1-43 Controlling *Salmonella* Typhimurium, *Escherichia coli* O157:H7, *Yersinia enterocolitica*, and *Listeria monocytogenes* in Vacuum-packed Nham, a Thai Style Fermented Pork Sausage, by Lactacel 115 Alone or in a Combination with Dried Plum Mixtures — CHAOWAREE RUENGWILYSUP and Daniel Y. C. Fung, Kansas State University, Manhattan, KS, USA

P1-44 Measuring the Forces of Detachment of *Listeria monocytogenes* on Stainless Steel — STEFANO PERNI, Gilbert Shama, and Members of the LMTOOCHE Partnership: A. Adrião, P. W. Andrew, M. Barbosa, B. Berata, L. M. Chambel, M. L. Faleiro, I. Fernandes, S. J. Jordan, R. Tenreiro, M. Sol & I. Zilhão, Loughborough University, Loughborough, Leicestershire, UK

P1-45 Characterization of *Listeria innocua* Biofilm Formation Using Tn917 Transposon Mutagenesis and Arbitrary PCR — WILLIAM K. SHAW, JR. and Lynne A. McLandsborough, USDA, Washington, D.C., USA

P1-46 A Comparison of Biofilm Formation by *Listeria monocytogenes* and *Listeria innocua* on Stainless Steel — TERESA C. PODTBURG, Scott Burnett, and Peter W. Bodnaruk, Ecolab Inc., Mendota Heights, MN, USA

P1-47 Inactivation of *Escherichia coli* O157:H7 in Biofilm on Stainless Steel — Manan Sharma, JEE-HOON RYU, and Larry R. Beuchat, University of Georgia, Griffin, GA, USA

P1-48 Comparison of Biofilm Formation by *Salmonella* spp. Originating from Produce, Animal, and Clinical Sources — ETHAN B. SOLOMON, Brendan A. Niemira, Gerald M. Sapers, and Bassam A. Annous, USDA-ARS-ERRC, Wyndmoor, PA, USA

P1-49 A New Chromogenic Plating Medium for the Isolation and Identification of *Enterobacter sakazakii* — LAWRENCE RESTAINO, Elon W. Frampton, William C. Lionberg, and Richard J. Becker, R & F Laboratories, Downers Grove, IL, USA

P1-50 Isolation of *Enterobacter sakazakii* Using Combined Selective and Differential Enrichment Broth and Agar — Carol Iversen, Patrick Druggan, PETER STEPHENS, and Stephen Forsythe, Oxoid Limited, Basingstoke, Hampshire, UK

P1-51 DSC Cloning and Sequencing of the Gene Encoding Outer Membrane Protein A (ompA) in *Enterobacter sakazakii* and Development of an *E. sakazakii*-specific PCR for Its Rapid Detection in Infant Formula — MANOJ KUMAR MOHAN NAIR and Kumar Venkitanarayanan, University of Connecticut, Storrs, CT, USA

P1-52 Survival and Growth of *Enterobacter sakazakii* in Infant Rice Cereal Reconstituted with Water, Milk, Infant Formula, or Apple Juice — GLENNER M. RICHARDS, Joshua B. Gurtler, and Larry R. Beuchat, University of Georgia, Griffin, GA, USA

P1-53 The Survival and Growth of *Enterobacter sakazakii* in Human Breast Milk and Powdered Infant Formula — RAQUEL LENATI, Karine Hébert, Lisa Houghton, Deborah L. O'Connor, Jeff Farber, and Franco Pagotto, Health Canada, Ottawa, ON, Canada

P1-54 Prior Exposure to An Acidic Environment Increases the Acid Resistance of *Enterobacter sakazakii* — SHARON EDELSON-MAMMEL and Robert L. Buchanan, FDA-CFSAN-OPDF-DDES, College Park, MD, USA

P1-55 DSC Development of a High Pressure Processing Inactivation Model for Hepatitis A Virus — STEPHEN GROVE, Tom Lewis, Alvin Lee, and Cynthia Stewart, University of Tasmania, Werribee, VIC, Australia

P1-56 DSC Evaluation of Repair Potential of Sublethally Injured *Listeria monocytogenes* in Six Enrichment Broths — C. SMART, E. Groves, and C.W. Donnelly, University of Vermont, Burlington, VT, USA

P1-57 DSC Use of the Feline Calicivirus Model in Evaluating Methods to Extract and Detect Noroviruses in Foods — EFSTATHIA PAPAFRAGKOU, Jan Vinge, and Lee-Ann Jaykus, North Carolina State University, Raleigh, NC, USA

MONDAY AFTERNOON — AUGUST 15
1:30 p.m. – 5:00 p.m.

S06 Update on Foodborne Disease Outbreaks
Harborside C
Sponsored by IAFP Foundation Fund

Organizers/Convenors: Jeff Farrar and Jack Guzewich

1:30 Multistate Outbreak of *Salmonella* Braenderup Associated with Roma Tomatoes – June–July 2004 — SUNDEEP GUPTA, CDC, Atlanta, GA, USA

1:50 Environmental Investigation of Packing Sheds and Farms Linked to the *Salmonella* Braenderup in Tomatoes Outbreak — THOMAS HILL, FDA, College Park, MD, USA

2:10 *Salmonella* in Tomatoes: A Research Update — LARRY BEUCHAT, University of Georgia, Griffin, GA, USA

2:30 The Emergence of *Salmonella* 4, 5, (12):i: – As a Significant Foodborne Pathogen in the United States — MICHAEL LYNCH, CDC, Atlanta, GA, USA

3:00 Break

3:30 Characterization of Antimicrobial Resistance and Genetic Relatedness of *Salmonella* 4, 5 (12):i: – Recovered from Retail Foods of Animal Origin — DAVID WHITE, FDA, Laurel, MD, USA

3:50 FSIS Perspective on This Emerging Pathogen — KRISTIN HOLT, CDC, Atlanta, GA, USA

4:10 Foodborne Disease Outbreaks Associated with Lettuce, 1994-2004 — MICHAEL LYNCH, CDC, Atlanta, GA, USA

4:30 California's Environmental Investigations of Lettuce Growers — JEFF FARRAR, California Department of Health Services, Sacramento, CA, USA

S07 Safety Concerns of Food Chemical Contaminants

Harborside A

Organizers: Mark Moorman and Catherine Nnoka
Convenors: Mark Moorman and Pamela A. Wilger

1:30 Overview of Contaminants in Food – Sources/ Origins and Concerns — WILSON K. RUMBEIHA, Michigan State University, Lansing, MI, USA

2:00 Toxicological Considerations Related to Dietary Supplements — LORI L. BESTERVELT, NSF International, Ann Arbor, MI, USA

2:30 Migration of Chemicals from Packaging into Foods — GEORGE D. SADLER, National Center for Food Safety and Technology, Summit, IL, USA

3:00 Break

3:30 How Do Toxicologiests Extrapolate Risk? — STEPHEN S. OLIN, ILSI Risk Science Institute, Washington, D.C., USA

4:00 Environmental Compounds in Seafoods — CHARLES R. SANTERRE, Purdue University, West Lafayette, IN, USA

4:30 Legal Concerns Related to Chemical Food Safety Issues and the Impact on the Food Industry — MARK F. NELSON, Grocery Manufacturers of America, Washington, D.C., USA

S08 Data for Decision Making

Harborside B

Organizers/Convenors: Margaret Hardin and Indaue Mello-Hall

1:30 Thirty-Five Years of Environmental Sampling: What Have We Accomplished? — BRUCE TOMPKIN, LaGrange, IL, USA

2:00 Statistical Sampling Plans for Finished Products — MARTIN COLE, National Center for Food Safety and Technology, Summit, IL, USA

2:30 The Importance and Value of Customer Specifications — ALEJANDRO MAZZOTTA, McDonald's Corporation, Oak Brook, IL, USA

3:00 Break

3:30 Testing Results are Back – What Do You Do with Them? — DOMENIC CARAVETTA, Unilever NA, Englewood Cliffs, NJ, USA

4:00 Using Sampling to Determine Process Validation — To be announced

4:30 The Real Truth about Microbiological Testing Accuracy – How to Actually Have Confidence in Your Testing Program — GARY ACUFF, Texas A&M University, College Station, TX, USA

S09 Materials for Multi-Use Food Contact Surfaces: Characteristics, Fabrication, and Evaluation

Essex ABC
Sponsored by IAFP Foundation Fund

Organizers/Convenors: Dan Erickson and Ron Schmidt

1:30 An Overview and Current Issues Regarding Food Contact Material Composition, Sanitary Design, Fabrication, and Finish Criteria — STEVE SIMS, FDA, College Park, MD, USA

2:00 Stainless Steel: Composition, Characteristics, Evaluation, and Applications — JOHN TVERBERG, Metals and Materials Consulting Engineers, Dallastown, PA, USA

2:30 Plastic Materials: Composition, Characteristics, Evaluation, and Applications — DAN ERICKSON, Harold Wainess & Associates, North Saint Paul, MN, USA

3:00 Break

3:30 Rubber and Rubber-like Materials: Composition, Characteristics, Evaluations, and Applications — To be announced

4:00 Overview of Evaluation and Testing Methods and Regulatory Considerations Regarding Materials Used in Food Contact — SARA RISCH, Michigan State University, East Lansing, MI, USA

4:30 Panel Discussion

T02 Foods of Animal Origin Technical Session

Laurel ABC

Convenors: To be determined

T2-01 1:30 DSC Evaluating Microbial Safety of a Slow Partial-cooking Process for Bacon: Use of a Model Based on Small-scale Meat Inoculation Studies — GREG M. BURNHAM, Melody Fanslau, and Steven C. Ingham, University of Wisconsin-Madison, Madison, WI, USA

T2-02 1:45 DSC Survival of *Listeria monocytogenes*, *Listeria innocua*, and Lactic Acid Bacteria Species in Chill Brines — RENEE M. RAIDEN, Susan S. Sumner, Robert C. Williams, Joseph D. Eifert, Wafa Birbari, and Dave Jones, Virginia Tech., Blacksburg, VA, USA

Monday p.m. continued

T2-03 2:00 Alternative Cutting Methods to Minimize Transfer of Specified Risk Materials during Steak Preparation from Bone-in Short Loins — MARISSA LOPES, Jarret Stopforth, Katie Sucre, Robert Miksch, Ellis Giddens, and Mansour Samadpour, Institute for Environmental Health, Seattle, WA, USA

T2-04 2:15 Decontamination of Beef Cuts, Intended for Blade/Needle or Moisture-enhancement Tenderization, by Surface Trimming vs. Rinsing with Solutions of Hot (82°C) Water, Warm (55°C) Lactic Acid or Activated Lactoferrin Plus Warm (55°C) Lactic Acid — COURTNEY HELLER, John Scanga, John Sofos, Keith Belk, R. Todd Bacon, and Gary Smith, Colorado State University, Fort Collins, CO, USA

T2-05 2:30 Microbiological Loads on Subprimals and the Impact on Injection — JARRET STOPFORTH, Marissa Lopes, John Shultz, Robert Miksch, and Mansour Samadpour, Institute for Environmental Health, Seattle, WA, USA

T2-06 2:45 Prevalence and Numbers of *Campylobacter jejuni* and *C. coli* in Uncooked Retail Meats in New Zealand — TECK LOK WONG, Lauren Hollis, Angela J. Cornelius, Carolyn Nicol, J. Andrew Hudson, and Roger L. Cook, Institute of Environmental Science and Research, Christchurch, Canterbury, New Zealand

3:00 Break

T2-07 3:30 Enhancement of Food Safety Surveillance in the Republic of Ireland — EMILY JORDAN, Karen McGillicuddy, John Ward, Kevin Kenny, Bernard Bradshaw, Charles Dullea, Paul Rafter, Stanley McDowell, Nola Leonard, and John Egan, Central Veterinary Research Laboratory, Dublin, Ireland

T2-08 3:45 Indigenous Protein Markers for Evaluation of Prion Inactivation in Processed Meat Products — FUR-CHI CHEN, Agnes Kilonzo-Nthenge, Dwyan Young, and Abdullah Abdullah, Tennessee State University, Nashville, TN, USA

T2-09 4:00 DSC Distribution and Prevalence of *Salmonella* Serotypes in Maryland Retail Poultry Meat — MAUNG S. MYINT, Yvette J. Johnson, Nathaniel L. Tablante, and Estelle Russek-Cohen, University of Illinois at Urbana-Champaign, Urbana, IL, USA

T2-10 4:15 Water Spray and Extended Dry Time to Lower Bacterial Numbers on Soiled Flooring from Broiler Transport Cages — MARK E. BERRANG and Julie K. Northcutt, USDA-ARS-RRC, Athens, GA, USA

T2-11 4:30 DSC Evaluation of Water Quality and Prevalence of Bacterial Pathogens and Their Antimicrobial Resistance in Food Fish and Their Pond Water in Trinidad — AWEEDA NEWAJ-FYZUL, Abiodun Adesiyun, and Alexander Mutani, University of the West Indies, St. Augustine, Trinidad and Tobago

T2-12 4:45 Antimicrobial Resistance in *Salmonella* and *Escherichia coli* Isolated from Commercial Shell Eggs — MICHAEL MUSGROVE, Deana Jones, Julie Northcutt, Nelson Cox, Mark Harrison, Paula Fedorka-Cray, and Scott Ladely, USDA-ARS, Athens, GA, USA

P02 Risk Assessment and Antimicrobials Poster Session

Grand Foyer West

1:00 p.m. – 5:00 p.m.
Authors present 2:00 p.m. – 4:00 p.m.
Convenors: To be determined

P2-01 Restaurant Inspection Practices and Beliefs of Environmental Health Specialists — LAURA GREEN and Carol Selman, RTI International, Atlanta, GA, USA

P2-02 DSC Prevalence of *Arcobacter* and *Campylobacter* on Broiler Carcasses during Processing — INSOOK SON, Mark D. Englen, Mark Berrang, and Mark A. Harrison, USDA-ARS, Bacterial Ecology and Antimicrobial Resistance Research Unit, Athens, GA, USA

P2-03 Microbial Analysis of Meal Served in Foodservice — AE-SON OM, Jae-Young Shim, Jung-Eun Shin, Ji-Hye Moon, In-Hye Kim, Moon-Gi Sohn, and Heon-Ok Lee, Hanyang University, Seoul, Sungdoung-gu, South Korea

P2-04 Sequential Transfer of *Listeria monocytogenes* from a High-density Polyethylene Surface to Bologna — ZHINONG YAN, Ewen C. D. Todd, and Elliot T. Ryser, Michigan State University, East Lansing, MI, USA

P2-05 Optimization of Recovery Methods for *Listeria monocytogenes* from Conveyor Belt Surfaces — ZHINONG YAN, Ewen C. D. Todd, and Elliot T. Ryser, Michigan State University, East Lansing, MI, USA

P2-06 Use of a Sensitive Adenosine Triphosphate Method to Quickly Verify Wet Cleaning Effectiveness at Removing Food Soils and Allergens from Food Contact Surfaces — ROBERT S. SALTER, Sue Hefle, Lauren S. Jackson, and Katherine M. J. Swanson, Charm Sciences, Inc., Lawrence, MA, USA

P2-07 The Proteomic Response of *Escherichia coli* Filaments at Temperatures Near the Minimum for Growth — TINEKE JONES, Mike Johns, Colin Gill, Austin Murray, and Lynn McMullen, Agriculture and Agri-Food Canada, Lacombe, AB, Canada

P2-08 Fitness Problems in *Escherichia coli* K-12 Transformed with a High Copy Plasmid Encoding the Green Fluorescent Protein — THOMAS OSCAR, Kalpana Dulal, and Dwayne Boucaud, USDA-ARS, University of Maryland Eastern Shore, Princess Anne, MD, USA

P2-09 DSC Quantitative Analysis of the Growth of *Salmonella* Stanley during Alfalfa Sprouting and Evaluation of *Enterobacter aerogenes* as Its Surrogate — BIN LIU and Donald Schaffner, Rutgers University, New Brunswick, NJ, USA

P2-10 DSC Fecal Pat Sampling and Homogenation for Detection of *Escherichia coli* O157 — ALEJANDRO ECHEVERRY, Loree A. Branham, Mindy M. Brashears, and Guy H. Loneragan, Texas Tech University, Lubbock, TX, USA

P2-11 Development of Rapid Immuno-diaganostic Methods for the Detection of Atrazine in Water Samples — WON-BO SHIM, Zheng-You Yang, Seon-Ja Park, Sung-Jo Kang, and Duch-Hwa Chung, Gyeongsang National University, Chinju, Gyeongnam, Korea

P2-12 Prediction of Pathogen Growth on Iceberg Lettuce under Real Temperatures History during Farm-to-Table Distribution — SHIGENOBU KOSEKI and Seiichiro Isobe, National Food Research Institute, Tsukuba, Ibaraki, Japan

P2-13 DSC Predictive Modeling for the Growth of *Listeria monocytogenes* as a Function of Temperature, pH, and NaCl — JIN-WON CHOI, Shin Young Park, Dong-Ha Lee, and Sang-Do Ha, Chung-Ang University, Ansung, Gyunggi-Do, South Korea

P2-14 Exposure Assessment of *Staphylococcus aureus* Inoculated into Potentially Hazardous Foods in School Foodservice Operation — EUN-JUNG KIM, Tong-Kyung Kwak, Young-Jae Kang, and Ki S. Yoon, Yonsei University, Seoul, South Korea

P2-15 DSC Microbial Risk Assessment of *Staphylococcus aureus* in Ready-to-Eat Kimbab in Korea — GYUNG-JIN BAHK, Deog-Hwan Oh, Sang-Do Ha, Chong-Hae Hong, and Ewen C. D. Todd, Michigan State University, East Lansing, MI, USA

P2-16 Results from a Pilot Survey on Domestic Handling of Meat and Poultry in Christchurch, New Zealand — Susan Gilbert, Rosemary Whyte, ROBIN LAKE, and Peter van der Logt, Institute of Environmental Science and Research, Christchurch, New Zealand

P2-17 Results from a Pilot Survey of Domestic Refrigerators in Christchurch, New Zealand — SUSAN GILBERT, Rosemary Whyte, Rob Lake, and Peter van der Logt, Institute of Environmental Science and Research Ltd, Christchurch, New Zealand

P2-18 Acute and Subacute Toxicity and Antimicrobial Activity of Nano Au — AE-SON OM, Jae-Young Shim, Young-Mi Cho, In-Hye Kim, Dai-Sam Kang, and Heon-Ok Lee, Hanyang University, Seoul, Sungdoung-gu, South Korea

P2-19 Adsorption of Cadmium and Lead by Various Cereals from Korea — Hyo-Jung Park, Mi-Hae Kim, Soon-Mi Shim, and GUN-HEE KIM, Duksung Women's University, Seoul, South Korea

P2-20 DSC Antibiotic Resistance Patterns in *Escherichia coli* O157 Isolates Collected from 2001 to 2004 — LOREE A. BRANHAM, Karen M. Killinger Mann, Jason E. Mann, Mindy M. Brashears, and Guy H. Loneragan, Texas Tech University, Lubbock, TX, USA

P2-21 Antimicrobial and Genetic Characterization of *Salmonella* spp. Isolated from Broiler Washes from Four Different Sampling Points — TYRICO ENGLISH, Rita Stevenson, N'jere Austin, Leonard L. Williams, Lloyd T. Walker, and Aretha Clisby, Alabama A&M University, Normal, AL, USA

P2-22 Characterization of Multi-antimicrobial Resistant Enterohemorrahgic *Escherichia coli* Isolated from Whole Broiler Carcass Rinses — N'JERE AUSTIN, Rita Stevenson, Tyrico English, Leonard L. Williams, Lloyd T. Walker, and Aretha Clisby, Alabama A&M University, Normal, AL, USA

P2-23 Diversity of Plasmid Mediated Multidrug Resistance in *Proteus mirabilis* Isolates from Retail Meat Products — SHIN-HEE Kim and Cheng-i Wei, Oklahoma State University, Stillwater, OK, USA

P2-24 Subtyping of Antibiotic Resistant Generic *Escherichia coli* by Manual and Automated HindIII Ribotyping — L.D. GOODRIDGE, University of Wyoming, Laramie, WY, USA

P2-25 Staphylococcal Cassette Chromosome mec (SCCmec) Characterization and Molecular Analysis for Methicillin-resistant *Staphylococcus aureus* Isolated from Bovine Milk in Korea — Nam Hoon Kwon, Kun Taek Park, Jin San Moon, Woo Kyung Jung, So Hyun Kim, Jun Man Kim, Soon Keun Hong, Hye Cheong Koo, Yi Seok Joo, and YONG HO PARK, Seoul National University, Seoul, Korea

P2-26 Difference of Molecular Characteristics of Vancomycin-resistant *Enterococci* between Poultry and Humans in Korea — Soon Keun Hong, Woo Kyung Jung, Ji Youn Lim, Nam Hoon Kwon, Yasuyoshi Ike, Koichi Tanimoto, Suk Kyung Lim, Jun Man Kim, Hye Cheong Koo, So Hyun Kim, and YONG HO PARK, Seoul National University, Seoul, Korea

P2-27 Antimicrobial Resistance in Generic *Escherichia coli* Isolated from Commercial Beef Packing Plant — MUEEN ASLAM and Cara Landers, Agriculture and Agri-Food Canada, Lacombe, AB, Canada

P2-28 Characterization of *Staphyloccocus aureus* Isolates from Milk by RAPD Analysis and Antibiotic Disk Diffusion Method — Wendy Lang, LEONARD L. WILLIAMS, Cornelius Howard, Krishuan Caldwell, and Vamsi Vasireddy, Alabama A&M University, Normal, AL, USA

P2-29 Mold Growth Response to Vapors of Cinnamon, Lemon Grass and Orange Peel Extracts — Claudia Coronel, Enrique Palou, and AURELIO LÓPEZ-MALO, Universidad de las Américas-Puebla, Cholula, Puebla, México

P2-30 Antibacterial Effects of Vaporized Essential Oils from Spice against *Vibrio* Species — DONG-HWA SHIN, Mi-Ji Yoo, and Yong-Suk Kim, Chonbuk National University, Jeonju, Chonbuk, Republic of Korea

P2-31 Killing and Suppressive Effects of the Combination of Cranberries and Wild Blueberries on *Escherichia coli* O157:H7, *Listeria monocytogenes*, *Salmonella* Typhimurium, and *Staphylococcus aureus* — VIVIAN C.H. WU and Xujian Qiu, University of Maine, Orono, ME, USA

P2-32 Inhibition of Enteric Foodborne Viruses by Natural Peptide and Protein — Joseph Eid, Claude Côté, Ismaïl Fliss and JULIE JEAN, Universite Laval, Quebec, QC, Canada

P2-33 DSC Effect of Sodium Hexametaphosphate against *Carnobacterium viridans* — ANAS AL-NABULSI and Richard Holley, University of Manitoba, Winnipeg, MB, Canada

P2-34 DSC Reduction of *Escherichia coli* O157:H7 from Refrigerated Nitrogen-packed (AIT) Ground Beef Using Microencapsulated Allyl Isothiocyanate — PEDRO CHACON and Richard Holley, University of Manitoba, Winnipeg, MB, Canada

P2-35 DSC Antibacterial Effect of Nisin-adsorbed Silica and Corn Starch Powder against *Listeria monocytogenes* — BYUNGJIN MIN, Inyee Han, and Paul L. Dawson, Clemson University, Clemson, SC, USA

P2-36 DSC Inhibition of *Listeria monocytogenes* by Natural Plant Extracts in Brain Heart Infusion Broth at 4°C and 10°C — NATALIA WEINSETEL and Aubrey Mendonca, Iowa State University, Ames, IA, USA

P2-37 Effects of Oregano Essential Oil and Nisin Combinations on Growth of Gram Positive and Gram Negative Foodborne Pathogens — Janine P. L. Silva, Monika F. Kruger, Paulo S. Costa Sobrinho, Susana P. Silva, Maria T. Destro, Marisa Landgraf and BERNADETTE D. G. M. FRANCO, University of São Pãulo, São Pãulo, Brazil

P2-38 DSC Effect of Surfactants on Antimicrobial Activity of Nisin against Bacterial Pathogens — THOMAS M. TAYLOR, Rhiannon Youngblood, and P. Michael Davidson, University of Tennessee, Knoxville, TN, USA

P2-39 Evaluation of Frankfurters Manufactured Using Cellulose Casings Dipped in Buffered Sodium Citrate on *Listeria monocytogenes* and Shelf Life — Vidya Kethireddy, Randall Phebus, James Marsden, Tom Herald, and LARRY J. FRANKEN, Kansas State University, Manhattan, KS, USA

P2-40 Cold Atmospheric Pressure Plasma Reduces *Listeria innocua* on the Surface of Apples – BRENDAN A. NIEMIRA, Alexander Gutsol, and Alexander Fridman, USDA-ARS-ERRC, Wyndmoor, PA, USA

P2-41 Yeast Inhibition with Ternary Mixtures of Naturally Occurring Phenolic Compounds and Potassium Sorbate — Karol Alatriste-Montiel, Enrique Palou, and AURELIO LÓPEZ-MALO, Universidad de las Américas-Puebla, Cholula, Puebla, México

P2-42 Inactivation of *Salmonella* spp. and *Escherichia coli* O157:H7 on Cantaloupe Skin Using Citric Acid, Hydrogen Peroxide and a Foodgrade Surfactant — AINURA OROZALIEVA and Aubrey Mendonca, Iowa State University, Ames, IA, USA

P2-43 Decontamination of *Campylobacter*, *Salmonella* and *Escherichia coli* on Chicken Carcasses Using Ca-acidified Sodium Chlorite and SAS-acidified Sodium Chlorite Antimicrobial Solutions under Commercial Plant Conditions — ERDOGAN CEYLAN, Ann Marie McNamara, and Nahed Kotrola, Silliker, Inc, South Holland, IL, USA

P2-44 DSC Efficacy of Ultraviolet Light in Combination with Chemical Preservatives for the Reduction of *Escherichia coli* in Apple Cider — JOEMEL M. QUICHO, Robert C. Williams, Susan S. Sumner, and Joseph E. Marcy, Virginia Tech, Blacksburg, VA, USA

P2-45 Evaluation of an Ozonated Water System and a Steam Pasteurization System for Controlling *Listeria monocytogenes* and *Salmonella* spp. on Raw Whole Shelled Almonds — C. A. TANUS, R. K. Phebus, J. L. Marsden, L. J. Franken, and E. J. Harvey, Kansas State University, Manhattan, KS, USA

P2-46 Evaluation of a Commerical Steam Pasteurization System for Controlling *Listeria monocytogenes* and *Salmonella* spp. on Raw Whole Shelled Pistachios — C. A. TANUS, R. K. Phebus, J. L. Marsden, L. J. Franken, and E. J. Harvey, Kansas State University, Manhattan, KS, USA

P2-47 DSC Antimicrobial Efficacy of Methanobactin against *Listeria monocytogenes* Scott A in Laboratory Medium — CLINTON L. JOHNSON, Aubrey F. Mendonca, and Alan A. DiSpirito, Iowa State University, Ames, IA, USA

P2-48 Response Surface Model for Effects of Temperature, pH, and Combined Potassium Lactate and Sodium Diacetate on Growth Kinetics of *Listeria monocytogenes* Scott A in Broth — KHALED A. ABOU-ZEID, Kisun S. Yoon, Jurgen G. Schwarz, Tom P. Oscar, and Richard C. Whiting, University of Maryland Eastern Shore, Princess Anne, MD, USA

P2-49 DSC Potential for Development of Resistance by *Listeria monocytogenes* and *Salmonella* Typhimurium to Potassium Sorbate or Sodium Benzoate following Repeated Exposure — LILIA M. SANTIAGO and P. M. Davidson, University of Tennessee, Knoxville, TN, USA

P2-50 Effect of a Hydrogen Peroxide-producing Strain of Lactic Acid Bacteria on Aflatoxin B1 and Fumonisin B1 at pH 2 and 7 — CHEA-YUN SE, Alex Y. Teo, and Hai-Meng Tan, Kemin Industries (Asia) Pte. Ltd., Singapore

P2-51 The Role of Efflux Pumps and Outer Membrane Protein in the Susceptibility of *Escherichia coli* and *Salmonella* Typhimurium to Biocides — DONG JEONG, Shenghui Cui, and Jianghong Meng, Kosin University, Busan, Korea

P2-52 The Sensitivity to Alpha-Amylase of Pediocin 34 Produced by *Pediococcus* Pentosaceus 34 Isolated from Indian Cheddar Cheese was Due to Contaminating Serine Proteinases — RAO K. NAGESWARA, R. K. Malik, and D. K. Mathur, National Dairy Development Board, Anand, Gujarat, India

P2-53 Development of the Direct ELISA and Immunochromatographic Assay for the Determination of Aminoglycosides — YONG JIN, Jin-Wook Jang, Chang-Hoon Han, and Mun-Han Lee, Seoul National University, Seoul, Republic of Korea

P2-54 DSC In Vitro Inhibition of Adsorption of Foodborne Viruses by Human Bifidobacterial Isolates — MELANIE GAGNON, Julie Jean, Andre Darveau, and Ismail Fliss, Universite Laval, Quebec, QC, Canada

P2-55 Antimicrobial Activity of Thai Rhizomatous Spices against *Listeria monocytogenes* and *Salmonella* Enteritidis Associated with Chicken Breast Meat — C. THONGSON, W. Mahakarnchanakul, and P. Wanchaitanawong, Kasetsart University, Jatujak, Bangkok, Thailand

P2-56 DSC Efficacy of Aerosolized Peroxyacetic Acid as a Sanitizer of Lettuce Leaves — Se-Wook Oh, GENISIS IRIS DANCER, and Dong-Hyun Kang, Washington State University, Pullman, WA, USA

P2-57 Detection and Identification of Animal Species in Raw and Processed Food and Feed Using a High-density DNA Probe Array — CLAUDE MABILAT, Odile Babola, Sabine Desvarenne, and Bruno Lacroix, bioMérieux, Marcy l'Etoile, France

TUESDAY MORNING — AUGUST 16

8:30 a.m. – 12:00 p.m.

S10 Foodborne Diseases: Discovery of Causes and Reduction Strategies

Harborside C

Organizer: Ewen Todd
Convenors: Kristina Barlow and Ewen Todd

8:30 Causes of Foodborne Illness: FDA and USDA Perspective — JACK GUZEWICH, FDA-CFSAN, College Park, MD, USA; and DAVID GOLDMAN, USDA-FSIS-OPHS, Washington, D.C., USA

9:00 Preventing Foodborne Illness – Industry Solutions — JENNY SCOTT, Food Products Association, Washington, D.C., USA

9:30 What EHSNet Has Told Us about Foodborne Disease — CAROL SELMAN, CDC, Atlanta, GA, USA

10:00 Break

10:30 Microbes or Humans – Which is the Bigger Problem? — CHRISTOPHER GRIFFITH, Unviersity of Wales Institute, Cardiff, Cardiff, South Wales, UK

11:00 Consumer Education Strategies to Reduce Foodborne Disease in Michigan — TRENT WAKENIGHT, Michigan State University, East Lansing, MI, USA

11:30 Tracking Improvements in Food Safety through Key Objectives of the Healthy People 2010 Initiative — ELISA ELLIOT, FDA-CFSAN-OC-ERC, College Park, MD, USA

S11 Safety of Raw Milk Cheeses – A Global Perspective

Harborside DE
Sponsored by California Dairy Research Foundation and IAFP Foundation Fund

Organizers: John C. Bruhn and Catherine Donnelly
Convenor: John F. Sheehan

8:30 Introduction to the Symposium — KUN-HO SEO, FDA-CFSAN-OPDFB, College Park, MD, USA

9:00 Raw Milk Cheeses – A Canadian Perspective — JEFFREY FARBER, Health Canada, Ottawa, ON, Canada

9:30 The Australian Perspective on Assuring Safe Imported and Domestically Manufactured Cheeses — PETER SUTHERLAND, NSW Food Authority, Stillwater, NSW, Australia

10:00 Break

10:30 Raw Milk Cheeses – A French Approach — SYLVIE LORTAL, INRA-AGROCAMPUS, Rennes, Cedex, France

11:00 Hard Swiss Cheeses – Approaching Safety — UELI BUETIKOFER, Agroscope Liebefeld-Posieux, Schwarzenburgstr, Berne, Switzerland

11:30 Traditional Italian Cheeses – Approaches through Technical Assistance to Assure Their Safety — GIUSEPPE LICITRA, Consorzio Ricerca Filira Lattiero-Casearia (CORFILAC), Sicily, Italy

S12 Yeast and Molds: When Fungi Go Bad, Who Do You Call?

Harborside A
Sponsored by ILSI N.A.

Organizer: Catherine Nnoka
Convenors: J. Stanley Bailey and Paul A. Hall

8:30 Overveiw of the Problem — EMILIA E. RICO, BCN Research Laboratories, Inc., Knoxville, TN, USA

9:00 Case Studies on the Spoilage of Processed Foods and Beverages by Yeasts and Molds — PAUL A. HALL, Kraft Foods NA, Glenview, IL, USA

9:30 Mycotoxins: Current Challenges and Prospects for the Future — J. DAVID MILLER, Carleton University, Ottawa, Ontario, Canada

10:00 Break

10:30 Novel Approaches for Controlling Yeasts and Molds in Processed Foods and Beverages — LARRY R. BEUCHAT, Univeristy of Georgia, Griffin, GA, USA

11:00 Preharvest Control of Yeast and Molds in Commodities — MIKE E. TUMBLESON, Univeristy of Illinois, Urbana, IL, USA

11:30 Rapid Detection Methods for Yeasts and Molds — ROY P. BETTS, Campden & Chorleywood Food Research Association, Gloucestershire, UK

S13 They Said What? – The Risky World of Risk Communication

Harborside B

Organizer: John Bassett
Convenors: John Bassett and Gordon Mowat

8:30 Global Differences in Risk Communication – GMOs and Irradiation — TOBY TEN EYCK, Michigan State University, East Lansing, MI, USA

9:00 Under Fire: Your Finest Hour?…Your Worst Defeat… — GORDON MERIWETHER, The Uriah Group, Falls Church, VA, USA

9:30 Organic Food Safety – Sorting Facts from Misinformation — EDWARD GROTH, Groth Consulting Services, Pelham, NY, USA

10:00 Break

10:30 Lost in Translation: Communicating Trans Fat to the Consumer — SHELLEY GOLDBERG, International Food Information Council Foundation, Washington, D.C., USA

11:00 Raw Milk and Disease: Are They Synonymous? — TODD PRITCHARD, University of Vermont, Burlington, VT, USA

11:30 The Maddening Challenge of BSE Risk Communication — WILLIAM HUESTON, University of Minnesota, St. Paul, MN, USA

S14 Pre-Harvest Issues Associated with the Transmission of Viruses and Parasitic Protozoa – The Problems and the Solutions

Essex ABC
Sponsored by IAFP Foundation Fund

Organizers/Convenors: Rebecca Guy and Julie Jean

8:30 Viral Outbreaks Associated with Produce – The Source — FRANCOISE S. LE GUYADER, IFREMER, Nantes Cedex, France

9:00 Possible Risk for Cross-species Transmission of Caliciviruses from Husbandry Animals to Humans — JAN VINJE, University of North Carolina, Chapel Hill, NC, USA

9:30 Impact of Avian Influenza on Food Safety — DANUTA SKOWRONSKI, University of British Columbia Center for Disease Control, Vancouver, BC, Canada

10:00 Break

10:30 *Cryptosporidium* in Shellfish – A Hazard? — RONALD FAYER, USDA, Beltsville, MD, USA

11:00 Cyclospora Outbreaks – Past and Present — BRENT DIXON, Health Canada Research Division, Ottawa, Ontario, Canada

11:30 Toxoplasma on the Farm-prevalence and Risks — J. P. DUBEY, USDA, Beltsville, MD, USA

T03 Pathogens Technical Session

Laurel ABC

Convenors: To be determined

T3-01 8:30 Multistate Foodborne Outbreaks in the United States, 1973–2003 — ELIZABETH BLANTON, Michael Lynch, and Chris Braden, CDC, Atlanta, GA, USA

T3-02 8:45 A Review of Foodborne and Waterborne Disease Outbreaks 1998–2004 — JUDY GREIG and Janet Harris, Public Health Agency of Canada, Guelph, ON, Canada

T3-03 9:00 Outbreak Alert! Trends in Foodborne Illness Outbreaks, 1990–2003 — CAROLINE SMITH DEWAAL and Giselle C. Hicks, Center for Science in the Public Interest, Washington, D.C., USA

T3-04 9:15 Difference in the Causes of Foodborne Illness among Young Children and Older Adults in the United States, 1998–2003 — RACHEL WOODRUFF, John Painter, and Chris Braden, CDC, Atlanta, GA, USA

T3-05 9:30 *Salmonella* Serotype Enteritidis Outbreaks in the United States, 1993–2003 — NYTZIA E. PEREZ, Christopher R. Braden, and Timothy J. Barrett, CDC, Atlanta, GA, USA

T3-06 9:45 Public Health Investigation of *Salmonella* in Raw Shell Eggs Used in Catering — CHRISTINE L. LITTLE, Satnam K. Sagoo, Richard Elson, Robert T. Mitchell, Linda Ward, John Threlfall, Iain Gillespie, Bob Adak, Gordon Nichols, and Henry Smith, Health Protection Agency, London, UK

10:00 Break

T3-07 10:30 Analysis of Food Commodities Recalled for Microbial Reasons 2003–2004 — JUDY GREIG and Janet Harris, Public Health Agency of Canada, Guelph, ON, Canada

T3-08 10:45 *Salmonella* Serotypes in Selected Classes of Food Animal Carcasses and Raw Ground Products, 1990–2000 — PRISCILLA LEVINE, Bonnie E. Rose, Alecia L. Naugle, Gerri M. Ransom, Walter E. Hill, and Moshe Dreyfuss, USDA-FSIS-OPHS, Washington, D.C., USA

T3-09 11:00 DSC Studies to Evaluate Chemicals/Conditions for Lowering Microbial Counts on Cattle Hides — BRANDON A. CARLSON, Ifigenia Geornaras, Yohan Yoon, John A. Scanga, Keith E. Belk, John N. Sofos, and Gary C. Smith, Colorado State University, Fort Collins, CO, USA

T3-10 11:15 DSC An Innovative Method for the Recovery of *Escherichia coli*, *Clostridia*, and *Yersinia enterocolitica* from Air Samples — BETH CROZIER-DODSON and Daniel Fung, Kansas State University, Manhattan, KS, USA

T3-11 11:30 DSC Sensitive Detection of *Listeria monocytogenes* Using Fully Engineered Recombinant scFv Antibody Fragments — PAUL LEONARD, Stephen Hearty, John Quinn, and Richard O'Kennedy, Dublin City University, Dublin, Ireland

T3-12 11:45 DSC *Listeria monocytogenes* Subtypes Commonly Found in Foods Show Reduced Invasion in Human Intestinal Cells Due to Distinct Non-sense Mutations in inlA — KENDRA NIGHTINGALE, Katy Windham, Kelly Martin, Marie Yeung, and Martin Wiedmann, Cornell University, Ithaca, NY, USA

P03 Produce and General Microbiology Poster Session

Grand Foyer West

8:00 a.m. – 12:00 p.m.
Authors Present: 9:00 a.m. – 11:00 a.m.
Convenors: To be determined

P3-01 Prevalence of *Listeria* in Pork Bulbogi Obtained from Restaurants and Retail Markets in Korea — YUN-JI KIM, Ean-Jeong Seo, Jong-Keun Jang, Sang-Phill Hong, and Nam-Hyouck Lee, Korea Food Research Institute, Seongnam-si, Kyunggi-do, Korea

P3-02 Incidence of *Listeria* in Pork Collected from School Foodservice Programs in Korea — YUN-JI KIM, Ean-Jung Seo, Young-Ho Kim, Nam-Hyouck Lee, and Seok-Chan Jung, Korea Food Research Institute, Seongnam-si, Kyunggi-do, Korea

P3-03 Survival of *Listeria monocytogenes* on Ready-to-Eat Meat Products Stored at Freezer Temperatures under Vacuum and Non-vacuum Packaging — RICHELLE BEVERLY and Marlene Janes, Louisiana State University, Baton Rouge, LA, USA

P3-04 Microbial and Environmental Hazards in Street Foods of Urban Vadodara, India — MINI SHETH, Renu Gurudasani, and Rashmi Mudbidri, The M. S. University of Baroda, Vadodara, India

P3-05 Dynamic Assessment of the Microbial Quality of Fresh Broccoli in a Food Supply Chain — Réjeanne Dallaire, Denyse I. LeBlanc, CAROLE C. TRANCHANT, Liette Vasseur, Pascal Delaquis, Bernadette Goguen, Mary Taylor, Chantal Beaulieu, Patrick Maltais, and Ken McRae, Université de Moncton, Moncton, New Brunswick, Canada

P3-06 Microbiological Hazard Assessment for the Construction GAP System in Strawberry Farms in the Gyeongnam Province of Korea — Se-Ri Kim, Won-Bo Shim, Seon-Ja Park, Zheng-You Yang, Soo-Hyung Lee, and DUCK-HWA CHUNG, Gyeongsang National University, Chinju, Gyeongnam, Korea

P3-07 DSC Role of Post-harvest Processing Practices in Contamination of Lettuce — YASSAMAN SHAFAIE and Karl R. Matthews, Rutgers University, New Brunswick, NJ, USA

P3-08 DSC Microflora on Georgia-grown Cantaloupes Related to Packaging and Handling Practices — DEANN AKINS, Mark Harrison, and William Hurst, University of Georgia, Athens, GA, USA

P3-09 Levels of Microbial Contaminants in Highbush Blueberries before, during and after Processing — IULIANO POPA, Siva Sabaratnam, Eric J. Hanson, Annemiek Schilder, Ewen C. D. Todd, and Elliot T. Ryser, Michigan State University, East Lansing, MI, USA

P3-10 Influence of Biosurfactant-producing *Pseudomonas fluorescens* on Growth Kinetics and Dynamics of Adherence of *Escherichia coli* O157:H7 on Greenhouse-grown Romaine Lettuce — WENDY MADUFF and Trevor Suslow, University of California-Davis, Davis, CA, USA

P3-11 Using Sanitizers and Heat Treatments to Enhance Microbial Safety of Fresh-cut Mangoes — W. MAHAKARNCHANAKUL, C. Sertthikul, N. Tussaporn, and T. Sajjaanuntakul, Kasetsart University, Jatujak, Bangkok, Thailand

P3-12 The Use of Peracetic Acid for Microbial Control of Minimally Processed Cheiro Verde — SILVANA SREBERNICH, Antenor Pizzinato, and Neliane Silveira, Pontificia Universidade Católica de Campinas, Campinas, São Pãulo, Brazil

P3-13 Survival of *Escherichia coli* O157:H7, *Salmonella* spp. and *Shigella* spp. on Watermelon Surfaces — FRANK SCHLITT-DITTRICH, Aaron Uesugi, Trevor V. Suslow, and Linda J. Harris, University of California-Davis, Davis, CA, USA

P3-14 DSC Survival of *Salmonella* on Wounded Orange Surfaces — AMANPREET BRAR and Linda J. Harris, University of California-Davis, Davis, CA, USA

P3-15 DSC Survival and Growth of *Enterobacter sakazakii* on Fresh-cut Fruits and Vegetables — HOIKYUNG KIM and Larry R. Beuchat, University of Georgia, Griffin, GA, USA

P3-16 DSC Attachment of *Escherichia coli* O157:H7 to Lettuce and Carrot Surfaces and Possible Internalization — JINKYUNG KIM and Mark A. Harrison, University of Georgia, Athens, GA, USA

P3-17 DSC Incidence and Distribution of *Salmonella* Serotypes Isolated from Tomato and Related Environmental Materials from Hydroponic Greenhouses — LEOPOLDO OROZCO R., Montserrat H. Iturriaga, and Eduardo F. Escartin, Universidad Autonoma de Queretaro, Queretaro, Mexico

P3-18 Isolation of *Salmonella* Enteritidis PT 30 from a Single Almond Orchard over a Four-year Period — AARON R. UESUGI, Michelle D. Danyluk, Robert E. Mandrell, and Linda J. Harris, University of California-Davis, Davis, CA, USA

P3-19 Survival of *Salmonella* Enteritidis PT 30 on Almonds after Exposure to Hot Water — AARON R. UESUGI and Linda J. Harris, University of California-Davis, Davis, CA, USA

P3-20 Survival of *Salmonella* Enteritidis PT 30 on Almonds after Exposure to Hot Oil — WEN-XIAN DU and Linda J. Harris, University of California-Davis, Davis, CA, USA

Tuesday a.m. continued

P3-21 Inhibition of Bacterial Human Pathogens by Plant-Associated *Pseudomonads* Both In Vitro and on Sprouting Alfalfa Seed — WILLIAM FETT and George Somkuti, USDA, ARS, ERRC, Wyndmoor, PA, USA

P3-22 DSC Microbial Profiles of Internet-procured Sprouting Seeds and Potential Hazards Associated with *Bacillus cereus* in Home-grown Sprouts — MAHMOUD KHALID, Aref Kalantari, and Steven Pao, Virginia State University, Petersburg, VA, USA

P3-23 Influence of Blanching Treatments on *Salmonella* during Home-type Dehydration and Storage of Potato Slices – Patricia Dipersio, PATRICIA KENDALL, Yohan Yoon, and John Sofos, Colorado State University, Fort Collins, CO, USA

P3-24 Effectiveness of Gaseous Chlorine Dioxide in Killing *Salmonella*, *Escherichia coli* O157:H7, *Listeria monocytogenes*, and Yeasts and Molds on Fresh and Fresh-cut Fruits and Vegetables — Kaye V. Sy, Melinda B. Murray, M. David Harrison, and LARRY R. BEUCHAT, University of Georgia, Griffin, GA, USA

P3-25 Disinfectant/Sanitizer Management for Food Utensils, Containers and Packages in Korea — Kwang-Ho Lee, In-Shin Kwak, Kil-Jin Kang, Mi-Ok Eom, Dae-Hoon Jeon, HYUNG-IL KIM Jun-Hyun Sung, Jung-Mi Choi, Han-Saem Kang, and Chul-Won Lee, Korea Food and Administration, Seoul, Korea

P3-26 DSC Susceptibility of *Penicillium expansum* Spores to Sodium Hypochlorite, Electrolyzed Oxidizing Water, and Chlorine Dioxide on Wood and Plastic Surfaces in the Presence of Surfactants — DERRICK OKULL, Ali Demirci, and Luke LaBorde, Pennsylvania State University, University Park, PA, USA

P3-27 Monitoring and Survey of Sanitizers and Disinfectants in Food Processing Plants in South Korea — BYUNG KYU PARK, Hye won Shin, Hee kyung Park, Dae woo Park, Yang-Hee Cho, Yong-Soo Kim, kwang-Ho Lee, Kil-Jin Kang, Dae-Hoon Jeon, Ki-Hwan Park, and Sang-Do Ha, CJ Corp., Seoul, South Korea

P3-28 Evaluation of Effectiveness of Sanitizers and Disinfectants in Food Processing Plants in South Korea — BYUNG KYU PARK, Hye Won Shin, Hee Kyung Park, Dae Woo Park, Kwang-Ho Lee, Kil-Jin Kang, Dae-Hoon Jeon, Ki-Hwan Park, and Sang-Do Ha, CJ Corp., Seoul, South Korea

P3-29 Microbial Hazard Analysis of Potentially Hazardous Foods and Food Contact Surfaces in School Foodservice Establishments — EUN-JUNG KIM, Tong-Kyung Kwak Yum, Ji-Hyun Lee, Young-Jae Kang, Kyung Ryu, and Sung-Hee Kim, Yonsei University, Seoul, South Korea

P3-30 Efficacy of Sterilox Hypochlorous Acid to Disinfect Norovirus and Bacteriophage MS2 on Ceramic Tile and Stainless Steel Surfaces — GEUNWOO PARK and Mark D. Sobsey, University of North Carolina-Chapel Hill, Chapel Hill, NC, USA

P3-31 DSC Potential for Application of Rapid Methods to Monitor Sanitation of Food Service Areas in Child Care Centers — CATHERINE M. COSBY, P. M. Davidson, W. C. Morris, C. A. Costello, B. Haughton, and M. J. Devereaux, University of Tennessee, Knoxville, TN, USA

P3-32 DSC An Investigation into the Efficacy and Acceptability of Two Commercially Available Hand-cleansing Products to Determine Their Potential Suitablity as an Alternative to Traditional Hand-washing Methods — GORDON HAYBURN and Andrew Clarke, University of Wales Institute-Cardiff, Cardiff, Wales, UK

P3-33 Evaluation of Exterior Sanitary Garments for Meat Plant Employees — Gerald Hickey, Jill Bieker, James Marsden, Randall Phebus, Curtis Kastner, Larry Franken, and ERIN J. HARVEY, Kansas State University, Manhattan, KS, USA

P3-34 Field Assessment of Sanitation Management Practices in School Foodservice Operations — KYUNG RYU, Tong-Kyung Kwak Yum, Ji-Hyun Lee, Eun-Jung Kim, and Young-Jae Kang, Yonsei University, Seoul, South Korea

P3-35 Evaluation of the DOX System for Hygiene Screening at Real Food Manufacturing Factories — MEGUMI AKAMATSU, Yuki Nishida, Mariko Utsuno, and Masakazu Yoshida, Daikin Environmental Laboratory, LTD., Tsukuba-shi, IBARAKI, JAPAN

P3-36 Characteristics of Swabbing Solutions and Their Influence upon the Recovery of Microorganisms — GINNY MOORE and Chris Griffith, University of Wales Institute-Cardiff, Cardiff, UK

P3-37 DSC Effects of Welding on Attachment of *Listeria monocytogenes* to Stainless Steel — TAM L. MAI, Nofrijon I. Sofyan, William F. Gale, and Donald E. Conner, Auburn University, Auburn, AL, USA

P3-38 DSC Effect of Nutrients on the Antimicrobial Activity of Copper and Brass against *Listeria monocytogenes* — AISHA ABUSHELAIBI and Marlene Janes, Louisiana State University Agricultural Center, Baton Rouge, LA, USA

P3-39 Biofilm Formation by *Salmonella* spp. on Cantaloupe Surfaces — BASSAM A. ANNOUS, Ethan B. Solomon, and Peter H. Cooke, USDA-ARS-ERRC, Wyndmoor, PA, USA

P3-40 In Situ Biofilms Associated with Baker's Yeast Processing Equipment — S. S. O'Brien, D. Lindsay and A. VON HOLY, University of the Witswatersrand, Wits, South Africa

P3-41 DSC Biofilm Formation by *Enterococcus faecalis* and *Saccharomyces cerevisiae* on Stainless Steel and Polyurethane Surfaces — C. CHRISTISON, D. Lindsay, and A. von Holy, University of the Witswatersrand, Wits, South Africa

P3-42 Gage R&R Study Comparison of Variability in Two Measurement Systems, 3M™ Petrifilm™ Plate Readers and Trained Technicians, to Enumerate Counts below Plate Count Ranges — DEANN L. BENESH and Michael E. Hughes, 3M Microbiology, St. Paul, MN, USA

P3-43 DSC Attachment and Biofilm Forming Abilities of Persistent and Non-persistent *Listeria monocytogenes* Isolates — ARPAN R. BHAGAT and Joseph F. Frank, University of Georgia, Athens, GA, USA

P3-44 DSC The Effect of Select Lactic Acid Bacteria on *Listeria monocytogenes* Scott A Biofilm Formation on Stainless Steel as Detected by Impedance Measurement — KRISHAUN N. CALDWELL and Leonard L. Williams, Alabama A&M University, Normal, AL, USA

P3-45 Comparison of Neutralizing Media for Recovery of *Listeria monocytogenes* from Environmental Swabs after Exposure to Sanitizers — Libin Zhu, Richard Swiech, Sadhana Ravishankar, and MARY LOU TORTORELLO, US FDA, Summit-Argo, IL, USA

P3-46 DSC MPN of *Listeria monocytogenes* in Luncheon Meats by Use of Conventional and Modified Dilutions in UVM Broth — J. H. STEVENS, Lei Zhang, Zhinong Yan, Elliot Ryser, and F. A. Draughon, University of Tennessee-Knoxville, Knoxville, TN, USA

P3-47 Evaluation of the Warnex™ *Campylobacter* Real-time PCR Assay — DANIEL PLANTE, Luc Blanchard, Nancy Dallaire, Alexandre Hébert, Mireille Picard, Isabelle Robillard, Diane Valois, and Yvan P. Côté, Warnex Research, Laval, QC, Canada

P3-48 Evaluation of 3M™ Petrifilm™ Staph Express Count System for Enumerating Coagulase Positive *Staphylococcus* — P.K. Noda, A.R. TASSINARI, B.D.G.M. Franco, M. Landgraf, and M.T. Destro, 3M do Brasil Ltda, Sumare, São Pãulo, Brazil

P3-49 Development of a Bioluminescent ATP Assay of Somatic Cells and Total Bacterial Contamination in Milk and Other Food Samples — DAVID TRUDIL, Natalia Ugarova, Valeri Froundjian, and Evgenia Rainina, New Horizons Diagnostics Corp., Columbia, MD, USA

P3-50 DSC Performance of Media for Recovering Stressed *Enterobacter sakazakii* Using Spiral Plating and Ecometric Techniques — JOSHUA B. GURTLER and Larry R. Beuchat, University of Georgia, Griffin, GA, USA

P3-51 D-radiation Values of *Salmonella* DT104 Inoculated in Ground Beef and Pork and on Radish Sprouts — KATHLEEN T. RAJKOWSKI, USDA-ARS-ERRC-FSITRU, Wyndmoor, PA, USA

P3-52 Predictive Models for the Growth of *Bacillus cereus* and *Staphylococcus aureus* in Ready-to-Eat Kimbab in Korea — SEONG-SIK JIN, Bimal-Kumar Khen, Sang-Do Ha, Chong-Hae Hong, Gyung-Jin Bahk, Keon-Jo Woo, and Deog-Hwan Oh, Kangwon National University, Chunchon, Kangwon, Korea

P3-53 Growth of *Clostridium Perfringens* during Cooling of Bulk Pie Filling — Rosemary Whyte, J. Andrew Hudson, and CHRISTOPHER GRAHAM, Institute of Environmental Science and Research, Christchurch, Canterbury, New Zealand

P3-54 DSC Manage Risks of *Clostridium botulinum* in Process Cheese Using Machine Learning — WEI ZHANG and John Norback, University of Wisconsin-Madison, Madison, WI, USA

P3-55 Identification of Yeasts by Use of Automated Ribosomal Intergenic Spacer Analysis — JENNIFER HIGGINS, Matthew Dickinson, Helen Meakin, and David Dawson, Campden and Chorleywood Food Research Association, Gloucestershire, UK

P3-56 Effect of the Activation Temperature of Zeolite and Bentonite for the Adsorption of Fumonisin B1 — J. E. VIZCARRA-OLVERA, M. O. Cortez-Rocha, N. V. Parra-Vergara, M. G. Suárez-Jiménez, and R. I. Sanchez-Mariñez, Universidad de Sonora, Hermosillo, Sonora, México

P3-57 Determination of Residual Pesticides in Produce According to Distribution Channel and Storage — Younmi Choi, Shinyoung Park, Myung Hwan Kim, Hyean-Wee Kim, and BYONGKI KIM, Dankook University, Cheonan, Korea

TUESDAY AFTERNOON — AUGUST 16
12:15 p.m. – 1:00 p.m.

IAFP Business Meeting — *Harborside B*

TUESDAY AFTERNOON — AUGUST 16
1:30 p.m. – 5:00 p.m.

S15 Managing the Risk of *Listeria monocytogenes* at Retail and Restaurants
Harborside C

Organizer: Alejandro Mazzotta
Convenors: Alejandro Mazzotta and Katherine M. J. Swanson

1:30 Defining the Problem of *Listeria monocytogenes* at Retail — ANN DRAUGHON, University of Tennessee, Knoxville, TN, USA

2:00 Use of Molecular Subtyping Tools to Better Understand *Listeria monocytogenes* Risks and Transmission at Retail and Restaurants — MARTIN WIEDMANN, Cornell University, Ithaca, NY, USA

2:30 Current and Future Control Measures for *Listeria monocytogenes* in FDA's Food Code — JON WOODY, FDA, College Park, MD, USA

3:00 Break

3:30 Control Measures for *Listeria monocytogenes* at Restaurants — STEVEN GROVER, Burger King, Miami, FL, USA

4:00 Control Measures for *Listeria monocytogenes* at Retail — JILL HOLLINGSWORTH, Food Marketing Institute, Washington, D.C., USA

4:30 Sanitation – Essential for *Listeria monocytogenes* Control — KATHERINE SWANSON, Ecolab, Mendota Heights, MN, USA

S16 Risk and Control of *Salmonella* in Raw Nuts

Harborside DE

Organizer: Theodora Morille-Hinds
Convenors: Malcolm McDonald and Theodora Morille-Hinds

1:30 *Salmonella* in Nut Production and Processing Environments — BILL HOSKINS, Blue Diamond Growers, Sacramento, CA, USA

2:00 FDA Investigation of a 2004 Outbreak of Salmonellosis from Consumption of Raw Almonds — JACK GUZEWICH, FDA-CFSAN, College Park, MD, USA

2:30 Dry vs. Wet Cleaning and Sanitizing Practices in the Postharvest Almond Environment — LINDA HARRIS, University of California, Davis, CA, USA

3:00 Break

3:30 Review of Thermal Process Validation in Nutmeat — KAREN BATTISTA, Kraft Foods, East Hanover, NJ, USA

4:00 Review of Non-traditional Thermal Approaches to Reduce *Salmonella* in Almonds — GUANGWEI HUANG, Almond Board of California, Modesto, CA, USA

4:30 Almond Industry Action in Response to Outbreaks of Salmonellosis — MERLE JACOBS, Almond Board of California, Modesto, CA, USA

S17 Oceans and Human Health: Trends and Practical Tools for Seafood Safety

Harborside A

Organizers/Convenors: Linda Andrews and Marlene E. Janes

1:30 Overview of Oceans and Human Health Initiative — JULI TRTANJ, National Oceanic and Atmospheric Administration, Silver Springs, MD, USA

2:00 Creating a Framework for the Reuse of Water in the Food Industry — To be announced

2:30 Sanitation Verification of Seafood Processing Facilities — MARLENE JANES, Louisiana State University, Baton Rouge, LA, USA

3:00 Break

3:30 Processing Trends for Seafood Safety and Process Validation for *Vibrios* — LINDA ANDREW, Mississippi State University, Biloxi, MS, USA

4:00 Science-based Strategies for Histamine Control in Fish – The Need for a Holistic Approach — DAVID GREEN, North Carolina State University, Morehead City, NC, USA

4:30 *Photobacterium phophoreum:* Bioluminescence and Importance for Seafood Safety and Quality — PAW DALGAARD, Danish Institute for Fisheries Research, Kgs. Lyngby, Denmark

S18 Risk Ranking for Foodborne Pathogens

Harborside B

Oganizers: Peter Cressey and Tanya Roberts
Convenors: Aamir Fazil and Tanya Roberts

1:30 Risk Ranking in Food Safety: An Overview of Approaches and Key Challenges — GREG PAOLI, Decisionalysis Risk Consultants, Inc., Ottawa, ON, Canada

2:00 Preliminary Risk Analysis Activities: Risk Profiling and Risk Ranking — ROB LAKE, ESR Food Safety Programme, Christchurch, New Zealand

2:30 Risk Ranking for Public Decision Making — MICHAEL BATZ, Resources for the Future, Washington, D.C., USA

3:00 Break

3:30 Risk Ranking Framework: The FDA-IFT Cooperative Initiative — ROSETTA NEWSOME, Institute of Food Technologists, Chicago, IL, USA

4:00 Attribution of Pathogen-related Disease to Specific Foods — JOHN PAINTER, CDC-NCID-DBMD, Atlanta, GA, USA

4:30 Risk Ranking and Its Use in the Development of a National Seafood Standard — DEON MAHONEY, Food Standards Australia New Zealand, Canberra, BC, Australia

S19 Enrichment Media and Sample Preparation: What's New?

Essex ABC
Sponsored by IAFP Foundation Fund

Organizer: Philip Coombs
Convenors: Philip Coombs and Lee-Ann Jaykus

1:30 Challenges of the Enrichment of Pathogens from Food and Environmental Samples — CATHERINE DONNELLY, University of Vermont, Burlington, VT, USA

2:00 New Developments in Rapid Enrichment Media for Foodborne Pathogens: Where is the Limit? — JINGKUN LI, Strategic Diagnostics, Inc., Newark, DE, USA

2:30 Alternatives to Cultural Enrichment: The Feasibility of Upstream Sample Processing — LEE-ANN JAYKUS, North Carolina State University, Raleigh, NC, USA

3:00 Break

3:30 A Novel Surface Sampling Method Combined with Rapid Detection — BARRY PYLE, Montana State University, Bozeman, MT, USA

4:00 Coupling Immunomagnetic Separation with PCR — JAY ELLINGSON, Marshfield Clinic Laboratories, Marshfield, WI, USA

4:30 Nucleic Acic Aptamers: A Novel Approach for the Detection of Pathogens — SRINAND SREEVATSAN, Ohio State University, Wooster, OH, USA

T04 Antimicrobials Technical Session

Laurel ABC

Convenors: To be determine

T4-01 1:30 DSC Determination of Minimum Inhibitory Concentrations of Sodium Lactate and Sodium Diacetate Combinations against Individual *Listeria monocytogenes* Strains — GIANNA DURÁN and John N. Sofos, Colorado State University, Fort Collins, CO, USA

T4-02 1:45 DSC Combined Inhibition of *Listeria monocytogenes* Growth Using Lactic Acid, Monolaurin, and Nisin — OLEKSANDR TOKARSKYY and Douglas L. Marshall, Mississippi State University, Starkville, MS, USA

T4-03 2:00 DSC The Antibacterial Effects of Decanol with and without Nisin against *Listeria monocytogenes* Strains — HESHAM A. ELGAALI, Melissa C. Newman, Thomas R. Hamilton-Kemp, and William B. Mikel, University of Kentucky, Lexington, KY, USA

T4-04 2:15 DSC Multi-drug Resistance in Nalidixic Acid Resistant Mutants of *Salmonella* Typhimurium — KAREN KILLINGER MANN and Mindy Brashears, Texas Tech University, Lubbock, TX, USA

T4-05 2:30 DSC The Effect of Dried Plum Mixtures on Microbial Shelf Life of Ground Beef — LESLIE K. THOMPSON and Daniel Y. C. Fung, Kansas State University, North Tonawanda, KS, USA

T4-06 2:45 A Comparative Study as Related to the Effects of Glucose Monohydrate, Hot Water and Sodium Pyrophosphate on Some Quality Criteria of Deboned and Matured Brisket — UGUR GOGUS, Faruk Bozoglu, and Hami Alpas, Middle East Technical University, Ankara, Turkish Republic, Turkey

3:00 Break

T4-07 3:30 Prevalence and Enumeration of *Escherichia coli* O157 in Beef Steers Receiving Various Strains of Direct-fed Microbials — LINDSAY M. CHICHESTER, Guy H. Loneragan, Mindy M. Brashears, Tyler Stephens, David J. Kunze, Tammy M. Platt, Lacey L. Proffit, and Douglas Ware, West Texas A&M University, Canyon, TX, USA

T4-08 3:45 Comparison of Petrifilm and ChromAgar ECC for Isolation of *Escherichia coli* from Chicken — J. STAN BAILEY, Paula F. Cray, Mark E. Berrang, and Jodi R. Plumbee, USDA-ARS-SAA-BEAR, Athens, GA, USA

T4-09 4:00 The Microbial Efficacy of Commercial Application of CPC Antimicrobial to Prechill Broiler Carcasses — KELLY BEERS, Christine Farrance, April Hernandez, Joe Rheingans, and Amy Waldroup, Safe Foods Corporation, Little Rock, AR, USA

T4-10 4:15 Random Amplified Polymorphic DNA Analysis and Antibiotic Resistance Patterns of *Salmonella* spp. from Whole Broiler Carcass Rinses — Leonard L. Williams, Rita Stevenson, ARETHA CLISBY, Cornelius Howard, Lloyd T. Walker, N'Jere Austin, and Tyrico English, Alabama A&M University, Normal, Alabama, USA

T4-11 4:30 Antimicrobial Resistance Profiles of *Salmonella*, *Campylobacter*, and *Escherichia coli* from Chickens Reared without Exposure to Antibiotics — J. STAN BAILEY, Paula F. Cray, and Mark E. Berrang, USDA-ARS-SAA-BEAR, Athens, GA, USA

T4-12 4:45 Decontamination of Whole Cantaloupes Using a Pilot-scale Chlorine Dioxide Gas Treatment System — YINGCHANG HAN, Travis L. Selby, Fan Yang, Shuangqi Hu, Philip E. Nelson, and Richard H. Linton, Purdue University, West Lafayette, IN, USA

P04 Miscellaneous Food Commodities Poster Session

Grand Foyer West

1:00 p.m. – 5:00 p.m.
Authors present 2:00 p.m. – 4:00 p.m.
Convenors: To be determined

P4-01 Prevalence of Foodborne Pathogens in Human Feces, Retail Meat and Animal Intestines in Mexico — MUSSARET ZAIDI, Juan Calva, Jesus Contreras, Gloria Figueroa, Estela Lopez, Martin Magaña, Lorena Noriega, Gabriela Vazquez, Marcia Headrick, and Linda Tollefson, Hospital General O'Horan, Merida, Yucatan, Mexico

P4-02 Rapid Detection of *Salmonella* Enteritidis by Quantum Dot Biolabeling Coupled with Immunomagnetic Separation — KWANG Y. SONG, Kun H. Seo, Grace Thammasuvimol, and Robert E. Brackett, University of Maryland, College Park, MD, USA

P4-03 Methods for the Detection of *Salmonella* spp. in Animal Feed Ingredients and Finished Feed — JAYNE STRATTON, Harshavardhan Thippareddi, and Tim Herrman, University of Nebraska-Lincoln, Lincoln, NE, USA

P4-04 Dissemination of *Salmonella* sp. in the Swine Production Chain — Luciano Bersot, Sueli A. Fernandes, Mariza Landgraf, Bernadette Franco, MARIA-TERESA DESTRO, University of São Pãulo, São Pãulo, Brazil

P4-05 Enhancement of *Salmonella* Enteritidis Isolation from Shell Eggs by Use of Ferroxiamine E — IRIS E. VALENTIN-BON, Kun-Ho Seo, and Robert E. Brackett, FDA-CFSAN-DHHS-PHS, College Park, MD, USA

Tuesday p.m. continued

P4-06 Detection of *Salmonella* Enteritidis in Incubated Pools of Shell Eggs Supplemented with Ferrioxamine E by Lateral Flow Test Kit — KUN-HO SEO, Grace Thammasuvimol, and Kwang-Yong Song, FDA-CFSAN-OPDF, College Park, MD, USA

P4-07 DSC Incidence of *Salmonella* spp. on Processed Poultry — MARYAM TAABODI, Tom Oscar, Jurgen Schwarz, and Salina Parveen, University of Maryland Eastern Shore, Princess Anne, MD, USA

P4-08 DSC Biotypes and Serotypes of *Campylobacter* spp. Isolated from Broilers in Trinidad — SHELLY RODRIGO, Abiodun Adesiyun, Zinora Asgarali, and William Swanston, University of the West Indies, St. Augustine, NA, Trinidad and Tobago

P4-09 The USDA-FSIS Intensified Verification Testing Program for *Listeria monocytogenes*: Ready-to-Eat Product, Food-contact, and Environmental Sampling Results — KRISTINA BARLOW, Nisha Oatman, and Victor Cook, USDA-FSIS, Washington, D.C., USA

P4-10 DSC Inhibition of *Listeria monocytogenes* in Processed Meat and Poultry by Combinations of Sorbate, Benzoate, and Propionate — DAWN PRESTON, Jeffrey Vessenmeyer, Eric Johnson, and Kathleen Glass, University of Wisconsin-Madison, Madison, WI, USA

P4-11 Fate of *Listeria monocytogenes* in Ham Treated with an Acid Dip and Subsequently Used as an Ingredient in Ham Salad — CHENG-AN HWANG, ERRC-ARS-USDA, Wyndmoor, PA, USA

P4-12 The Identification of an *Escherichia coli* O157:H7 Meat Processing Indicator for Fresh Meat through the Comparison of the Effects of Selected Antimicrobial Interventions — K. M. Marshall, S. E. Niebuhr, G. R. Acuff, and J. S. DICKSON, Iowa State University, Ames, IA, USA

P4-13 Validation of Time and Temperature Values as Critical Limits for Ground Beef Processing and Storage – *Escherichia coli* O157:H7 — JASON MANN and Mindy Brashears, Texas Tech University, Lubbock, TX, USA

P4-14 Comparison of Indicators of Hygienic Meat Processing — IAN JENSON, David Jordan, Stephen Morris, David Phillips, and John Sumner, Meat and Livestock Australia, North Sydney, NSW, Australia

P4-15 Genetic Diversity of *Pseudomonas* spp. Isolated from Retail Displayed Beef — MUEEN ASLAM and Cara Landers, Agriculture and Agri-Food Canada, Lacombe, AB, Canada

P4-16 Microbiological Quality of Meat Carcasses and Trim in Australia — IAN JENSON, David Jordan, Stephen Morris, David Phillips, and John Sumner, Meat and Livestock Australia, North Sydney, NSW, Australia

P4-17 Efficacy of the Grovac™ System for Decontamination of Retail Beef Trimmings: Process Validation against *Escherichia coli* O157:H7 and *Salmonella* spp. — ROBIN FORGEY, Randall Phebus, James Marsden, Larry Franken, Tom Harold, Erin Harvey, and Carlos Tanus, Cosco Wholesale, Issaquah, WA, USA

P4-18 Fate of Acid-adapted and Nonadapted *Escherichia coli*, *Listeria monocytogenes*, and *Salmonella* on Ground or Whole Beef Jerky — RUTH A. MORROW, Mark A. Harrison, and Judy A. Harrison, University of Georgia, Athens, GA, USA

P4-19 Antibiotic Resistance and Cross-contamination of *Enterococcus* Isolated from Live Cattle, Hides and Carcasses — Wade Fluckey, MINDY BRASHEARS, and Guy Loneragan, Texas Tech University, Lubbock, TX, USA

P4-20 Evaluation of Ferrioxamine E as a Selective Iron Source for *Enterobacter sakazakii* in Iron-limited Nutrient Media and Egg White — KWANG Y. SONG, Kun H. Seo, Grace Thammasuvimol, and Robert E. Brackett, University of Maryland, College Park, MD, USA

P4-21 Detection of Virulence Genes of Atypical Non-O157 *Escherichia coli* Isolates from Feedlot Cattle Treated with Growth Promoters — K. Giguère, N. Kashani, G. Roy, S. Bach, P. DELAQUIS, B. Lefebvre, F. Malouin, and M. S. Diarra., Agriculture and Agri-Food Canada, Summerland, BC, Canada

P4-22 Survival of *Listeria monocytogenes* on Uncured Sliced Roast Beef and Turkey Products Manufactured with Different Levels of Antimicrobials during Refrigerated Storage — WAFA BIRBARI, Tracie Sheehan, Lindsey McDonnell, and Kathleen Glass, Sara Lee Foods, Cincinnati, OH, USA

P4-23 Delayed *Clostridium perfringens* Growth from a Spore Inocula by Sodium Lactate in Sous-vide Chicken Products — VIJAY K. JUNEJA, USDA-ARS-ERRC, Wyndmoor, PA, USA

P4-24 A Risk-based Approach to the Development of a National Through-chain Seafood Standard — DEON B. MAHONEY and Robert G. Solomon, Food Standards Australia New Zealand, Canberra BC, ACT, Australia

P4-25 DSC Daily Variability of *Listeria* Contamination Patterns in a Cold-smoked Salmon Processing Operation — YUEWEI HU, Ken Gall, Alphina Ho, Renata Ivanek, and Martin Wiedmann, Cornell University, Ithaca, NY, USA

P4-26 Influence of Packaging Atmosphere on Growth of *Listeria monocytogenes* on Refrigerated Ready-to-Eat Shrimp — DOUGLAS L. MARSHALL and Thomas J. Rutherford, Mississippi State University, Mississippi State, MS, USA

P4-27 A Novel, Enzyme-based Assay for the Rapid and Simple Detection of *Vibrios* in Shellfish and Seawater — GARY P. RICHARDS and David Bushek, USDA-ARS, Dover, DE, USA

P4-28 *Vibrio vulnificus* Septicemia Associated with Clam Consumption, 1988–2003 — Marc Knobbe, Patricia Griffin, and NANA KORAM, CDC, Atlanta, GA, USA

P4-29 Changes in Reported *Vibrio vulnificus* Infections in the USA following California's Ban on Gulf Coast Oysters — JOHN PAINTER, Nana Koram, and Robert Tauxe, CDC, Atlanta, GA, USA

P4-30 Genetic Variation within the *Vibrio vulnificus* Capsular Polysaccharide Operon — Maria Chatzidaki, Melissa Jones, and ANITA WRIGHT, University of Florida, Gainesville, FL, USA

P4-31 The Incidence of Pathogenic Microorganisms in Aquacultured Rainbow Trout (*Oncorhynchus mykiss*) — GEORGE J. FLICK, JR., T. James McAdams, Robert G. Reinhard, Stephen A. Smith, and George S. Libey, Virginia Tech., Blacksburg, VA, USA

P4-32 Effects of Acidified Sodium Chlorite, Grapefruit Seed Extract, and Storage Conditions on Recovery of *Listeria monocytogenes* and *Staphylococcus aureus* from Smoked Trout — SUSAN MCCARTHY and Farukh Khambaty, USDA, Gulf Coast Seafood Laboratory, Dauphin Island, AL, USA

P4-33 DSC Quality and Safety of X-ray Treated Fresh Catfish Fillets — CHRISTINA E. COLLINS, Linda S. Andrews, Mark W. Schilling, and Douglas L. Marshall, Mississippi State University, Mississippi State, MS, USA

P4-34 Rapid PCR-RFLP Method for the Identification of Five Billfish Species — HUNG-SHENG HSIEH, Tuu-Jyi Chai, and Deng-Fwu Hwang, National Taiwan Ocean University, Keelung, Taiwan

P4-35 Application of PCR-RFLP Analysis to Species Identification of Raw Material and Canned Products of Tuna — WEN-FENG LIN and Deng-Fwu Hwang, National Taiwan Ocean University, Keelung, Taiwan

P4-36 Growth and Histamine Formation of *Enterobacter aerogenes* Inoculated in Sailfish and Milkfish during Storage — YUNG-HSIANG TSAI, Shiou-Chung Chang, Hsien-Feng Kung, Cheng-I Wei, and Deng-Fwu Hwang, Tajen Institute of Technology, Pingtung, Taiwan

P4-37 Modeling the Inactivation of *Vibrio parahaemolyticus* in Oysters by High Pressure Processing — Jiangping Yu and PETER J. SLADE, Illinois Institute of Technology, Summit-Argo, IL, USA

P4-38 Mapping of Spoilage Indicators and Some Pathogenic Microbes in Three Estonian Dairies — Satu Salo, Helen Ehavald, Hanna Miettinen, Tiina Veskus, Outi Priha, Liisi Vakra, Raivo Vokk, Laura Raaska, and GUN WIRTANEN, VTT Biotechnology, Espoo, Finland

P4-39 Efficacy of Multiple Heat Treatments to Inactivate Bacterial Spores in Milk — LINDSEY M. MCDONNELL, Eric A. Johnson, and Kathleen A. Glass, University of Wisconsin-Madison, Madison, WI, USA

P4-40 Collaborative Evaluation of a Fluorometric Method for Measuring Alkaline Phosphatase Activity in Cow, Sheep and Goat Milk — Frank Harding and EILEEN GARRY, Advanced Instruments, Inc., Norwood, MA, USA

P4-41 Evaluation of Decontamination Protocols, Media Enrichments, and Improved Template DNA Preparation Procedure for the Detection and Recovery of *Mycobacterium avium paratuberculosis* from Cow Milk and Feces — Melinda Raymond, Anli Gao, Joseph Odumeru, and LUCY MUTHARIA, University of Guelph, Guelph, ON, Canada

P4-42 Prevalence of *Salmonella enterica* in Bulk Tank Milk from USA Dairies as Determined by PCR — JEFFREY S. KARNS, Jo Ann S. Van Kessel, Brian J. McCluskey, and Michael L. Perdue, USDA-ARS, Beltsville, MD, USA

P4-43 Prevalence of *Mycobacterium avium* subspecies *paratuberculosis* in Retail Cheese Curds from Wisconsin and Minnesota — DORN L. CLARK, Jennifer L. Anderson, Jeff J. Koziczkowski, and Jay L. E. Ellingson, Marshfield Clinic Food Safety Services, Marshfield, WI, USA

P4-44 The Microbiological Quality of Cheese Made from Raw or Thermized Milk from Production and Retail Premises in the UK — SATNAM SAGOO, Christine Little, and Melody Greenwood, Health Protection Agency, London, UK

P4-45 Evaluating the Safety of Raw Milk Cheeses — DEON B. MAHONEY, Narelle Marro, and Marion Healy, Food Standards Australia New Zealand, Canberra BC, ACT, Australia

P4-46 Effect of Cheese Substitution on the Botulinal Safety of Process Cheese Products — KATHLEEN A. GLASS, Wenyan Zhang, and Eric A. Johnson, University of Wisconsin-Madison, Madison, WI, USA

P4-47 Classifications of Process Cheese Formulations to Prevent Toxin Production of *Clostridium botulinum* by Support Vector Machine — WEI ZHANG and John Norback, University of Wisconsin-Madison, Madison, WI, USA

P4-48 Detection of Food Allergens by Quantitative and Qualitative ELISA — JOSIE QUINDERE, Kip Dudgeon, Uta Gasanov, Sue Croft, and Ian Garthwaite, TECRA International Pty Ltd., Frenchs Forest, NSW, Australia

P4-49 Screening Method to Rapidly Distinguish between Chemical Contamination, Microbial Spoilage, or Simple Deterioration in Fruit Juice and Other Drinks — DANIEL HARRING, Department of Defense, VETCOM Food Analysis and Diagnostic Lab, Fort Sam Houston, TX, USA

Tuesday p.m. continued

P4-50 DSC Development of a Common Rapid Method for Norovirus Concentration and Detection in Various Food Matrices — MICHELLE PLANTE, J. M. Farber, S. Bidawid, F. Pagotto, and Nathalie Corneau, Health Canada, Food Branch, Ottawa, ON, Canada

P4-51 Rapid Extraction and Detection of Hepatitis A Virus from Food Samples — MICHELLE PLANTE, Sabah Bidawid, Jeffrey M. Farber, and Kalavathi Karthikeyan, Health Canada, Food Branch, Ottawa, ON, Canada

P4-52 Distributions and Thermal Behaviors of *Enterobacter sakazakii* in Ready-to-Eat Agricultural Products and Infant Milk in Korea — Mi-Kyoung Jung, JUNG-PIL CHOI, Eun-Ju Kim, Bong-Soo Noh, and Jong-Hyun Park, Kyungwon University, Songnam-Si, Kyunggi-Do, Republic of Korea

P4-53 Bugs in Spuds: *Bacillus cereus* in Mashed Potato — NICOLA TURNER, Rosemary Whyte, Susan Kaltovei, Chris Graham, Todd Stanaway, and Andrew Hudson, Institute of Environmental Science and Research Limited, Christchurch, New Zealand

P4-54 BT Crops and Pesticide Reduction: Economic, Environmental and Health Impacts — FELICIA WU, University of Pittsburgh, Pittsburgh, PA, USA

P4-55 Inactivation of *Listeria monocytogenes* in Ready-to-Eat Deli Salads — SCOTT L. BURNETT, Peter W. Bodnaruk, and Jill Hollingsworth, Ecolab, Inc., Mendota Heights, MN, USA

P4-56 Inhibition of Microbial Growth on HabaGUARD® Conveyor Belt Surfaces — Luis Cediel and BONNIE B. SANDEL, ST Associates, Milford, CT, USA

P4-57 Consumer Attitudes towards Food Irradiation — NATNICHA BHUMIRATANA, Christine M. Bruhn, and Lorna K. Belden, University of California-Davis, Davis, CA, USA

WEDNESDAY MORNING — AUGUST 17
8:30 a.m. – 12:00 p.m.

S20 Behavioral Approach to Performance based Food Safety Management – Theory, Practice and Outcome for Successful Retail Food Safety Programs

Harborside C

Organizer: Fred Reimers
Convenors: Zeb E. Blanton and Fred Reimers

8:30 How to Affect Behavioral Change in Food Safety Best Practices — STEPHANIE OLMSTED, Safeway Inc., Kent, WA, USA

9:00 Positive Success Stories on Implementing Behavioral Changes in Food Safety Culture – Panel of IAFP Black Pearl Recipients

PAUL MARRA, Wegman's Food Markets, Rochester, NY, USA

TOM CHESTNUT, Darden Restaurants, Orlando, FL, USA

FRANK YIANNAS, Walt Disney World, Lake Buena Vista, FL, USA

9:30 Behavioral-based Food Safety Programs for Operators — LARRY COHEN, Kraft Foods, NA, Glenview, IL, USA

10:00 Break

10:30 FDA Intervention Strategies – An Operational Approach for Retail — ALAN TART, FDA, Atlanta, GA, USA

11:00 Consequences of Not Changing Behavior — Legal, Economic and Social Implications — HARRY FIELD, Law Office of Harry S. Field, Chicago, IL, USA

11:30 Tying It All Together – Theory, Practice and Outcome for a Successful Food Safety Program — ROBERT GRAVANI, Cornell University, Ithaca, NY, USA

S21 Produce Packinghouse Sanitation: Designing and Implementing Effective Food Safety Programs

Harborside DE

Organizers/Convenors: James Gorny and Suresh D. Pillai

8:30 Produce Foodborne Illness Outbreak Investigations: What Have We Learned — JACK GUZEWICH, FDA-CFSAN, College Park, MD, USA

9:00 Clean Greens II: The Microbiological Quality of Domestic vs. Imported Produce Collected from Southern US Packing Sheds — JUAN LEON, Emory University, Atlanta, GA, USA

9:30 GAPs, GMPs, and Guidance: An Industry Update on Assuring Produce Food Safety — JENNIFER TONG, United Fresh Fruit and Vegetable Association, Washington, D.C., USA

10:00 Break

10:30 Packinghouse Sanitary Design — RON SCHMIDT, University of Florida, Gainesville, FL, USA

11:00 Implementing Packinghouse Food Safety Programs — LES LIPSCHUTZ, Food Safety Inc., Albuquerque, NM, USA

11:30 Packinghouse Food Safety Audit Requirements — JUAN MUNIZ, PrimusLabs.com, Santa Maria, CA, USA

S22 International Food Safety Opportunities and Challenges in the Developing World

Harborside A
Sponsored by IAFP Foundation Fund

Organizer: Renee Raiden
Convenors: Benjamin Chapman and Renee Raiden

8:30 Approaches of Developing Countires in the International Food Safety Enviornment – FAO's Experience — MARIA DE LOURDES COSTARRICA, FAO, Rome, Italy

9:00 The Kraft–United Nations Unistar Program — MALCOLM MCDONALD, Kraft Foods, Cobourg, ON, Canada

9:30 Pathogen Control, A South American Perspective — MARIA TERESA DESTRO, University of São Pãulo, São Pãulo, Brazil

10:00 Break

10:30 Food Safety in the Middle East — LOUIS LALEYE, United Arab Emirates University, Al-Ain, UAE

11:00 Compliance to Food Safety Standards in the Developed World – Approaches to Success for Companies in Less Developed Countries — MARIA DEUG-DEEB, Roswell, GA, USA

11:30 Future of Food Safety: Improving Collaboration and Surveillance Worldwide — ROBERT TAUXE, CDC, Atlanta, GA, USA

S23 Recent Advances in Intervention Strategies for Pathogen Control

Harborside B

Organizers/Convenors: Vijay K. Juneja and John N. Sofos

8:30 Conventional and Emerging Intervention Technologies to Control Foodborne Pathogens — VIJAY JUNEJA, USDA-ARS-ERRC, Wyndmoor, PA, USA

9:00 Verification and Validation of Plant Sanitation Intervention Approaches — KATHERINE SWANSON, Ecolab, Mendota Heights, MN, USA

9:30 Update on Interventions to Control Pathogens in Meat and Poultry Products — JOHN SOFOS, Colorado State University, Fort Collins, CO, USA

10:00 Break

10:30 Update on Interventions to Decontaminate Fruits and Vegetables — LARRY BEUCHAT, University of Georgia, Griffin, GA, USA

11:00 Product Formulation as an Intervention for *Listeria* Control — JOSEPH MEYER, Kraft Foods — Oscar Mayer, Madison, WI, USA

11:30 Microbiological Safety of Foods: Current National and International Issues — ROBERT BUCHANAN, FDA-CFSAN-DHHS, College Park, MD, USA

T05 Risk Assessment Technical Session

Essex ABC

Convenors: To be determined

T5-01 8:30 Foodborne Illness Litigation and How to Avoid It — WILLIAM D. MARLER, Marler Clark LLP, PS, Seattle, WA, USA

T5-02 8:45 Framework for Identification and Collection of Data Useful for Risk Assessments of Microbial Foodborne or Waterborne Hazards – ISABEL WALLS for the ILSI Risk Science Institute Advisory Group on Data Collection for Microbial Risk Assessment, ILSI Risk Science Institute, Washington, D.C., USA

T5-03 9:00 The OIE Standard for BSE: A Case of International Risk Management — MARK R. POWELL, USDA, Washington, D.C., USA

T5-04 9:15 RTE Food Product Exposure from Cross Contamination Vectors — JOHN HOLAH and Debra Smith, Campden & Chorleywood Food Research Association, Gloucestershire, UK

T5-05 Withdrawn

T5-06 9:30 Impact of Contact Time and Product Weight on Transfer of *Listeria monocytogenes* from Different Conveyor Belt Surfaces to Ham and Bologna — ZHINONG YAN, Ewen C.D. Todd, Lei Zhang, and Elliot T. Ryser, Michigan State University, East Lansing, MI, USA

10:00 Break

T5-07 10:30 Validation of the Safety of Bacon Processing from Biological Hazards of *Clostridium perfringens* and *Staphylococcus aureus* — PETER J. TAORMINA and Gene W. Bartholomew, John Morrell & Co., Cincinnati, OH, USA

T5-08 10:45 Variation among Batches of Freshly Ground Chicken Breast Meat Complicates the Modeling of *Salmonella* Growth Kinetics — THOMAS P. OSCAR, USDA-ARS, Princess Anne, MD, USA

T5-09 11:00 Correlation of Visual Perception of Cleanliness and Reported Cleaning Practices with Levels of Microbial Contamination in Home Refrigerators — SANDRIA GODWIN, Furchi Chen, and Richard Coppings, Tennessee State University, Nashville, TN, USA

T5-10 11:15 An Evaluation of the Medical Screening Methods Used for Employees and Visitors to Food Manufacturing Plants in the USA, Canada, UK and Mainland Europe — DAVID LLOYD, University of Wales Institute-Cardiff, Carduff, South Glamorgan, Wales, UK

T5-11 11:30 In Situ Sensor Technology – MATTHEW SMITH, David Fries, Andrew Farmer, Center for Ocean Technology, St. Petersburg, FL, USA

T5-12 11:45 Assessment of Temperature Fluctuation in Multiple Locations of In-home Refrigerators in Four USA States — SANDRIA GODWIN, Furchi Chen, Richard Coppings, and Cindy Thompson, Tennessee State University, Nashville, TN, USA

T06 Education Technical Session

Laurel ABC

Convenors: To be determined

T6-01 8:30 Research on Consumer Attitudes and Behaviors as a Foundation for Educational Programs in FightBAC®! — MILDRED M. CODY and Hilary S. Thesmar, Georgia State University, Atlanta, GA, USA

T6-02 8:45 Influencing Factors for the Adoption of Food Safety Controls in the Mexican Meat Sector — EMA MALDONADO-SIMÁN, Leticia Rodríguez-Rivera, José Cadena-Meneses, and Melitón Córdoba-Álvarez, Universidad Autonoma Chapingo, Texcoco, Edo. de Mexico, Mexico

Wednesday a.m. continued

T6-03 9:00 Evaluation of Consumer Food Hygiene Initiatives in the UK — ELIZABETH C. REDMOND and Christopher Griffith, University of Wales Institute-Cardiff, Cardiff, South Glamorgan, UK

T6-04 9:15 DSC Comparison of Computer-based and Face-to-face Personal Hygiene Training Methods in Food Processing Facilities — GINGER D. FENTON, Luke F. LaBorde, Rama B. Radhakrishna, J. Lynne Brown, and Catherine N. Cutter, Pennsylvania State University, University Park, PA, USA

T6-05 9:30 Consumer Attitudes, Self-reported and Observed Behaviors Relating to Cloth-wiper Usage in the Domestic Kitchen — ELIZABETH C. REDMOND and Christopher Griffith, University of Wales Institute-Cardiff, Cardiff, South Glamorgan, UK

T6-06 9:45 Teaching Food Safety Principles to Children Using Smart Kids FightBAC!® Computer Games — JUDY A. HARRISON, Melissa P. Mixon, and Angela M. Fraser, The University of Georgia, Athens, GA, USA

10:00 Break

T6-07 10:30 Food Safety Practices of Vendors at Farmers' Markets in Florida — AMY SIMONNE, Mickie Swisher, and Kellee Saunders-Ferguson, University of Florida, Gainesville, FL, USA

T6-08 10:45 Thermometer Education Program — JULIE A. ALBRECHT and Carol Plate, University of Nebraska-Lincoln, Lincoln, NE, USA

T6-09 11:00 Educating Consumers to Use Food Thermometers with Thin/Small Meat Items — SANDRA M. MCCURDY, Val Hillers, and Sandra Cann, University of Idaho, Moscow, ID, USA

T6-10 11:15 School-related Foodborne Illness Outbreaks Low – The Food and Nutrition Service Collaborates with Other Agencies and Works to Assure Safe Food in Schools — Audrina Lange, Marion Hinners, BRENDA HALBROOK, and Margaret Venuto, USDA-FNS, Alexandria, VA, USA

T6-11 11:30 Knowledge and Routines in Equipment Hygiene in Finnish Food Factories — Kaarina Aarnisalo, Satu Salo, and GUN WIRTANEN, VTT Biotechnology, Espoo, Finland

T6-12 11:45 Unification of Retail and Process HACCP — O. PETER SNYDER, JR., Hospitality Institute of Technology and Management, St. Paul, MN, USA

P05 Method Development for Pathogen Testing Poster Session

Grand Foyer West

8:00 a.m. – 12:00 p.m.
Authors present 9:00 a.m. – 11:00 a.m.
Convenors: To be determined

P5-01 A Comparative Study of VIDAS ECO and the ISO 16654 Method for the Detection of *Escherichia coli* O157 in Food Products — Virginie Ewe and JEAN-LOUIS PITTET, bioMérieux, Marcy l'Etoile, France

P5-02 A Simple Colorimetric Assay for Rapid Detection of *Escherichia coli* O157:H7 — LAWRENCE D. GOODRIDGE and John Willford, University of Wyoming, Laramie, WY, USA

P5-03 The Envisio™ System: Magnetic Detection Technology for *Escherichia coli* O157:H7 — MARK BARBOUR, Spencer Hochstetler, Charles Carver, and Melissa Shelton, Eastman Chemical Company, Kingsport, TN, USA

P5-04 Comparison of Immunomagnetic Separation and a Commercial Enzyme-linked Immunosorbent Assay for the Detection of *Escherichia coli* O157 on Hides of Feedlot Cattle — TYLER P. STEPHENS, Guy H. Loneragan, Ambika Sridhara, Loree A. Branham, Shankaralingam Pitchiah, and Mindy M. Brashears, Texas Tech University, Lubbock, TX, USA

P5-05 DSC Rapid Detection of Low Numbers of *Escherichia coli* O157:H7 in Apple Cider by Real-time Polymerase Chain Reaction — NANCY R. DETRANA, David A. Golden, Darío Pérez Conesa, and F. Ann Draughon, University of Tennessee, Knoxville, TN, USA

P5-06 PCR Detection of *Escherichia coli* O157:H7 in Ground Beef: Individual and Pooled Samples — HONDO DAMMANN, Jeff Koziczkowski, Dorn Clark, Roy P. Radcliff, and Jay L. E. Ellingson, Marshfield Clinic Laboratories, Marshfield, WI, USA

P5-07 Detection of Very Low Levels of Stressed *Salmonella* in Food in 8 to 10 Hours with the Alaska AK-phage™ Method — Raffaella Giardino, ROY P. BETTS, Mike F. Sanders, and Paul M. Ricaud, Campden and Chorleywood Food Research Association, Gloucestershire, UK

P5-08 Application of Real-time NASBA and Molecular Beacon to the Detection of *Salmonella* sp. in Food — Delphine Tolooie, Laurette Pharabet, Céline Malartre, STÉPHANE BULTEAU and Claude Mabilat, bioMérieux, Marcy l'Etoile, France

P5-09 Next-day Detection of *Salmonella* spp. in Select Foods by DNA Hybridization Assay in Conjunction with Abbreviated Sample Enrichment — Susan Alles, MICHAEL WENDORF, Heather Donohue, Linda Xuan Peng, and Mark Mozola, Neogen Corporation, Lansing, MI, USA

P5-10 A Recovery Study of *Salmonella* spp. from the Surfaces of Tomatoes and Packinghouse Materials — Raina L. Allen, B. R. Warren, Douglas L. Archer and KEITH R. SCHNEIDER, University of Florida, Gainesville, FL, USA

P5-11 A Real-time PCR Assay for the Detection of *Salmonella* spp. in Food and Food-animal Matrices — VALERIE BOHAYCHUK, Gary Gensler, Robin King, Margaret McFall, and David Renter, Alberta Agriculture, Food and Rural Development, Edmonton, AB, Canada

P5-12 Effect of Growth Temperatures on Rapid Detection of *Listeria* — JINGKUN LI, Strategic Diagnostics Inc., Newark, DE, USA

P5-13 Validation of the Use of Composite Sampling for the Detection of *Listeria monocytogenes* in a Variety of Food Products — WENDY A. MCMAHON, Ann M. Schultz, Ann Marie McNamara, Loralyn Ledenbach, Mark W. Carter, and Paul A. Hall, Silliker, Inc., Chicago Heights, IL, USA

P5-14 Impact of Stomaching, Pulsifying and Dilution Ratio on Growth of *Listeria monocytogenes* in University of Vermont Medium — ZHINONG YAN, Lei Zhang, Jacob H. Stevens, F. A. Draughon, and Elliot T. Ryser, Michigan State University, East Lansing, MI, USA

P5-15 Rescheduled to P1-56

P5-16 Comparison of Four Half-Fraser Enrichment Broths for the Detection of *Listeria monocytogenes* in Foodstuffs — Jean-Michel Pradel, Christine Cullafroz, and JEAN-LOUIS PITTET, bioMérieux, Marcy l'Etoile, France

P5-17 Evaluation of a Novel Enrichment Broth and Chromogenic Medium for the Detection of *Listeria monocytogenes* — PETER STEPHENS, Jonathan Cloke, Steve Sherwood, Daniel Bashford, and Sue Elsbury, Oxoid Limited, Basingstoke, Hampshire, UK

P5-18 Evaluation of New BBL™ CHROMagar™ *Listeria* for Isolation of *Listeria monocytogenes* in Foods — JOSEPH A. ODUMERU, Veena Hedge, and Carlos G. Leon-Velarde, University of Guelph, Guelph, Ontario, Canada

P5-19 Evaluation of New Chromogenic Media, the Ottaviani and Agosti Agar, for the Detection of *Listeria monocytogenes* in Food Products and Environmental Samples — JEAN-MARC ROCHE, Emmanuel Simond, François Villeval, and Jean-Louis Pittet, bioMérieux, Craponne, France

P5-20 DSC Comparison of 3M™ Petrifilm™ Environmental *Listeria* Plate vs. Standard Methods in Detecting *Listeria* from Environmental Surfaces — ERROL GROVES and C. W. Donnelly, University of Vermont, Burlington, VT, USA

P5-21 Concentration of *Listeria monocytogenes* from Artificially Contaminated Mayonnaise-based Deli Salads Using Cultural and PCR Detection Methods — JAMIE ISONHOOD, MaryAnne Drake, and Lee-Ann Jaykus, North Carolina State University, Raleigh, NC, USA

P5-22 A New Method for Next Day Detection of *Listeria* in Environmental Samples — DENISE HUGHES and Selina Begum, DH MICRO Consulting, Peelwood, NSW, Australia

P5-23 A New Method for the Simultaneous Detection of *Listeria monocytogenes* and *Listeria* Species in Food Products — Céline Domingos, Aurélie Lafay, and JEAN-MICHEL PRADEL, bioMérieux, Marcy l'Etoile, France

P5-24 A Comparative Study of VIDAS LSX Method for the Next Day Detection of *Listeria* sp. in Food Products and the ISO 11290-1 Reference Method — Peggy Noel and BÉRENGÈRE GENEST, bioMérieux, Marcy l'Etoile, France

P5-25 Evaluation of Epidemiological Relevance of Multi-virulence-locus Sequence Typing for *Listeria monocytogenes* — YI CHEN, Natasha Brooks, and Stephen Knabel, Penn State University, State College, PA, USA

P5-26 Integrating Tangential Flow Filtration with Rapid Tests for Detection of *Escherichia coli* O157:H7, *Salmonella* and *Listeria monocytogenes* in Large Volumes of Spent Sprout Irrigation Water — TONG-JEN FU, Karl Reineke, Thomas Krupinski, Olif VanPelt, Nicole Maks-Warren, Brian Parisi, and Peter Slade, FDA, Summit-Argo, IL, USA

P5-27 Evaluation of an Automated Immunomagnetic Separation System for Selective Isolation of *Escherichia coli* O157, *Salmonella* and *Listeria monocytogenes* from Inoculated Spent Sprout Irrigation Water — Nicole Maks-Warren, Brian Parisi, Peter Slade, and TONG-JEN FU, FDA, Summit-Argo, IL, USA

P5-28 Evaluation of a Novel Sample Pooling Strategy for High Volume Screening and Detection of *Escherichia coli* O157:H7, *Salmonella* spp. and *Listeria* spp. in Food — ADRIAN PARTON, John Murray, Nicole Prentice, Michael Scott, and Phillip Coombs, Matrix MicroScience, Newmarket, Cambridgeshire, UK

P5-29 Multiplex PCR for Simultaneous Detection of *Salmonella* spp., *Listeria monocytogenes*, and *Escherichia coli* O157:H7 in Meat Samples — SUSUMU KAWASAKI, Naoko Horikoshi, Yukio Okada, Kazuko Takeshita, Takashi Sameshima, and Shinichi Kawamoto, National Food Research Institute, Tsukuba, Ibaraki, JAPAN

P5-30 PCR-based Fluorescent Method for Rapid Detection of *Campylobacter jejuni*, *Salmonella* Typhimurium, *Escherichia coli* O157:H7, and *Listeria monocytogenes* in Poultry Samples — HONG WANG, Yanbin Li, and Michael Slavik, University of Arkansas, Fayetteville, AR, USA

P5-31 Nanobeads-based Biosensor for Rapid Detection of Pathogenic Bacteria in Poultry and Meat Samples — YANBIN LI, Qian Sun, Madhukar Varshney, and Hong Wang, University of Arkansas, Fayetteville, AR, USA

P5-32 Detection of an Array of Foodborne Pathogens by Use of Universal Primers and Specific Oligoprobes — BLANCA ESCUDERO, Doris H. D'Souza, and Lee-Ann Jaykus, North Carolina State University, Raleigh, NC, USA

P5-33 Rescheduled to P2-02

Wednesday a.m. continued

P5-34 Adaptive Response to Environmental Stresses by *Campylobacter jejuni* — Y. MA, I. Hanning, H. Wang, and M. Slavik, University of Arkansas, Fayetteville, AR, USA

P5-35 Highly Virulent *Campylobacter jejuni* in Retail Raw Chicken Carcass Rinses — RAMAKRISHNA NANNAPANENI, Robert Story, Keith C. Wiggins, and Michael G. Johnson, University of Arkansas, Fayetteville, AR, USA

P5-36 Cross-comtamination and Enhanced Attachment to Chicken Skin by *Campylobacter jejuni* Biofilm Isolates — I. HANNING, C. Gilbert, X. Liu, A. O'Leary, H. Wang, Y. Ma, and M. Slavik, University of Arkansas, Fayetteville, AR, USA

P5-37 DSC Identification of *Campylobacter* Isolates from Farms by PSTL Ribotyping — WILLIE TAYLOR, Harry Richards, Philipus Pangloli, Steven P. Oliver, David A. Golden, and F. Ann Draughon, University of Tennessee, Knoxville, TN, USA

P5-38 A Multiplex PCR Assay for Speciating *Campylobacter coli* and *Campylobacter jejuni* strains by Partial Sequencing of Virulence Genes — RAJESH NAYAK, Tabitha Stewart, and Mohamed Nawaz, FDA-NCTR, Jefferson, AR, USA

P5-39 Effect of Freeze-stress on Enrichment, Isolation, and Virulence of Plasmid-bearing Virulent *Yersinia enterocolitica* in Pork Chops — SAUMYA BHADURI, USDA-ARS-ERRC, Microbial Food Safety Research Unit, Wyndmoor, PA, USA

P5-40 Loss of Virulence by *Yersinia enterocolitica* under Various Environmental Conditions — Diana Stewart, Karl Reineke, and MARY LOU TORTORELLO, FDA, Summit-Argo, IL, USA

P5-41 Comparison of Survival of *Yersinia enterocolitica* and *Yersinia pestis* under Various Environmental Conditions — Karl Reineke, Diana Stewart, and MARY LOU TORTORELLO, FDA, Summit-Argo, IL, USA

P5-42 DSC Production and Characterization of Monoclonal Antibodies against *Clostridium perfringens* Alpha Toxin — ZHENG-YOU YANG, Won-Bo Shim, and Duck-Hwa Chung, Gyeongsang National University, Chinju, Gyeongnam, Korea

P5-43 Influence of Four Retail Foodservice Cooling Methods on the Behavior of *Clostridium perfringens* ATCC 10388 in Turkey Roasts following Heating to an Internal Temperature of 74°C — DAVID OLDS, Aubrey Mendonca, Jeannie Sneed, and Bledar Bisha, Iowa State University, Ames, IA, USA

P5-44 Protein A, a Source of False Positive Results for Staphylococcal Enterotoxins Detection in Food Products — Christine Cullafroz, Marie-Claire Cavaud, Jean-Marc Dugua, and JEAN-LOUIS PITTET, bioMérieux, Marcy l'Etoile, France

P5-45 A Comparative Study of Methods for the Detection of *Staphylococcus aureus* in Food Samples — Bettine Dijs, Sheree Rogers, and JILL GEBLER, Murray Goulburn Co-op Co. Ltd., Yarram, Victoria, Australia

P5-46 Detection of *Shigella* spp. by Selective Plating and PCR Methods after Aerobic Enrichment in *Shigella* Broth — LYNNE KIKUTA-OSHIMA, Ruben Zapata, Chitra Wendakoon, and Willis Fedio, New Mexico State University, Las Cruces, NM, USA

P5-47 Development of Protocol for the Rapid Detection of Foodborne Virus in Oyster — Soo-Yeon Lee, Myoung-Hee Shin, Kang-Whi Lee, Keum-Il Jang, and KWANG-YUP KIM, Chungbuk National University, Cheongju, Chungbuk, Republic of Korea

P5-48 DSC RT-PCR Assay for Detecting Noroviruses — KAREN WILLIAMS and Jianghong Meng, University of Maryland-College Park, College Park, MD, USA

P5-49 Rescheduled to P1-57

P5-50 Serological Typing of Pathogenic *Vibrio parahaemolyticus* Isolated from Oregon and Washington Coastal Water — JINGYUN DUAN and Yi-Cheng Su, Oregon State University Seafood Laboratory, Astoria, OR, USA

P5-51 Thermal Resistance Characteristics of *Bacillus anthracis* Spores are Similar to Those of Other *Bacillus* Species — Rebecca Dengrove, Tara De Siano, Marcelo Bonnet, Donald Schaffner, and THOMAS MONTVILLE, Rutgers, The State University of New Jersey, New Brunswick, NJ, USA

P5-52 Development of Fluorescent Reference Bacterial Strains by Chromosomal Integration of a Modified Green Fluorescent Protein Gene — LEONARDO B. PINHEIRO, Moreland D. Gibbs, Graham Vesey, and Peter L. Bergquist, Macquarie University, Sydney, NSW, Australia

P5-53 Precise Reference Standards for Easy Measurement of Uncertainty — CHARLOTTE MORGAN, Nicholas Herman, Mark Gauci, Peter A. White, and Graham Vesey, BTF Pty Ltd., North Ryde, NSW, Australia

P5-54 Primer Design for Rapid PCR Detection of *Listeria monocytogenes* — KEN WALKER, Ywh-min Tzou, Jean Weese, and Tung-Shi Huang, Auburn University, Auburn, AL, USA

P5-55 Detection of Bovine DNA by the Warnex™ Real-Time PCR Assay — JOHANNE D. LAPORTE, Isabelle Guillet, Géraldine Asselin, and Yvan P. Côté, Warnex Research, Laval, Quebec, Canada

P5-56 Optimization of *Ferrioxamine* E Concentration as Effective Supplementation for Selective Isolation of *Salmonella* Enteritidis in Egg White — GRACE THAMMASUVIMOL, Kun H. Seo and Kwang Y. Song, FDA, College Park, MD, USA

WEDNESDAY AFTERNOON — AUGUST 17
1:30 p.m. – 3:30 p.m.

S24 Microarray Technology: An Emerging Tool in the Food Microbiologist's Toolbox
Harborside DE
Sponsored by ILSI N.A.

Organizer: Catherine Nnoka
Convenors: Mark Moorman and Martin Wiedmann

1:30 What is the Microarray Technology and How is It Used? — MARTIN WIEDMANN, Cornell University, Ithaca, NY, USA

2:00 Use of Microarray for Subtyping Microorganisms — ANDREW K. BENSON, University of Nebraska, Lincoln, NE, USA

2:30 Transcriptional Profiling: Is This Gene On? — KATHRYN J. BOOR, Cornell University, Ithaca, NY, USA

3:00 Microarray as a Diagnostic Tool — CLAUDE MABILAT, bioMérieux, Venissieux, France

S25 Pathogen Survival in Dried Fermented Meat and Partially Cooked Products
Harborside A

Organizer: Richard A. Holley
Convenors: Carl S. Custer and Richard A. Holley

1:30 Can the Risk from Pathogens in Dry and Semi-dry Fermented Products be Reduced? An Overview — CARL CUSTER, USDA-FSIS-OPHS-MD-MIB, Washington, D.C., USA

2:00 Stress Response, Like Exercise, Makes Pathogens Stronger — MARK HARRISON, University of Georgia, Athens, GA, USA

2:30 Natural Antimicrobial Approaches for Pathogen Control — RICHARD HOLLEY, University of Manitoba, Winnipeg, MB, Canada

3:00 Real Solutions to Real Problems — CATHERINE CUTTER, Penn State University, University Park, PA, USA

S26 Food Safety Objectives — Now We Have Decided to Have Them, How Do We Think They Will be Used in Food Safety Management?
Harborside B

Organizer: Leon Gorris
Convenors: Leon Gorris and Tanya Roberts

1:30 Using Governmetnal Risk Analysis (or Assessment) Studies to Set Food Safety Objectives — ROBERT BUCHANAN, FDA-CFSAN-DHHS, College Park, MD, USA

2:00 Examples of Science and Technology Driving the Rationale for Food Safety Objectives — PATRICIA DESMARCHELIER, Food Science Australia, CSIRO, North Ryde, NSW, Australia

2:30 Use of Food Safety Objectives and MRA in Food Safety Management in Food Industry — LEON GORRIS, Unilever, Sharnbrook, Bedford, UK

3:00 Economic Incentives in Pathogen Testing to Meet Food Safety Objectives — S. ANDREW STARBIRD, Santa Clara University, Santa Clara, CA, USA; and TANYA ROBERTS, USDA-ERS, Washington, D.C., USA

S27 Current Practices and Innovations in Cold Chain Management for Food Products
Essex ABC

Convenors: John Rushing and Allen Sayler
Organizers: Lori Ledenback and Allen Sayler

1:30 Microbiology of Cold Chain Management for Foods — KATHRYN BOOR, Cornell University, Ithaca, NY, USA

2:00 Current Practices, Challenges and Technology in Cold Chain Management – Case Studies — STEVE WYCKOFF, WalMart Stores Inc., Bentonville, AR, USA; TIM JACKSON, Nestlé International, Lausanne, Switzerland; and MARK SALIMBENE, Safeway Inc., Walnut Creek, CA, USA

2:30 New Technologies for Monitoring and Managing Product Temperatures — STEPHEN NIGHTINGALE, Burntside Partners, Inc., Ijamsville, MD, USA; and THOMAS MCMEEKIN, University of Tasmania, Hobart, Tasmania, Australia

3:00 Panel Discussion

T07 General Microbiology Technical Session
Laurel ABC

Convenors: To be determined

T7-01 1:30 DSC The Direct Detection of *Salmonella* and *Escherichia coli* O157:H7 from Raw Alfalfa Sprouts and Spent Irrigation Water by Use of Polymerase Chain Reaction — LYNETTE JOHNSTON, Driss Elhanafi, MaryAnne Drake, and Lee-Ann Jaykus, North Carolina State University, Raleigh, NC, USA

T7-02 1:45 Location of Bung Bagging during Beef Slaughter Influences the Potential for Spreading Pathogen Contamination on Carcasses — JARRET STOPFORTH, Marissa Lopes, Robert Miksch, and Mansour Samadpour, Institute for Environmental Health, Seattle, WA, USA

T7-03 2:00 DSC Impact of Bacterial Stress and Biofilm Forming Ability on Transfer of Surface-dried *Listeria monocytogenes* Cells during Slicing of Delicatessen Meats — LINDSEY A. KESKINEN, Ewen C. D. Todd, and Elliot T. Ryser, Michigan State University, East Lansing, MI, USA

Wednesday p.m. continued

T7-04 2:15 Transfer of *Listeria monocytogenes* during Slicing of Turkey Breast, Bologna, and Salami Using Kitchen Knives — KEITH L. VORST, Ewen C.D. Todd, and Elliot T. Ryser, Michigan State University, East Lansing, MI, USA

T7-05 2:30 Evaluation of Hot Water and Sanitizer Dip Treatments of Contaminated Meat-cutting Knives — PETER J. TAORMINA and Warren J. Dorsa, John Morrell & Co., Cincinnati, OH, USA

T7-06 2:45 Evaluation of the VERIcleen Hygiene Indicator Test, Compared with Traditional Microbiological Methods, to Assess the Efficacy of Hand Washing — LOUISE FIELDING, Tracy Pritchard, and Chris Griffith, University of Wales Institute-Cardiff, Cardiff, UK

T7-07 3:00 Restructuring Employee Health Requirements in the FDA Food Code to Reduce the Risk of Transmitting Viral and Bacterial Pathogens from Infected Food Employees in Food — DAVID ACHESON and Wendy Fanaselle, FDA-CFSAN, College Park, MD, USA

T7-08 3:15 Rapid Determination of Bacterial Load for Assessment of Water Quality — ROLF DEININGER, Ji Young Lee, and David Trudil, University of Michigan, Ann Arbor, MI, USA

WEDNESDAY AFTERNOON — AUGUST 17
3:45 p.m. – 4:30 p.m.

John H. Silliker Lecture
Harborside C

Managing the Safety of Internationally Traded Food, Michiel van Schothorst, Ph.D., Retired Vice President, Food Safety Affairs, Nestlé, Vevey, Switzerland

IAFP 2005 Networking Opportunities

IAFP FUNCTIONS

NEW MEMBER RECEPTION

Saturday, August 13, 2005 • 4:30 p.m. –5:30 p.m.

If you recently joined the Association or if this is your first time attending an IAFP Annual Meeting, welcome! Attend this informal reception to learn how to get the most out of attending the Meeting and meet some of today's leaders.

AFFILIATE RECEPTION

Saturday, August 13, 2005 • 5:30 p.m. –7:00 p.m.
Sponsored in part by Weber Scientific, Inc.

Affiliate Officers and Delegates plan to arrive in time to participate in this educational reception. Watch your mail for additional details.

COMMITTEE MEETINGS

Sunday, August 14, 2005 • 7:00 a.m. –5:00 p.m.
Sponsored by Springer

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 any number of committees or PDGs. Everyone is invited to attend.

STUDENT LUNCHEON

Sunday, August 14, 2005 • 12:00 p.m. –1:30 p.m.

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.

OPENING SESSION AND IVAN PARKIN LECTURE

Sunday, August 14, 2005 • 7:00 p.m. –8:00 p.m.

Join us to kick off IAFP 2005 at the Opening Session. Listen to the prestigous Ivan Parkin Lecture delivered by Douglas L. Archer, Ph.D., Professor and Past Chair, Food Science and Human Nutrition Department, University of Florida, Gainesville, Florida. He will deliver a presentation titled "Food Safety 2005: Facts Come Easy – Answers are Elusive."

CHEESE AND WINE RECEPTION

Sunday, August 14, 2005 • 8:00 p.m. –10:00 p.m.
Sponsored by Kraft Foods, Inc.

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 14 through Wednesday, August 17, 2005

Employers, take advantage of recruiting the top food scientists in the world! Post your job announcements and interview candidates.

COMMITTEE AND PDG CHAIRPERSON BREAKFAST

(By invitation)
Monday, August 15, 2005 • 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 committees.

EXHIBIT HALL RECEPTION

Monday, August 15, 2005 • 5:00 p.m. –6:15 p.m.
Sponsored by DuPont Qualicon and REMEL, Inc.

Join your colleagues in the Exhibit Hall to see the most up-to-date trends in food safety techniques and equipment. Discuss with exhibitors their latest products or use this time to view the poster presentations. Take advantage of this great networking reception.

BUSINESS MEETING

Tuesday, August 16, 2005 • 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.

PRESIDENT'S RECEPTION (By invitation)

Tuesday, August 16, 2005 • 5:30 p.m. – 6:30 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.

PAST PRESIDENTS' DINNER (By invitation)

Tuesday, August 16, 2005 • 6:30 p.m. – 9:00 p.m.

Past Presidents and their guests are invited to this dinner to socialize and reminisce.

JOHN H. SILLIKER LECTURE

Wednesday, August 17, 2005 • 3:45 p.m. – 4:30 p.m.

Michiel van Schothorst, Ph.D., Retired Vice President, Food Safety Affairs, Nestlé, Vevey, Switzerland will deliver a presentation titled "Managing the Safety of Internationally Traded Food".

AWARDS BANQUET

Wednesday, August 17, 2005 • 7:00 p.m. – 9:30 p.m.

Bring IAFP 2005 to a close at the Awards Banquet. Award recipients will be recognized for their outstanding achievements and the gavel will be passed from Dr. Kathleen Glass to Incoming President Dr. Jeffrey Farber.

IAFP 2005 Event Information

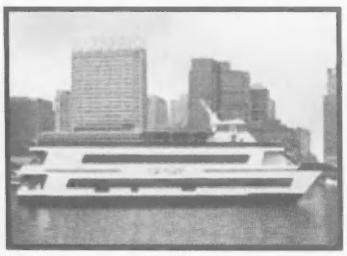
EVENING EVENTS

Orioles Baseball Game
Saturday, August 13, 2005 • 3:30 p.m. –7:30 p.m.

Play Ball! Join the fun as the Orioles take on the Toronto Blue Jays. Oriole Park at Camden Yards became the official home of the Orioles on April 6, 1992. The one-time railroad center is only 2 blocks from the birth-place of baseball's most legendary hero, George Herman "Babe" Ruth. Ruth's father operated Ruth's Cafe on the ground floor of the family residence, now center field at Oriole Park.

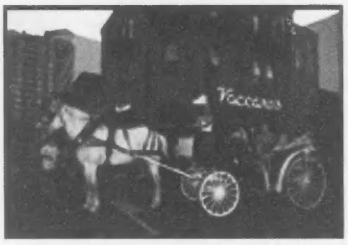
Oriole Park is state-of-the-art yet unique, traditional and intimate in design. It blends with the urban context of downtown Baltimore while taking its image from baseball parks built in the early 20th century. Ticket price includes admission to the game and transportation between the Baltimore Marriott Waterfront Hotel and Camden Yards.

Monday Night Social – Harbor Cruise
Monday, August 15, 2005 • 6:30 p.m. – 10:00 p.m.



Let the good times float on a Harbor Cruise. After a short walk from the Baltimore Marriott Waterfront to the Pier, the Bay Lady will be waiting for you to come on board and enjoy the evening. The Bay Lady will take you across the harbor and along the Patapsco River, with the city skyline in view. Enjoy a fabulous spread of food within the enclosed air-conditioned deck or go up to the top deck for a refreshing breeze and the most gorgeous panoramic view of Baltimore's Historic Harbor. Get your ticket today to reserve your spot aboard the Bay Lady! Everyone is welcome.

Little Italy Walking Tour and Dinner
Tuesday, August 16, 2005 • 6:30 p.m. – 10:30 p.m.



Take a guided walking tour through Little Italy, founded in 1849 and located in the heart of the downtown renaissance in Baltimore. Nestled between the Inner Harbor and Historic Fells Point, the area boasts more than 20 of Maryland's best Italian restaurants and trattorias. It's so hard to pick just one of the fabulous restaurants – so tonight you'll try three! Appetizer, entrée and dessert are served in charming trattorias for which this neighborhood is known regionally. Limited tickets available.

GOLF TOURNAMENT

Golf Tournament
Saturday, August 13, 2005 • 8:45 a.m. – 4:00 p.m.

Begin IAFP 2005 with a relaxing round of golf with your friends. This year's tournament will be held at Waverly Woods Golf Club, which was recognized as the "2002 Maryland Course of the Year" for its unique design and playability. The appeal of this new but mature and lush course is its wide-landing areas for tee shots while much of the challenge comes from the small, undulating greens. Course designer Arthur Hills was selected by *Golf Digest* magazine as one of their "Top Five Favorite Present-Day Architects." Everyone is welcome to play in this fun best-ball tournament. Registration fee includes green fees, cart, range balls, transportation to and from the course, a box lunch and prizes!

DAYTIME TOURS

Welcome to Washington
Saturday, August 13, 2005 • 9:00 a.m. –5:00 p.m.

Welcome to America's most unique city! One of the few capitals founded as a show-place and a seat of government, Washington is really several cities in one and you will get a chance to experience something of each.

This all-encompassing tour of Washington is designed to introduce you to the most magnificent monuments, memorials and architectural structures of the city. You will ride by the White House, Washington Monument, Capitol Building, Supreme Court, Library of Congress, Smithsonian Complex, as well as many other Washington attractions. You will stop at the Lincoln Memorial, World War II Monument, Vietnam Veterans Memorial, Korean War Veterans Memorial, and the Jefferson Memorial.

While visiting these sites, you will hear the story of Washington's unique city plan devised by the gifted architect, Pierre L'Enfant. L'Enfant was the master architect who envisioned placing broad avenues, dramatic vistas and plentiful parkland in what was then a swamp.

Lunch will be at Washington, D.C.'s historic Union Station, a Beaux Arts national landmark. After lunch, guests may enjoy over 100 stores in which to browse and window shop.

Baltimore City Tour by Land and by Sea
Sunday, August 14, 2005 • 10:00 a.m. –2:00 p.m.

Guests will take a guided tour through the historic Mt. Vernon, Federal Hill and Fells Point neighborhoods. Once arriving in Fells Point, the original harbor of Baltimore, a costumed Living-History Narrator brings to life Baltimore's colorful history with stories about real people. Lunch in an authentic Fells Point pub is also included.

Then sail aboard a blue and white Water Taxi out to the place where Francis Scott Key wrote our nation's anthem. From the water, you'll see where British ships fired on Fort McHenry in 1814.

From the fastest sailing vessels in the history of the Navy to the arrest of Southern sympathizers in City Hall at the beginning of the "War between the States", to the oldest continually working waterfront in the country, you'll take home a new opinion of Baltimore as a stalwart city of national importance.

Annapolis Past and Present
Monday, August 15, 2005 • 9:00 a.m. –2:00 p.m.

The brick streets, the charming church, state circles around which colonial era homes and inns are built, and the history that breathes from every antique house all contribute to a fascinating day's adventure in Maryland's Capital, Annapolis.

You'll begin with a walking tour of the historic center of Annapolis. Led by costumed guides you will hear fascinating stories.

The State House, the oldest continually operating in the US, is another highlight of your visit. It is where George Washington resigned as Commander-in-Chief of the Continental Armies.

There's much more to this quaint seaport town, and as you continue your exploration, you'll walk through the US Naval Academy, with its stately brick campus, and passing Bancroft Hall Dormitory, where thousands of midshipmen are fed in a matter of minutes; the famous Tecumseh statue, which serves as an Academy mascot; and stopping at the Chapel and at the dolphin-supported grave of Naval hero John Paul Jones.

Lunch will be served at the historic Maryland Inn. The Maryland Inn has a rich history – dating back to our country's revolutionary era.

PLEASE NOTE: Photo Identification is required for admittance to the US Naval Academy.

A Taste of Baltimore from the Inside
Tuesday, August 16, 2005 • 10:30 a.m. –3:30 p.m.

Take a guided tour through the new world headquarters of Phillips Foods in Baltimore, where millions of crab cakes and seafood products are prepared for distribution across the country. Known for award-winning Maryland style crab cakes and simple dedication to quality, Phillips has served millions of seafood lovers from around the world.

Guests will see how Phillips produces more than 150 crab cakes per minute –80,000 crab cakes a day –20 million crab cakes per year! Then, get a true taste for blue crab with a Maryland crab cake sandwich.

Next, it's on to Clipper City Brewing Company. Clipper City is Baltimore's largest brewing facility producing hand-crafted draught and bottled beers. Enjoy complimentary samples after the tour featuring Baltimore's "best locally brewed beer."

Chesapeake Bay Cooking Class
Wednesday, August 17, 2005 • 10:00 a.m. –1:00 p.m.

Executive Chef Jerry Pellegrino is fascinated by food and wine, and the way they work in harmony on the palate. His understanding of the two goes all the way to the molecular level, drawing on his advanced education in molecular biology. His cuisine is simple and surprising, pairing unexpected ingredients together to work with wines from the US.

Participate and observe as the Chef prepares regional specialties step-by-step. You will dine on the chef's creations and learn about what makes a wine complement or clash with cuisine.

Each course will be served with Maryland wines – Cheers!

IMPORTANT! Please read this information before completing your registration form.

MEETING INFORMATION

Register to attend the world's leading food safety conference.

Full Registration includes:

- Technical Sessions
- Symposia
- Poster Presentations
- Ivan Parkin Lecture
- John H. Silliker Lecture
- Awards Banquet
- Exhibit Hall Admittance
- Cheese and Wine Reception
- Exhibit Hall Reception
- Program and Abstract Book

4 EASY WAYS TO REGISTER

Complete the Attendee Registration Form and submit it to the International Association for Food Protection by:

Online: www.foodprotection.org

Fax: 515.276.8655

Mail: 6200 Aurora Avenue, Suite 200W
Des Moines, IA 50322-2864, USA

Phone: 800.369.6337; 515.276.3344

The early registration deadline is July 13, 2005. After this date, late registration fees are in effect.

REFUND/CANCELLATION POLICY

Registration fees, less a $50 administration fee and any applicable bank charges, will be refunded for written cancellations received by July 29, 2005. No refunds will be made after July 29, 2005; however, the registration may be transferred to a colleague with written notification. Refunds will be processed after August 22, 2005. Event and tour tickets purchased are nonrefundable.

STUDENT FUNDRAISER

Help support the students with their annual fund raiser. See page 592 to order T-shirts or polo shirts.

International Association for Food Protection®

EXHIBIT HOURS

Sunday, August 14, 2005	8:00 p.m. - 10:00 p.m.
Monday, August 15, 2005	8:00 a.m. - 11:00 a.m.
	1:00 p.m. - 6:15 p.m.
Tuesday, August 16, 2005	8:00 a.m. - 2:00 p.m.

DAYTIME TOURS – Lunch included

Saturday, August 13, 2005	9:00 a.m. - 5:00 p.m.
Welcome to Washington	
Sunday, August 14, 2005	10:00 a.m. - 2:00 p.m.
Baltimore City Tour by Land and by Sea	
Monday, August 15, 2005	9:00 a.m. - 2:00 p.m.
Annapolis Past and Present	
Tuesday, August 16, 2005	10:30 a.m. - 3:30 p.m.
A Taste of Baltimore from the Inside	
Wednesday, August 17, 2005	10:00 a.m. - 1:00 p.m.
Chesapeake Bay Cooking Class	

EVENING EVENTS

Saturday, August 13, 2005	
Orioles Baseball Game	3:30 p.m. - 7:30 p.m.
Sunday, August 14, 2005	
Opening Session	7:00 p.m. - 8:00 p.m.
Cheese and Wine Reception *Sponsored by Kraft Foods North America*	8:00 p.m. - 10:00 p.m.
Monday, August 15, 2005	
Exhibit Hall Reception *Sponsored by DuPont Qualicon and REMEL, Inc.*	5:00 p.m. - 6:15 p.m.
Monday Night Social - Harbor Cruise	6:30 p.m. - 10:00 p.m.
Tuesday, August 16, 2005	
Little Italy Walking Tour and Dinner	6:30 p.m. - 10:30 p.m.
Wednesday, August 17, 2005	
Awards Banquet Reception	6:00 p.m. - 7:00 p.m.
Awards Banquet	7:00 p.m. - 9:30 p.m.

GOLF TOURNAMENT

Saturday, August 13, 2005	
Golf Tournament at Waverly Woods Golf Club	8:45 a.m. - 4:00 p.m.

HOTEL INFORMATION

For reservations, contact the hotel directly and identify yourself as an IAFP 2005 attendee to receive a special rate of $149 per night, single/double or make your reservations online. This special rate is available only until July 13, 2005 or until sold out.

Baltimore Marriott Waterfront Hotel
700 Aliceanna St.
Baltimore, Maryland 21202
Phone: 800.228.9290 • 410.385.3000 • Fax: 410.895.1910
Web site: www.stayatmarriott.com/IAFP2005
(Group Code iafiafa)

Attendee Registration Form

Member Number: _____

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.

Member since: _____

❒ IAFP occasionally provides Attendees' addresses (excluding phone and E-mail) to vendors and exhibitors supplying products and services for the food safety industry. If you prefer NOT to be included in these lists, please check the box.

PAYMENT MUST BE RECEIVED BY JULY 13, 2005 TO AVOID LATE REGISTRATION FEES

REGISTRATION FEES:	MEMBERS	NONMEMBERS	TOTAL
Registration	$ 385 ($ 435 late)	$ 583 ($633 late)	_____
Association Student Member	$ 78 ($ 88 late)	Not Available	_____
Retired Association Member	$ 78 ($ 88 late)	Not Available	_____
One Day Registration* ❒ Mon. ❒ Tues. ❒ Wed.	$ 210 ($235 late)	$ 320 ($345 late)	_____
Spouse/Companion* (Name): _____	$ 55 ($ 55 late)	$ 55 ($ 55 late)	_____
Children 15 & Over* (Names): _____	$ 25 ($ 25 late)	$ 25 ($ 25 late)	_____
Children 14 & Under* (Names): _____	FREE	FREE	_____
*Awards Banquet not included			

EVENING EVENTS:		# OF TICKETS	
Golf Tournament (Saturday, 8/13)	$ 135 ($145 late)	_____	_____
Baseball Game (Saturday, 8/13 – 3:30 p.m.–7:30 p.m.)	$ 26 ($ 36 late)	_____	_____
Student Luncheon (Sunday, 8/14)	$ 5 ($ 15 late)	_____	_____
Monday Night Social – Harbor Cruise (Monday, 8/15)	$ 45 ($ 55 late)	_____	_____
Children 14 and under	$ 40 ($ 50 late)	_____	_____
Tuesday Evening – Little Italy Walking Tour and Dinner (Tuesday, 8/16)	$ 92 ($102 late)	_____	_____
Additional Awards Banquet Ticket (Wednesday, 8/17)	$ 50 ($ 60 late)	_____	_____

DAYTIME TOURS: (Lunch included in daytime tours)			
Welcome to Washington (Saturday, 8/13)	$ 89 ($ 99 late)	_____	_____
Baltimore City Tour by Land and by Sea (Sunday, 8/14)	$ 74 ($ 84 late)	_____	_____
Annapolis Past and Present (Monday, 8/15	$ 125 ($135 late)	_____	_____
A Taste of Baltimore from the Inside (Tuesday, 8/16)	$ 80 ($ 90 late)	_____	_____
Chesapeake Bay Cooking Class (Wednesday, 8/17)	$ 99 ($109 late)	_____	_____

PAYMENT OPTIONS: ❒ VISA ❒ MasterCard ❒

❒ Check Enclosed

Credit Card # _____

Name on Card _____

Signature _____

❒ Check box if you are a technical, poster, or symposium speaker.

TOTAL AMOUNT ENCLOSED $ _____
US FUNDS on US BANK

Expiration Date _____

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

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E-mail: info@foodprotection.org
Web site: www.foodprotection.org

EXHIBITORS DO NOT USE THIS FORM

Workshops

WORKSHOP 1	WORKSHOP 2	WORKSHOP 3
Friday, August 12 1:00 p.m. to 5:00 p.m.	**Friday, August 12** 1:00 p.m. to 5:00 p.m.	**Friday and Saturday** **August 12–13** 8:00 a.m. to 5:30 p.m.
Statistics as a Tool for the Microbial Evaluation of Foods	*Statistics as a Tool for the Microbial Evaluation of Foods*	*Epidemiology and Foodborne Illness: How Disease is Detected and How Investigations Proceed*
Saturday, August 13 8:00 a.m. to 4:30 p.m.	**Saturday, August 13** 8:00 a.m. to 4:30 p.m.	
Methods, Methods Everywhere but Which is Right for Me? Selection and Verification of Methods	*Out of the Filing Cabinet and Into Use: Real World Experience with Trending Data*	

Workshop 1 and Workshop 2
Day 1— Statistics as a Tool for the Microbial Evaluation of Foods

Basic statistical concepts including variance and errors, types of distributions, and their frequencies as well as basic approaches to sampling and testing, and the risks and uncertainties in sampling and distribution will be taught. The workshop will end with a session on practical application using HACCP validation and microbiological testing assurances of meat quality as examples.

Topics:

- Basic Statistical Concepts
- Uncertainty and Distribution (Basic approaches to sampling and testing)
- Practical Application – HACCP Validation and Microbiological Testing Assurances of Meat Quality

Instructors:

Colin Gill, Agriculture and Agri-Food Canada, Lacombe, Alberta, Canada
Don Schaffner, Rutgers University, New Brunswick, NJ
Richard C. Whiting, FDA-CFSAN, College Park, MD

Organizer: Ron Usborne, Guelph, Ontario Canada

Workshop 1
Day 2 — Methods, Methods Everywhere but Which is Right for Me? Selection and Verification of Methods

Selecting the analytical tools for microbiological analysis that best meets your needs is a critical task. This workshop will teach you about selecting a microbiological method that is "fit for purpose." Experience a first time release and the demonstration of an AOAC "online" learning center to understand the various international approaches to method validation schemes. Speakers will address

Workshop 2
Day 2 — Out of the Filing Cabinet and Into Use: Real World Experience with Trending Data

This workshop will present principals for understanding and implementing microbial environmental testing in a food production facility and the subsequent value and importance of that data through trending analysis. You will learn, in an interactive environment, how to perform effective environmental sampling that can be implemented into your standard operating procedures and

practical considerations in method selection both for corporate and single manufacturing site labs; the concept of uncertainty of measurement as a key component of method verification; and the Canadian experience in expectations of accrediting authorities for methods verification.

Topics:

- Method Validation – The AOAC RI Learning Center Approach
- How to Choose a Method: Practical Consideration
- Is the Uncertainty of Measurement a European Conspiracy?
- Expectations of an Accrediting Body – A Canadian Perspective

Instructors:

Michael Brodsky, Brodsky Consultants, Thornhill, Ontario, Canada
Donna Christensen, Canadian Food Inspection Agency, Calgary, Alberta, Canada
Robin Kalinowski, National Center for Food Safety and Technology, Summit-Argo, IL
Deborah McKenzie, AOAC Research Institute, Gaithersburg, MD
Maria Nelson, AOAC Research Institute, Gaithersburg, MD

Organizers:

Christine Aleski, Centrus International Inc., Ann Arbor, MI
George Wilson, BD Diagnostics, Sparks, MD

provide powerful trending information. Workshop participants will review and discuss material from practical case studies and will discuss trend analysis and summation of the data in order to develop the tools needed for the implementation of practical and measurable corrective action.

Topics:

- How Microorganisms Evade HACCP Plans: Developing Effective Environmental Sampling
- Are You Ready to Trend? Authenticating Results for Accurate and Reliable Data
- Using Data Management and Trend Analysis to Drive Continuous Improvement
- Three Case Studies

Instructors:

Robert Behling, Kornacki Food Safety Associates, LLC, McFarland, WI
Jeff Kornacki, Kornacki Food Safety Associates, LLC, McFarland, WI
W. Payton Pruett, Jr., ConAgra Foods, Inc, Omaha NE
Patricia Rule, bioMérieux, Inc., Hazelwood, MO
Cindy Ryan, Nestlé USA, Dublin, OH

Organizers:

Jeff Kornacki, Kornacki Food Safety Associates, LLC, McFarland, WI
Patricia Rule, bioMérieux, Inc., Hazelwood, MO

Workshop 3
Epidemiology and Foodborne Illness: How Disease is Detected and How Investigations Proceed

This course is aimed at microbiologists and personnel working in the food industry who wish to gain a better understanding of how foodborne disease is recognized and investigated, ranging from the local to the national and international level and including in-plant epidemiological investigations by USDA and FDA. The program will include lectures and exercises, including case studies and mock outbreak investigations.

Topics:

- The Science of Epidemiology: an Overview
- Local, State, Federal, and International Agencies Involved in Foodborne Illness Outbreak Investigations
- Epidemiology Applied to Foodborne Disease
- Surveillance: Laboratory Techniques, Application, and Analysis
- Mock Outbreak Investigations

Instructors:

Jack Guzewich, Food and Drug Administration, College Park, MD
Randy Huffman, American Meat Institute Foundation, Washington, D.C.
Marguerite Neill, Brown Medical School and Memorial Hospital of Rhode Island, Pawtucket, RI
Martin Wiedmann, Cornell University, Ithaca, NY

Organizer:

Catherine Nnoka, International Life Sciences Institute, North America

Workshop Registration Form

❑ **Workshop 1**

Day 1 — ***Statistics as a Tool for the Microbial Evaluation of Foods***

Day 2 — ***Methods, Methods Everywhere but Which is Right for Me? Selection and Verification of Methods***

❑ **Workshop 2**

Day 1 — ***Statistics as a Tool for the Microbial Evaluation of Foods***

Day 2 — ***Out of the Filing Cabinet and Into Use: Real World Experience with Trending Data***

❑ **Workshop 3 —** ***Epidemiology and Foodborne Illness: How Disease is Detected and How Investigations Proceed***

First Name (will appear on badge)

Last Name

Company | Job Title

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• REGISTRATION •

Payment must be received by July 22, 2005 to avoid late registration rates.

WORKSHOP 1	Early Rate	Late Rate
IAFP Member	$400.00	$475.00
NonMember	$500.00	$575.00

WORKSHOP 2	Early Rate	Late Rate
IAFP Member	$420.00	$495.00
NonMember	$520.00	$595.00

WORKSHOP 3	Early Rate	Late Rate
IAFP Member	$350.00	$425.00
NonMember	$450.00	$525.00

GROUP DISCOUNT:
Register 3 or more people from your company and receive a 15% discount. Registrations must be received as a group.

Refund/Cancellation Policy

Registration fees, less a $50 administrative charge, will be refunded for written cancellations received by July 29, 2005. No refunds will be made after that date; however, the registration may be transferred to a colleague with written notification. Refunds will be processed after August 22, 2005. The workshop may be cancelled if sufficient enrollment is not received by July 22, 2005.

For further information, please contact the Association office at 800.369.6337; 515.276.3344; Fax: 515.276.8655; E-mail: jcattanach@foodprotection.org.

• 4 Easy Ways to Register •

To register, complete the Workshop Registration Form and submit it to the International Association for Food Protection by:

Online: www.foodprotection.org

Phone: 800.369.6337; 515.276.3344

Fax: 515.276.8655

Mail: 6200 Aurora Avenue, Suite 200W, Des Moines, IA 50322-2864, USA

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Purchase an IAFP 2005 long-sleeve T-shirt or Polo Shirt from the Student PDG to help raise money in support of our Students. Pre-ordered T-shirts are $18.00 and Polo shirts are $25.00. Shirts will be available for pick-up from the SPDG booth throughout IAFP 2005. All order forms are due by July 13th. If you have any questions, contact Renee Raiden at rraiden@vt.edu.

IAFP SPDG Shirt Order Form

If you choose to pay by credit card, make sure you include the amount to be charged. If you are paying by check make checks payable to IAFP and enclose the check with your order form. Please mail order forms for receipt by July 13, 2005 for pre-orders.

Please return order form to the following address: Renee Raiden, Virginia Tech, 22 Food Science Bldg., Blacksburg, VA 24061-0418; Fax: 540.231.9293.

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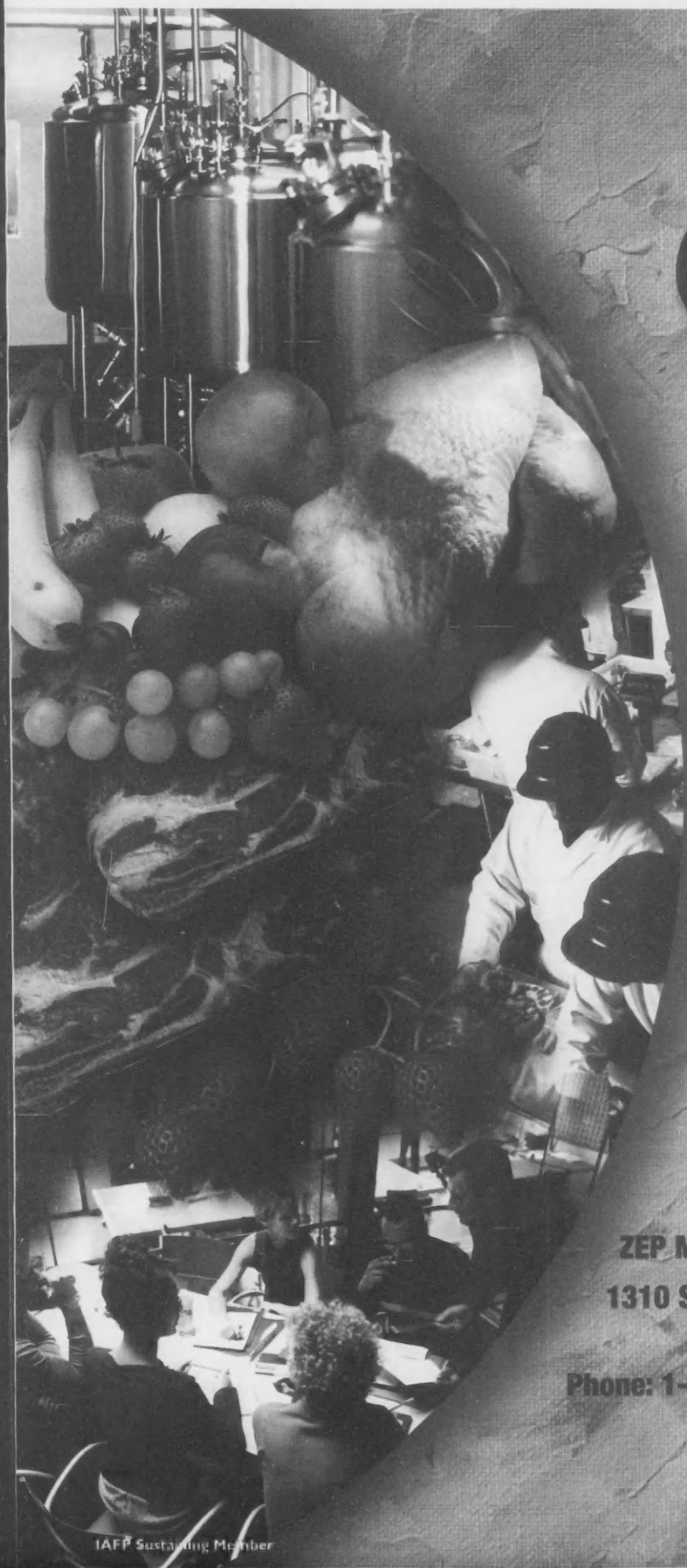

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Exhibitors

Companies scheduled to exhibit as of June 3, 2005

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ABC Research Corporation
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Accugenix
www.accugenix.com Phone: 800.886.9654

Advanced Instruments, Inc.
www.aicompanies.com Phone: 800.225.4034

Aerotech P&K
www.aerotechpk.com Phone: 888.862.6988

AES – Chemunex, Inc.
www.aeschemunex.com Phone: 609.497.0166

Alpha Biosciences, Inc.
www.alphabiosciences.com Phone: 410.467.9983

American Association for Laboratory Accreditation (A2LA)
www.a2la.org Phone: 607.753.0215

American Proficiency Institute
www.foodpt.com Phone: 800.333.0958

AOAC International
www.aoac.org Phone: 800.379.2622

ASI Food Safety Consultants, Inc.
www.asifood.com Phone: 800.477.0778

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www.atcc.org Phone: 800.638.6597

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www.biomerieux-usa.com Phone: 800.634.7656

Bio-Rad Laboratories
www.foodscience.bio-rad.com Phone: 800.4BIORAD

Bioscience International
www.biosci-intl.com Phone: 301.230.0072

Biotrace International
www.biotraceamericas.com Phone: 800.729.7611

Blackwell Publishing
www.blackwellprofessional.com Phone: 800.862.6657

Cambrex BioScience
www.cambrex.com Phone: 301.898.7025

Center for Food Safety and Applied Nutrition, US FDA
www.cfsan.fda.gov Phone: 301.436.2127

Centrus International, Inc.
www.centrusinternational.com Phone: 800.853.8101

Charm Sciences, Inc.
www.charm.com Phone: 800.343.2170

Copan Diagnostics, Inc.
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International Association for Food Protection – Student PDG
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MicroBioLogics, Inc.
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Sunday, August 14, 2005

8:00 p.m. - 10:00 p.m.
Cheese and Wine Reception
Sponsored by Kraft Foods North America

Monday, August 15, 2005

8:00 a.m.
Coffee and Pastries
Sponsored by Deibel Laboratories, Inc.

3:00 p.m. - Coffee Break
Sponsored by NSF - Cook & Thurber

5:00 p.m. - 6:15 p.m.
Exhibit Hall Reception
Sponsored by DuPont Qualicon and REMEL, Inc.

Tuesday, August 16, 2005

8:00 a.m.
Coffee and Pastries
Sponsored by Centrus International, Inc

EXHIBIT HOURS

Sunday, August 14, 2005
8:00 p.m. - 10:00 p.m.

Monday, August 15, 2005
8:00 a.m. - 11:00 a.m.
1:00 p.m. - 6:15 p.m.

Tuesday, August 16, 2005
8:00 a.m. - 2:00 p.m.

Contribute to the Eighth Annual Foundation Fund Silent Auction Today!

The Foundation of the International Association for Food Protection will hold its Annual Silent Auction during IAFP 2005, the Association's 92nd Annual Meeting in Baltimore, Maryland, August 14–17, 2005. The Foundation Fund supports:

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Strategic Diagnostics Inc.

Unilever (SEAC)

Weber Scientific

Zep Manufacturing Company

Thank You

COMING EVENTS

AUGUST

- **10–11, SuperSafeMark® Train-the-Trainer Program,** Indiana University Purdue University, Indianapolis, IN. For more information, contact Barbara Fisher at 317.274.3418; E-mail: Exec-Educ@iupui.edu.
- **12–13, IAFP 2005 Workshops,** Baltimore Marriott Waterfront Hotel, Baltimore, MD.

  Workshop 1, *Statistics as a Tool for the Microbial Evaluation of Foods* **and** *Methods, Methods Everywhere but Which is Right for Me? Selection and Verification of Methods*;

  Workshop 2, *Statistics as a Tool for the Microbial Evaluation of Foods* **and** *Out of the Filing Cabinet and Into Use: Real World Experience with Trending Data*; and

  Workshop 3, *Epidemiology and Foodborne Illness: How Disease is Detected and How Investigations Proceed.*

  For more information, see page 588 of this issue or contact Julie Cattanach at 800.369.6337; E-mail: jcattanach@foodprotection.org.
- **14–17, IAFP 2005, the Association's 92nd Annual Meeting,** Baltimore Marriott Waterfront Hotel, Baltimore, MD. For more information, see page 587 of this issue or contact Julie Cattanach at 800.369.6337; E-mail: jcattanach@foodprotection.org.
- **15–19, Culinology Arts for Food Technologists, A Culinology® Workshop,** The Culinary Institute of America, St. Helena, CA. For more information, contact Deb North at 404.252.3663; E-mail: dnorth@kellencompany.com.
- **22–23, Certifiefd Equipment Design Seminar,** Chicago, IL. For more information, contact AIB at 785. 537.4750; E-mail: info@aibonline.org.

SEPTEMBER

- **7, HACCP: A Management Summary,** GFTC, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821. 1246; E-mail: minglis@gftc.ca.
- **11–14, 4th International Whey Conference,** Chicago, IL. For more information, contact James Page at 630.530.8700 or go to www.IWC-2005.org.
- **13–15, HTST Pasteurization,** Randolph Associates, Inc., Nashville, TN. For more information, call 205. 595.6455; E-mail: us@randolphconsulting.com.
- **13–16, Food Safety/Sanitation & HACCP Workshop,** Chicago, IL. For more information, call AIB at 785. 537.4750 or go to www.aibonline.org.
- **15–16, Fundamentals of Auditing,** Atlanta, GA. For more information, contact Jeanette Hugé at 800.477. 0778 ext. 113; E-mail: jhuge@asifood.com.
- **19–20, Certified HACCP Auditor,** GFTC, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **20, Georgia Association for Food Protection Annual Fall Meeting,** Georgia Tech Food Processing Auditorium, Atlanta, GA. For more information, contact Louis Hughes at 912.267.3623; E-mail: lhughes@kpseafood.com.
- **20–22, Kansas Environmental Health Association Annual Fall Meeting,** Hyatt Regency, Wichita, KS. For more information, contact Cyndra Kastens at 316.383.7951; E-mail: ckastens@sedgwick.gov.
- **20–22, New York State Association for Food Protection Annual Meeting,** Holiday Inn, Liverpool, NY. For more information, contact Janene Lucia at 607.255.2892; E-mail: jgg3@cornell.edu.
- **20–22, Washington Association for Food Protection Annual Conference,** Campbells Resort on Lake Chelan, Chelan, WA. For more information, contact Bill Brewer at 206. 363.5411; E-mail: billbrewer1@juno.com.
- **21–22, Wisconsin Association for Food Protection Joint Education Conference,** Stoney Creek Inn, Mosinee, WI. For more information, contact Randy Daggs at 608.837.2087; E-mail: rdaggs@juno.com.
- **23–27, The 7th International Exhibition on Food & Drink Industry,** International Exhibition & Convention Center, Hachiminh City, Vietnam. For more information, contact Nguyen Ba Vinh at 84.90340.6383; E-mail: vinhba@hn.vnn.vn.
- **27–29, Wyoming Environmental Health Association Annual Educational Conference,** Buffalo Bill Village Resort, Cody, WY. For more information, contact Roy Kroeger at 307.633.4090; E-mail: roykehs@laramiecounty.com.
- **28–29, Sixth Annual Illinois Food Safety Symposium,** Holiday Inn City Centre, Peoria, IL. For more information, call the Illinois Dept. of Public Health at 217.785.2439 or E-mail Jayne Nosari at jnosari@idph.state. il.us.

OCTOBER

- **3–7, Dairy Technology Workshop,** Randolph Associates, Inc., Newport, KY. For more information, call 205. 595.6455; E-mail: us@randolphconsulting.com.
- **4–7, Better Process Control School,** University of Nebraska, Lincoln, NE. For more information, call 402. 472.9751; E-mail: tkoeppe2@unl.edu.
- **11–12, Better Process Control School,** University of Nebraska, Lincoln, NE. For more information, call 402.472.9751; E-mail: tkoeppe2@unl.edu.
- **11–12, IAFP European Symposium on Food Safety "Recontamination Issues in the Food Industry,"** to be held in Prague, The Czech Republic. For more information, check www.foodprotection.org under "Meetings and Education."
- **11–13, FoodScan,** Laughlin, NV. For more information, call 952.974.9892; E-mail: info@fossnorthamerica.com.
- **11–13, HTST Pasteurization and Controls Seminar,** LaQuinta Inns & Suites, San Antonio, TX. For more information, call 210.628.1596; E-mail: mvk1030@aol.com.
- **11–13, North Dakota Environmental Health Association Annual Meeting,** Holiday Inn, Fargo, ND. For more information, contact Deb Larson

COMING EVENTS

at 701.328.1291; E-mail: djlarson@state.nd.us.

- **12–13, Association of Illinois Milk, Food and Environmental Sanitarians Annual Fall Meeting,** Stoney Creek Inn, Peoria, IL. For more information, contact Frank Brown at 217.785.2439; E-mail: fbrown@idph.state.il.us.
- **15–19, Current Concepts in Foodborne Pathogens and Rapid and Automated Methods in Food Microbiology Symposium,** University of Wisconsin-River Falls, WI. For more information, contact Doreen Cegielski at 715.425.3704; E-mail: foodmicro@uwrf.edu.
- **18–20, Applied Extrusion Workshop,** University of Nebraska, Lincoln, NE. For more information, call 402.472.9751; E-mail: tkoeppe2@unl.edu.
- **19, Metropolitan Association for Food Protection Fall Meeting,** Rutgers University, New Brunswick, NJ. For more information, contact Carol Schwar at 908.689.6693; E-mail: cschwar@entermail.net.
- **20–21, HACCP/ISO 9000,** Las Vegas, NV. For more information, contact Jeanette Hugé at 800.477.0778 ext. 113; E-mail: jhuge@asifood.com.
- **25, Iowa Association for Food Protection Annual Fall Meeting,** Western Starlite Motel, Ames, IA. For more information, contact Phyllis Borer at 712.754.2511 ext. 33; E-mail: borerp@ampi.com.
- **26–27, Certififed Equipment Design Seminar,** Atlanta, GA. For more information, contact AIB at 785.537.4750; E-mail: info@aibonline.org.
- **31–1, Food Plant Sanitation,** GFTC, Guelph, Ontario, Canada. contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.

NOVEMBER

- **1–4, Food Safety/Sanitation & HACCP Workshop,** Toronto, Ontario, Canada. For more information, call AIB at 785.537.4750 or go to www.aibonline.org.
- **1–4, ProcessScan,** Eden Prairie, MN. For more information, call 952.974.9892; E-mail: info@fossnorthamerica.com.
- **9–11, Dairy Practices Council 2005 Annual Conference,** Radisson Lackawanna Station Hotel, Scranton, PA. For more information, call 732.203.1947; E-mail: dairypc@dairypc.org.
- **11–12, Mexico Association for Food Protection Annual Meeting,** Guadalajara, Jal., Mexico. For more information, contact Alejandro Castillo at 979.845.3565; E-mail: a-castillo@tamu.edu.
- **16, Ontario Food Protection Association Annual Fall Meeting,** Mississauga, Ontario. For more information, contact Gail Evans at 519.463.5674; E-mail: seed@golden.net.
- **25, HACCP: A Management Summary,** GFTC, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.

DECEMBER

- **13–14, Infratec 1255/1265,** Eden Prairie, MN. For more information, call 952.974.9892; E-mail: info@fossnorth america.com.

IAFP UPCOMING MEETINGS

AUGUST 14-17, 2005
Baltimore, Maryland

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CAREER SERVICES SECTION

Sr. Microbiology Laboratory Technician

The Sr. Microbiology Laboratory Technician will be a key member of the Food Safety Team that makes complex risk based food safety decisions that have direct impact on the microbial quality of our products and processes. You will provide technical leadership and scientific expertise for all of our sites… managing processes that ensure raw materials, manufacturing processes, and environments are microbiologically safe. You will intepret sensitive and technical information related to microbiological quality, and provide timely recommendations regarding cost effective resolutions and their potential impact on product quality and safety.

You will support both cross unit and global projects; so, you must have good project management and team leadership skills to work effectively with other functional areas in the pet, food and snack segments. Technical knowledge base and skills will be equally critical, because you will need to navigate through complex testing strategies and properly analyze results. You will also: conduct regular risk assessments to minimize microbiological risks, champion food safety monitoring programs and systems, investigate critical microbiological situations, drive innovative changes in test methods and strategies, and manage and maintain the Global Laboratory Information Management System or LIMS. In return for your efforts, we offer a unique Winning Environment where your hard work will be recognized and rewarded!

Minimum qualifications for this position are:
One year of relevant experience in either the food or pharmaceutical industries which demonstrated all of the following… expert laboratory skills; in depth knowledge of Good Laboratory Practices, food microbiology, food safety, manufacturing processes, material specifications, food laws, environmental regulations, HACCP, GMP's, microbiological test procedures, lab computer applications; and, the ability to evaluate sensitive business risks and define appropriate resolutions.

Preferred qualification for this position is:
B.S. in microbiology or related field (e.g., Food Science, Medical Technology, Biotechnology, Biology.)

Company paid relocation is not available for this position.

As a privately-held, family-owned company, Masterfoods USA offers benefits which reflect our commitment to attracting and retaining great people. This includes excellent pay, fully-funded health and dental care premiums (that means no money deducted from your paycheck for health care benefits), coverage which begins on your first day of work, one of the most generous retirement and savings plans in the nation, a very competitive vacation plan and unrivaled career advancement opportunities, to name just a few of our unique and generous benefits.

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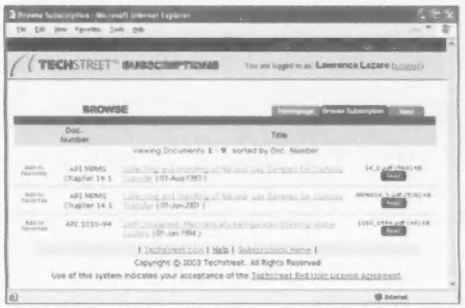

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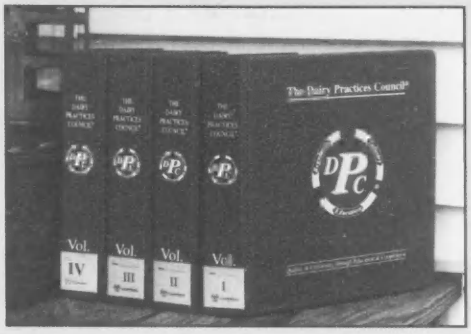

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