

January 2010

Vol. 30, No. 1

ISSN:1541-9576

Periodicals

6200 Aurora Avenue • Suite 200W

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Food Protection Trends

Science and News from the International Association for Food Protection



Inactivation of *Listeria monocytogenes*
during Reheating of Frankfurters

Optimization of Methodology to Enumerate
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FOOD PROTECTION TRENDS
ISSUE 30, NO. 1
JANUARY 2010

FOOD PROTECTION TRENDS

VOLUME 30, NO. 1

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A NOTE FROM THE FPT SCIENTIFIC EDITOR...



Despite the downturn in worldwide economies during 2009, *FPT* had a very good year with respect to papers submitted for peer-reviewed publication. As of the end of November, 2009, 37 manuscripts were submitted to *FPT* for consideration to publish (36 research articles, one review article). Additionally, seven non-peer reviewed papers were published in *FPT* by the end of November, and these include *General and/or Special Interest* articles and *Thoughts on Food Safety* papers. By comparison, only 22 papers were submitted by November, 2008, with the 2008 total being only 23.

Of the 37 submitted articles, 15 have been either published or accepted for publication, five were rejected, seven are under revision by the author(s), nine are under review, and one was withdrawn at the author's request. Notably, 13 papers were submitted since the end of September! Another point of interest is that 16 of the submitted papers are based upon what I refer to "non-benchtop" research. These papers typically comprise studies focused on determining consumer attitudes, consumer and retail food safety practices, effectiveness of training programs, and the like. Such an example is "Mexican Food Safety Trends: Examining the CDC Data in the United States from 1990 to 2006," by Wendy Franco and Amarat Simonne (April, 2009 Issue). While I do not have data to support my opinion, I believe that the increased focus on integrated research programs is at least partly responsible for the increase in "non-benchtop" studies being con-

ducted and published. Indeed, these papers may better serve a large portion of the IAFFP membership that is less interested in traditional laboratory research publications.

A recent *FPT* Analysis Report submitted by a private consultant revealed that *FPT* suffers from an identity crisis, partly owing to similarities between the types of papers published in *FPT* and its sister publication, the *Journal of Food Protection*. While no specific solution has been identified, there is consensus among *FPT* Management Committee members that more review articles should be published, drawn particularly from reviews prepared by graduate students, developed from posters, and from presentations given at the international meetings involving IAFFP. At any rate, the increase in submissions along with the heightened interest in "non-benchtop" research publications is good news for *FPT*.

In conclusion, I want to reiterate my steadfast appreciation for Donna Bahun, *FPT* Production Editor. While 37 or so papers may not seem like a lot to handle, it is worthy to note that submissions to *FPT* all go through Donna, who processes the papers, sends them to reviewers, etc. Owing to our comparatively low publication numbers, *FPT* doesn't enjoy the benefits of online submissions, making Donna's job critical to *FPT*'s success. Thanks, Donna!

I hope to see everyone in Anaheim in August. Meanwhile, I welcome your submissions to *FPT* as well as your thoughts and suggestions.

David A. Golden, *FPT* Scientific Editor



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FROM THE INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION

Food Protection Trends (ISSN-1541-9576) is published monthly beginning with the January number by the International Association for Food Protection, 6200 Aurora Avenue, Suite 200W, Des Moines, Iowa 50322-2864, USA. Each volume comprises 12 numbers. Printed by Heuss Printing, Inc., 911 N. Second Street, Ames, Iowa 50010, USA. Periodical Postage paid at Des Moines, Iowa 50318 and additional entry offices.

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

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Subscription Rates: *Food Protection Trends* is available by subscription for \$263.00 US, \$278.00 Canada/Mexico, and \$293.00 International. Single issues are available for \$31.00 US and \$40.00 all other countries. All rates include shipping and handling. No cancellations accepted. For more information contact Julie A. Cattanaach, Membership Services, International Association for Food Protection.

Claims: Notice of failure to receive copies must be reported within 30 days domestic, 90 days outside US.

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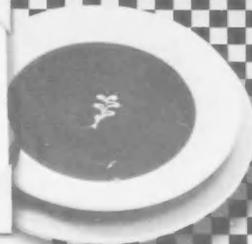


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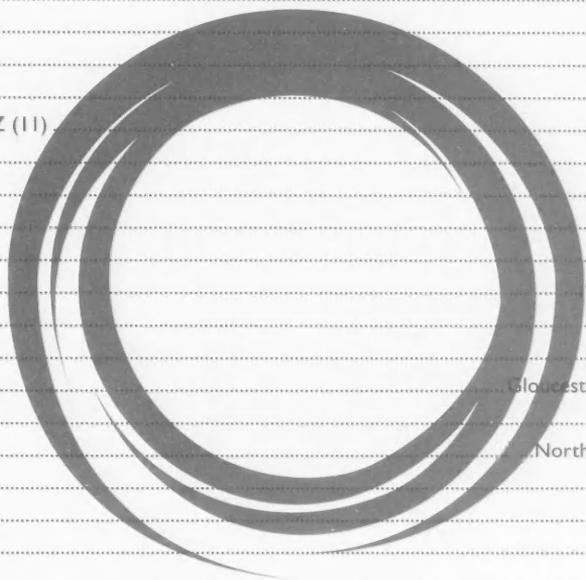
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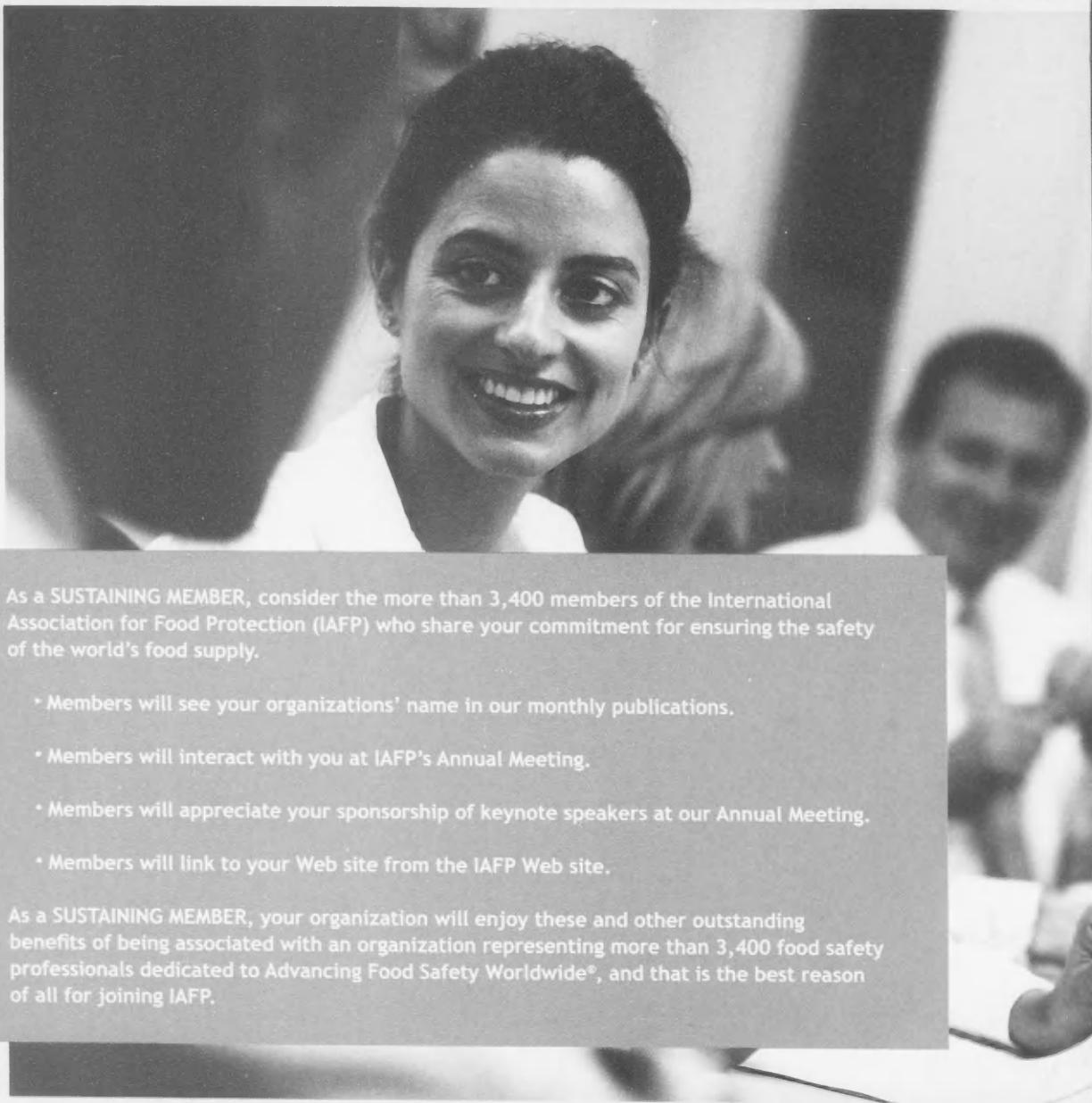
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“VICKIE’S VIEW” FROM YOUR PRESIDENT

Greetings! We have officially entered the “reflective” part of the year. Even though you are reading this in January, and I should be wishing everyone “Happy New Year,” it is actually the end of November as I write this column. More specifically, it is Thanksgiving in the United States. Thanksgiving is similar to New Year’s Day in that we take a look back, reflecting on the previous year’s successes and setbacks. This is a time to reflect on what we are thankful for and who we are thankful for.

So, what am I thankful for? First and foremost, my wonderful family! If you’ve read any of my columns you know about my two boys, Max and Jack. Each year at this time I am thankful that we had the opportunity to adopt them and make them part of our family. I am very thankful for my brothers and sisters, as well. I’d like to mention one of them specifically: my brother Mark. Mark recently returned home from his third tour of duty in Iraq. I am so thankful that he has returned home safe and sound all three times. I am also so thankful to him and countless other service men and women who are willing to serve for others, willing to fight for our freedom. Without freedom, I might not have Max and Jack in my life.

Similarly, without freedom we might not be able to come together and meet like we do today to ensure global food safety through IAFP. I am thankful that IAFP exists and that we are able to freely pursue fulfilling IAFP’s mission: “To provide food safety professionals *worldwide* with a forum to exchange information on protecting the food supply.” I have had the opportunity to travel to several IAFP affiliate meetings



By **VICKIE LEWANDOWSKI**
PRESIDENT

“As individuals we can do our part, but we can’t assure global food safety alone; we need organizations such as IAFP”

this past year. It had been exciting to see the passion for food safety across the world. We currently have 47 affiliates: 35 across North America, three in Latin America, five throughout Europe, two in Asia and two in the Australia and Oceania region.

I am thankful that I have a career that I am passionate about, not just a job that I do for a paycheck. I am thankful to work for a company that believes in and supports food safety. It is satisfying to know that my efforts are supported at all levels, from senior management on down. For many of us, our employer

supports our membership and participation in IAFP. As individuals we can do our part, but we can’t assure global food safety alone; we need organizations such as IAFP. I am thankful for the right to assemble and for IAFP!

I am so thankful that I live in a country where I rarely think about having enough to eat. I rarely think about food security, about having “...access to sufficient safe and nutritious food...” And through IAFP we are working towards making food security a reality for more and more people around the globe.

I am thankful for my good health and that of my family and friends. That’s not to say that my family or I never get sick—all four of us took our turn with the H1N1 flu. And, we also were affected by the PCA *Salmonella* outbreak. Jack received a goody bag from a birthday party that had crackers with peanut butter. Fortunately, my husband Rob raided the bag and ate them before Jack did. Well, Rob might not call it fortunate...several stool cultures later! In both instances, we had access to high-quality healthcare and received prompt and proper treatment.

I’m thankful that we live at a point in time where the tools exist to more quickly identify outbreaks and the source(s) of foodborne illness incidents. We have PFGE, PulseNet, Team Diarrhea (Go Minnesota!), among other public health organizations, that are providing vitally needed data that help inform and guide food safety professionals at all levels and in all stakeholder groups. Communication technologies exist today to quickly alert consumers of potential danger; news updates are at the tip of our fingers via cellular phones and

computers. IAFP provides various forums for rapid communication. Last year, IAFP held one "Timely Topic" symposium and one "Rapid Response" symposium as a way to spread important information. At least three workshops are held at the Annual Meeting to provide hands-on dissemination of information on methods, technologies, best practices, and so on.

I am also thankful that governments across the world are becoming more engaged and committed to food safety. Although we might not always (or ever) agree with the ideas that governmental authorities and regulatory bodies propose, I truly believe that their effort and involvement is in the best interest of the consumer. As food safety experts in academia, industry and government, we must continue to work together to help guide and shape the forthcoming

policies. Food safety is a team effort, and IAFP is the organization that brings us all together as that team. Through the association's Professional Development Groups (PDGs), special committees, symposia, and Annual Meetings we can all come together to influence laws, policies and regulations so that they are science-based and can be practically applied in the new world of extended supply chains.

In the past five months, many of you have reached out to me in response to my column here in *Food Protection Trends*. I am thankful that people are reading my columns, whether you agree or disagree with what I write! Thank you for your support and insightful feedback. For me, as I wrote in my first column, writing this column is the most challenging part of being IAFP's President, and so I am also thankful to Julie for wordsmithing my monthly messages prior to press!

And finally, I am thankful for the Thanksgiving dinner that my family,

along with my brother Gary and his family just finished. That one meal basically represents everything I am thankful for: family, freedom to assemble, food security, job security and meaningful employment, health, communication and food safety. I am thankful for the Thanksgiving dinner that left my family uncomfortable only because it was delicious and they all ate too much!

As I said, this is the "reflective" part of the year. It is now time to prepare for my year-end employee appraisal. At the same time I will appraise the year on a personal basis and contemplate what I might want to change or improve in the coming year. One thing I know I won't change is my passion for food safety. I trust that you will not either. I wish you a Happy New Year!

As always, feel free to contact me at anytime at VLewandowski@kraft.com.

ISOPOL XVII

International Symposium on Problems of Listeriosis



May 5 - 8, 2010

Alfandega Congress Centre, Porto, Portugal



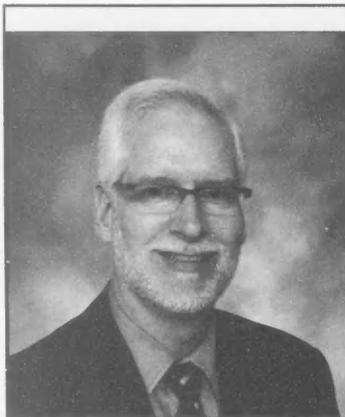
“COMMENTARY” FROM THE EXECUTIVE DIRECTOR

As was brought to your attention in this column last month, the financial year ending August 31, 2009 was not kind to our bottom line or to our General Fund reserves. The independent auditors have completed their work and agreed with our accounting methods and internal controls. Our financial report for 2009 is shown on page 52. The end result shows that we have a \$400,000 loss to incur from the general operations of the Association.

There are a number of ways to dissect this loss, but the simplest way to explain the loss is as follows:

\$ 70,000	The approved budget projected a \$70,000 loss
209,000	Shortfall from projected Annual Meeting net income
124,000	Shortfall from projected investment income
<u>\$403,000</u>	

Even with this “bad news,” there are some positive financial results that occurred during the year. For the European Symposium, we had budgeted for a \$10,000 loss and experienced a \$33,000 net gain for a positive result of \$43,000 when compared to budget. In addition, we budgeted to make \$10,000 from our special symposia (rapid response and timely topics symposia) and exceeded that by almost \$10,000 for a total net income from those special symposia of \$19,800.



By **DAVID W. THARP, CAE**
EXECUTIVE DIRECTOR

“The good news is that we had built up reserves to ‘weather a storm’ like this one”

There were also a number of areas where we spent out monies during the year. Web site development costs totaled about \$60,000 during the year where we had budgeted only \$30,000 for this activity. Membership software that was necessary for the new

Web site functionality cost about \$85,000, but we are able to amortize this expense over five years meaning that the expense portion for this year was \$17,000. The last major expense in this budget year was for membership material redesign and printing. For this activity, we had budgeted about \$8,000 but incurred a total of \$38,000 in design and printing fees. So, these “unbudgeted” expenses totaled about \$77,000.

Those unbudgeted expenses were partially offset by the excess revenue items of the European and Special Symposia (\$43,000 and \$10,000 respectively). This being the case, we could have been much closer to our “budgeted results” had it not been for the Annual Meeting shortfall and our investment loss.

Of course this is not a direction we can continue, but the good news is that we had built up reserves to “weather a storm” like this one. We now have \$268,600 in our General Fund. The following shows our year end General Fund balances since 1998. You can see that 2003 was when we first “broke into the positive” for a fund balance:

1998	-70,524
1999	-38,601
2000	-16,551
2001	- 1,546
2002	-64,007
2003	28,067
2004	190,724
2005	502,735
2006	578,245
2007	760,474
2008	668,638
2009	268,614

From that listing, you can see what a struggle we had to achieve a positive fund balance. IAFP has come a long ways since the days of holding a "negative General Fund Balance!" With this history, I can

tell you we will not be able to allow 2010 to be a loss year – it simply cannot be!

If you have any questions about this report, please let me know. We would be happy to answer

any questions you have about the financial operations of IAFP. For 2010, we certainly look forward to a more successful financial year.

We wish you only the best in 2010; good health and prosperity in the New Year!

ANNOUNCING...

IAFP's Sixth European Symposium on Food Safety

9-11 June 2010

University College Dublin

Dublin, Ireland

More information coming very soon!

Inactivation of *Listeria monocytogenes* during Reheating of Frankfurters with Hot Water before Consumption

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ABSTRACT

Hot water may be used to kill *Listeria monocytogenes* on frankfurters immediately before consumption. This study evaluated the effectiveness of different time and water temperature combinations in destroying *L. monocytogenes* on frankfurters formulated with or without potassium lactate and sodium diacetate (PL/SD). Frankfurters were inoculated (1–2 log CFU/cm²), vacuum-packaged and stored at 4°C (manufacturer/retail conditions). On days 18, 40 and 60, packages were opened, reclosed and stored at 7°C (household conditions). At 0, 7 and 14 days of simulated household storage, frankfurters were exposed to hot water (80 or 94°C) that was either maintained at constant temperature or removed from the heat source. The 80°C (60, 120 s) and 94°C (30, 60 s) treatments reduced pathogen counts on frankfurters with PL/SD to the detection limit (-0.4 log CFU/cm²) or below from initial levels of 0.6–0.9 log CFU/cm². For frankfurters without PL/SD, where pathogen numbers on the control reached 5.3 log CFU/cm², hot water treatments reduced counts by 0.3 (80°C, 30 s) to > 5.7 (94°C, 300 s) log CFU/cm². No survivors were detected in the heated water after any treatment. Findings of this study may be useful for the development of science-based recommendations for reheating of frankfurters by consumers in their homes.

INTRODUCTION

Listeria monocytogenes is the causative agent of listeriosis, a disease that produces an estimated 2,500 cases in the United States every year (99% of them foodborne), with a hospitalization rate of 92% and a case fatality rate of 20% (11). It mostly affects susceptible individuals such as pregnant women and their fetuses, the elderly and the immunocompromised (12, 18). *L. monocytogenes* is a ubiquitous organism that can be found in different foods such as salads, cheeses and ready-to-eat (RTE) meat and poultry products (9, 18, 24). In the case of RTE meat and poultry products, cross-contamination and/or recontamination with *L. monocytogenes* can occur after the product has undergone the lethality (i.e., cooking) treatment (14, 19), for example, during slicing of deli meats or peeling of frankfurters (24, 25, 26). Frankfurters, among other RTE meat products, can support growth of the pathogen to high numbers and, according to the 2003 *L. monocytogenes* risk assessment (22), non-reheated frankfurters are considered high risk, both on a per-serving and per-annum basis. Therefore, without

A peer-reviewed article

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further treatment before consumption, frankfurters contaminated with this pathogen represent a risk for consumers, especially to those with a compromised immune system.

The role of consumers in food safety is important, since they are responsible for the last treatments (i.e., cooking and/or reheating) of food products immediately before consumption (17). In a survey by Porto et al. (13), it was reported that 72% of the participants reheated frankfurters before eating, and 33% of these individuals preferred boiling over other methods (such as grilling, microwaving and frying). However, most brands of frankfurters do not offer instructions on their labels about reheating. Only a few brands provide consumers with reheating directions, but no information is available on the effectiveness of such recommendations on the inactivation of *L. monocytogenes*. Appropriate reheating instructions for this type of product are especially important for the population groups at particularly high risk for foodborne listeriosis infection. This study evaluated the efficacy of combinations of time and water temperature for destruction of *L. monocytogenes* contamination on frankfurters formulated with or without potassium lactate and sodium diacetate, during storage under simulated manufacturer/retail and household conditions.

MATERIALS AND METHODS

Preparation of frankfurters

Frankfurter emulsions were formulated with or without 1.5% potassium lactate (PL, Purac Purasal® HiPure P, Lincolnshire, IL) and 0.1% sodium diacetate (SD, Niacet Corporation, Niagara Falls, NY) as antimicrobials. The meat mixture consisted of 40% beef (beef chuck, 76–78% lean) and 60% pork (pork shoulder, 70–72% lean). Water, as ice, and seasonings and salts (dextrose, sodium chloride, corn syrup solids, dry mustard, polyphosphate, sodium nitrite, sodium erythorbate, paprika, onion powder, garlic powder, coriander and white pepper) were added according to the formulation of Samelis et al. (15). After emulsification in a vacuum bowl chopper (RME, Kansas City, MO) the batter was stuffed into cellulose casings, linked at

approximately 9 cm lengths, cooked and cooled (4°C) overnight, as described by Byelashov et al. (5). Frankfurters (65 cm²) were then manually peeled and moved to the microbiology laboratory for inoculation, packaging, storage, treatment and testing.

Preparation of inoculum and inoculation of frankfurters

The inoculum consisted of a mixture of 10 *L. monocytogenes* strains, including 558 (serotype 1/2, pork meat isolate), NA-1 (serotype 3b, pork sausage isolate), N-7150 (serotype 3a, meat isolate), N1-225 and N1-227 (serotype 4b, clinical and food isolates, respectively, associated with the same outbreak), R2-500 and R2-501 (serotype 4b, food and clinical isolates, respectively, associated with the same outbreak), and R2-763, R2-764 and R2-765 (serotype 4b, clinical, food, and environmental isolates, respectively, associated with the same outbreak). Strains N1-225, N1-227, R2-500, R2-501, R2-763, R2-764, and R2-765 (7) were kindly provided by Dr. Martin Wiedmann (Cornell University, Ithaca, NY). Each strain was individually activated and subcultured (30°C, 20–24 h) in tryptic soy broth (Difco, Becton Dickinson, Sparks, MD) supplemented with 0.6% yeast extract (Acumedia, Lansing, MI), and then harvested and washed as previously described (5, 8). Culture pellets of each strain were resuspended separately in 10 ml of autoclave-sterilized frankfurter extract and were stored at 7°C for 72 h, to acclimate the cells to a low temperature food environment (10). To prepare the extract, frankfurters formulated without PL/SD were homogenized (2 min; Masticator, IUL Instruments, Barcelona, Spain) with distilled water to yield a 10% (wt/wt) product suspension. The suspension was passed twice through cheesecloth, and the liquid portion was autoclaved and cooled to ambient (25°C) temperature before use (10).

Following the acclimatization period (7°C, 72 h), the 10 strains were mixed, and serially diluted in freshly prepared frankfurter extract; 0.2 ml of the diluted mixture (approximately 4 log CFU/ml) was used to inoculate the surface of each frankfurter, using a sterile glass spreader (5). The target inoculation level on each

frankfurter link was 1–2 log CFU/cm². Inoculated frankfurters were placed at 4°C for 15 min to allow for cell attachment. Samples (six frankfurters per bag) were placed in zip-top vacuum bags (Zip Vak 15.2 × 20.3 cm, nylon/EVA copolymer, Winpak, Winnipeg, MB, Canada), and were vacuum-packaged (LVII Super, Hollymatic Corp., Countryside, IL) and stored at 4°C for up to 60 days (simulating manufacturing and/or retail storage conditions). On days 18, 40 and 60, the zip-lock of each bag was opened to release the vacuum seal and the bag was then reclosed and stored at 7°C for up to 14 days (simulating aerobic, home storage conditions).

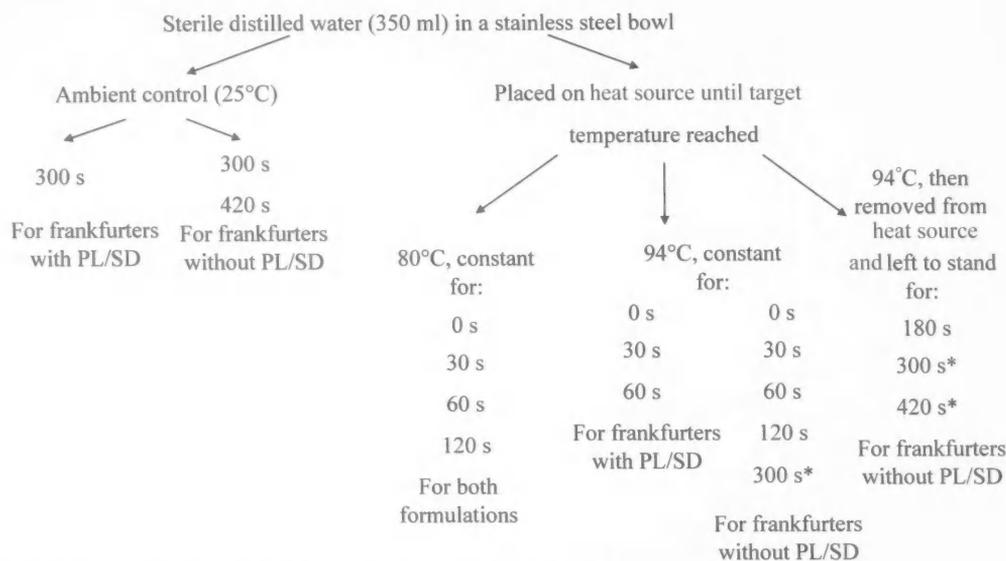
Hot water treatments

Hot water treatments were applied to frankfurters on days 0, 7 and 14 of aerobic storage (7°C). For selection of the treatments (Fig. 1), recommendations found on some commercial packages of frankfurters from certain manufacturers were considered. Such recommendations included “Boil in water for 5 min,” “Place in boiling water, cover and remove from heat, let stand 5–7 min,” and “Heat 2/3 cup of water in skillet, add franks, cover and simmer 7–9 min.” Treatments in this study were applied by placing two frankfurters (approx. 28 g each) in a stainless steel bowl (22.5 cm diameter, 10 cm deep, 2.84 liter capacity) containing sterile distilled water (350 ml) preheated to 80°C or 94°C on a hot plate (Corning Hot Plate Model PC-101, Corning Incorporated, New York, NY) (Fig. 1). For the 80°C treatments, the bowl containing the frankfurters and water was left on the hot plate for 0, 30, 60, or 120 s. For the 94°C treatments, the bowl containing the frankfurters and water was either left on the heat source (0, 30, 60, 120, or 300 s) or removed and left to stand for 180, 300 or 420 s. An untreated control (dry control, no water treatment) and two ambient temperature water controls (two frankfurters submerged in 25°C water for 300 or 420 s) were also included (Fig. 1).

Microbiological analyses

Immediately after each treatment, frankfurters (two frankfurters per sample) were transferred to a Whirl-Pak® bag (15 × 23 cm, Nasco, Modesto, CA) containing 50 ml of maximum recovery diluent

FIGURE 1. Hot water treatments applied to frankfurters formulated with or without 1.5% potassium lactate and 0.1% sodium diacetate (PL/SD) for inactivation of *Listeria monocytogenes* before consumption



* Treatments according to actual recommendations found on commercial packages of frankfurters from certain manufacturers

(MRD; 0.85% NaCl and 0.1% peptone) and vertically shaken 30 times to release cells from the surface of the samples (20). The rinsate was serially diluted with 0.1% buffered peptone water (Difco) and plated on PALCAM agar (Difco) and tryptic soy agar (Difco) supplemented with 0.6% yeast extract (TSAYE) for enumeration of *L. monocytogenes* survivors and total microbial populations, respectively. PALCAM agar plates were incubated at 30°C for 48 h and TSAYE plates were incubated at 25 ± 2°C for 72 h. The detection limit for the microbiological analysis of frankfurters was -0.4 log CFU/cm², which was calculated by taking into consideration the surface area of the frankfurters and the volume of MRD added to each sample. The heated water in which frankfurters were immersed was also serially diluted and plated on PALCAM agar for enumeration of possible *L. monocytogenes* survivors. The detection limit for the analysis of water samples was -2.4 log CFU/ml.

Frankfurter and water samples were kept at 4°C after microbiological analysis (and product pH measurements; described below), for possible enrichment in the event that no *L. monocytogenes* survivors would

be recovered by direct plating. In such cases, the US Department of Agriculture Food Safety and Inspection Service method (21) was followed with some modifications. Briefly, 100 ml of University of Vermont broth (UVM, Difco) was added to each sample and incubated for 24 ± 2 h at 30°C. After incubation, 1 ml of the UVM enrichment was transferred to 9 ml of Fraser broth (Difco) for secondary enrichment at 35°C. Fraser broth tubes were checked for darkening after 24 and 48 h of incubation. If no darkening appeared, the sample was recorded as negative for *L. monocytogenes* by enrichment. If darkening of the medium occurred, a loopful was streaked onto PALCAM agar plates and incubated at 30°C for 48 ± 2 h. Samples with PALCAM agar plates having typical *Listeria* colonies were recorded as positive for the pathogen by enrichment.

Physicochemical analyses

All frankfurter samples analyzed for microbial counts were homogenized (2 min; Masticator) after plating, and pH measurements were taken from a 5 ml aliquot of the homogenate, using a Denver Instruments (Arvada, CO) pH meter and

glass electrode. Water activities (a_w) of the two frankfurter formulations (i.e., with or without PL/SD) were measured (AquaLab model series 3, Decagon Devices, Pullman, WA) on day 0 of vacuum-packaged storage. Fat and moisture content analyses were conducted following AOAC International methods 960.39 and 950.46B, respectively (1).

Statistical analysis

Two complete replications were conducted, in a randomized block design. For each replication, three samples received the same treatment on each sampling day. Data were analyzed with storage time (days) under vacuum-packaged conditions, storage time (days) under aerobic conditions, hot water treatments, and the interactions of storage time under vacuum-packaged conditions × hot water treatments, and storage time under aerobic conditions × hot water treatments as independent variables, using the Glimmix Procedure of SAS/STAT® (16). Least-squares means were calculated, and mean separation was performed with Tukey's Honestly Significant Differences method, using a level of significance of 0.05.

TABLE 1. Mean \pm standard deviation pH values of frankfurters stored under vacuum-packaged (4°C, up to 60 days) and aerobic (7°C, up to 14 days) conditions

	Storage time (days)		Frankfurter formulation	
	Vacuum-packaged (4°C)	Aerobic (7°C)	With PL/SD	Without PL/SD
18		0	5.94 \pm 0.13 A	6.09 \pm 0.16 A
		7	5.97 \pm 0.11 A	6.01 \pm 0.08 AB
		14	5.96 \pm 0.11 A	5.98 \pm 0.19 BC
40		0	5.97 \pm 0.10 A	6.02 \pm 0.20 AB
		7	5.97 \pm 0.12 A	5.99 \pm 0.23 BC
		14	5.94 \pm 0.20 A	5.88 \pm 0.33 D
60		0	6.00 \pm 0.12 A	5.96 \pm 0.38 BC
		7	5.97 \pm 0.13 A	5.91 \pm 0.36 DC
		14	5.94 \pm 0.22 A	5.70 \pm 0.39 E

A-E Means with the same letter within a column are not significantly different ($P \geq 0.05$)

PL/SD: Potassium lactate (1.5%) and sodium diacetate (0.1%)

RESULTS AND DISCUSSION

Physicochemical properties of frankfurters

Values of a_w , fat content and moisture content were similar between frankfurters with and without PL/SD. The fat content was $15.37 \pm 0.97\%$ and $15.43 \pm 0.5\%$ for product with and without PL/SD, respectively. As expected, a_w and moisture content were slightly lower in the product formulated with PL/SD (0.964 ± 0.005 and $59.22 \pm 0.59\%$, respectively), compared with the product without PL/SD (0.970 ± 0.008 and $61.09 \pm 0.51\%$, respectively). The pH values of the frankfurters with and without PL/SD on the day of inoculation were 5.92 ± 0.07 and 5.93 ± 0.10 , respectively. As expected, there was no effect ($P \geq 0.05$) of hot water treatments on pH values of the product (data not shown). For frankfurters with PL/SD, pH remained constant ($P \geq 0.05$) throughout storage (Table 1). However, there was an effect of storage time (both in vacuum and aerobic packages) on the pH of frankfurters without PL/SD, most likely due to growth of *L. monocytogenes* and other background flora to high levels in these products (Fig. 2 and 3). For this formulation, 60-day old vacuum-packaged samples had a lower ($P < 0.05$) pH than corresponding samples stored for 18 days.

In general, during each aerobic storage cycle, the pH of 0- and 7-day samples were not different ($P \geq 0.05$), but decreased ($P < 0.05$) in samples stored for 14 days (Table 1).

Effect of storage time on microbial populations of frankfurters

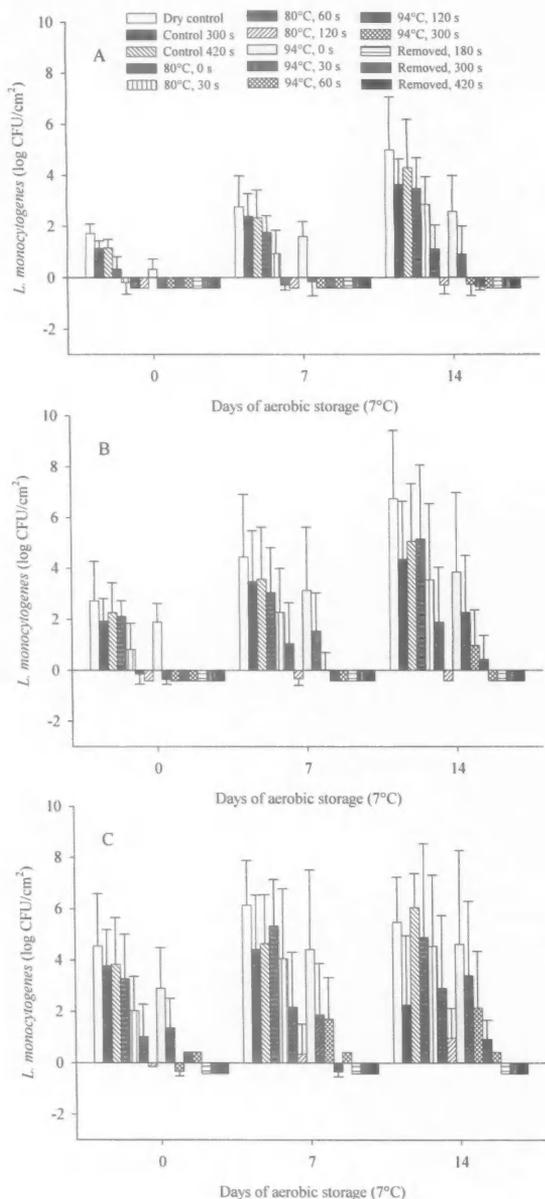
A dry control was used to evaluate changes in *L. monocytogenes* and total microbial populations on frankfurters during storage under vacuum-packaged and aerobic conditions. On day 0 (day of inoculation), *L. monocytogenes* counts on inoculated frankfurters with and without PL/SD in the formulation were 1.8 ± 0.0 and 1.7 ± 0.1 log CFU/cm², respectively. During vacuum-packaged storage (4°C), these initial numbers remained unchanged ($P \geq 0.05$) for up to 18 days on frankfurters without PL/SD in the formulation and then increased to 2.7 ± 1.5 and 4.5 ± 2.1 log CFU/cm² after 40 and 60 days, respectively (Fig. 2). Once the packages were opened and stored at 7°C, *L. monocytogenes* counts increased by 0.6 to 1.6 log CFU/cm² for every 7 days of storage (Fig. 2). Total microbial counts also increased during storage, and were comparable to those of *L. monocytogenes* (Fig. 3).

Growth of *L. monocytogenes* was inhibited on frankfurters formulated with PL/SD, under both vacuum-packaged and aerobic storage conditions (Fig. 4). Pathogen numbers on product stored for 60 days under vacuum-packaged conditions followed by 14 days under aerobic conditions were 1.2 ± 0.2 log CFU/cm² (Fig. 4); growth of total microbial populations was also inhibited (Fig. 5). These results highlight the importance of including antimicrobials in the formulation of frankfurters that inhibit growth of *L. monocytogenes* during refrigerated storage (2, 3, 8, 15), since it has been reported that consumers may store this type of product for periods of time exceeding recommendations (6), a practice that may allow for growth of *L. monocytogenes* to high numbers in the absence of inhibitors.

Effect of hot water treatments on microbial populations of frankfurters

To determine more accurately the effect of the hot water treatments on *L. monocytogenes* and total microbial populations, the rinsing effect of the water in which samples were immersed

FIGURE 2. *Listeria monocytogenes* counts on frankfurters formulated without 1.5% potassium lactate and 0.1% sodium diacetate, after treatment with hot water at 18 (A), 40 (B) and 60 (C) days of storage (4°C) in vacuum packages followed by aerobic storage (7°C) for 14 days



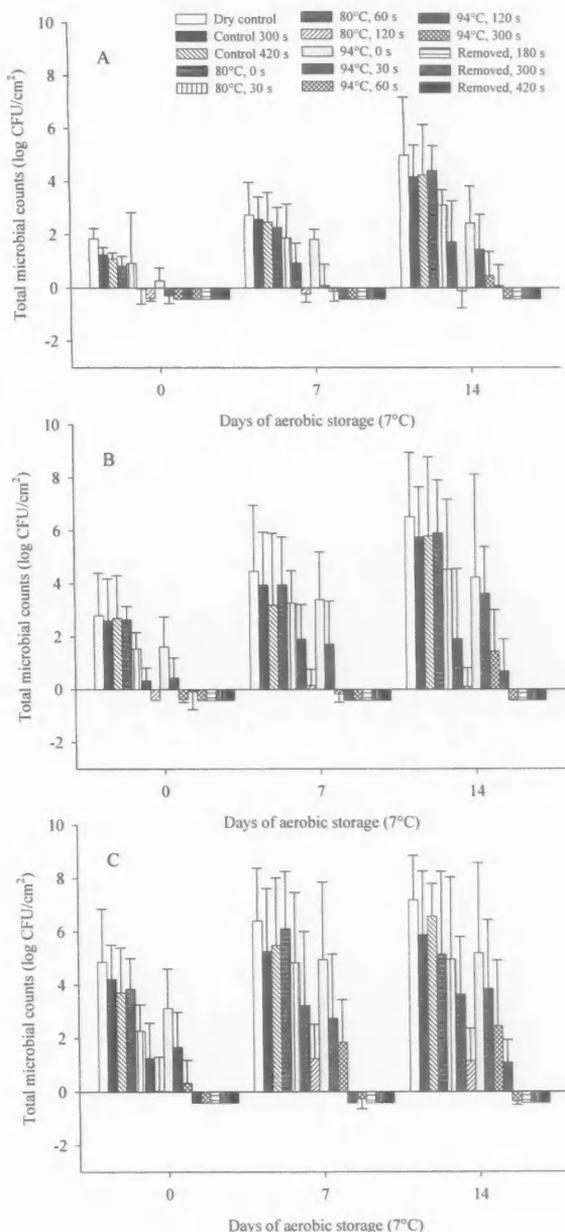
was taken into consideration by including two ambient temperature water controls: two frankfurters immersed in water at 25°C for 300 or 420 s. There was no significant difference ($P \geq 0.05$) between the counts found on frankfurters after these two control treatments; therefore,

the results and discussion presented in the following sections are based on the ambient temperature control treatment applied for 300 s, which is referred to as "control" and which is common to both product formulations (with and without PL/SD, Fig. 1).

As expected, the effectiveness of the hot water treatments applied at a constant temperature (80 or 94°C) on frankfurters formulated without PL/SD was influenced by initial counts on frankfurters, which depended on the storage conditions (vacuum vs. aerobic; 4°C vs. 7°C) and age of the product (Fig. 2). Longer storage times allowed for an increase in *L. monocytogenes* counts up to 5.3 ± 2.7 log CFU/cm² on the control (ambient temperature control, 300 s; Fig. 2). Naturally, these high numbers required longer times and/or higher temperatures to be reduced to below the detection limit (< -0.4 log CFU/cm²). Initial counts on the control of less than 3 log CFU/cm² were reduced to below the detection limit when treated for 120 s at 80°C or ≥ 60 s at 94°C. As counts on the control increased to 3–4 log CFU/cm², no treatments at 80°C were effective in reducing counts to below the detection limit, and the most effective treatments were ≥ 120 s at 94°C, with reductions of ≥ 4.2 log CFU/cm². The only treatment applied at constant temperature that reduced initial counts of > 4 log CFU/cm² to below the detection limit was 300 s at 94°C, but the pathogen was detected by enrichment in some samples (enrichment data not shown). Treatments that involved removal of frankfurters from the heat source (180, 300 and 420 s) consistently resulted in product with counts below the detection limit, regardless of initial levels, and accounted for reductions of up to ≥ 5.7 log CFU/cm²; however, some samples were positive by enrichment (enrichment data not shown). At a water temperature of 94°C, reductions achieved at 300 s were similar when the temperature was kept constant or when bowls were removed from the heat source (Fig. 2).

Treatments associated with manufacturers' recommendations ("boil for 5 min" and "place frankfurters in boiling water, remove from heat and let stand for 5–7 min"; Fig. 1) were effective in reducing *L. monocytogenes* initial counts to below the detection limit, with reductions of up to 5.7 log CFU/cm² on frankfurters without PL/SD. However, the pathogen was detected in some frankfurter samples by enrichment, indicating that these directions for reheating may potentially allow for survival of small numbers of the pathogen on product formulated without PL/SD that had been stored

FIGURE 3. Total microbial counts on frankfurters formulated without 1.5% potassium lactate and 0.1% sodium diacetate, after treatment with hot water at 18 (A), 40 (B) and 60 (C) days of storage (4°C) in vacuum packages followed by aerobic storage (7°C) for 14 days



under conditions that permitted growth to high levels ($> 5.3 \log \text{CFU}/\text{cm}^2$). Treatments of $\geq 60 \text{ s}$ at 80°C and $\geq 30 \text{ s}$ at 94°C applied to frankfurters formulated with PL/SD consistently

reduced initial counts of the pathogen (0.6 ± 0.7 to $0.9 \pm 0.7 \log \text{CFU}/\text{cm}^2$) to levels at/below the detection limit (but sometimes detectable by enrichment), regardless of storage conditions (Fig. 4).

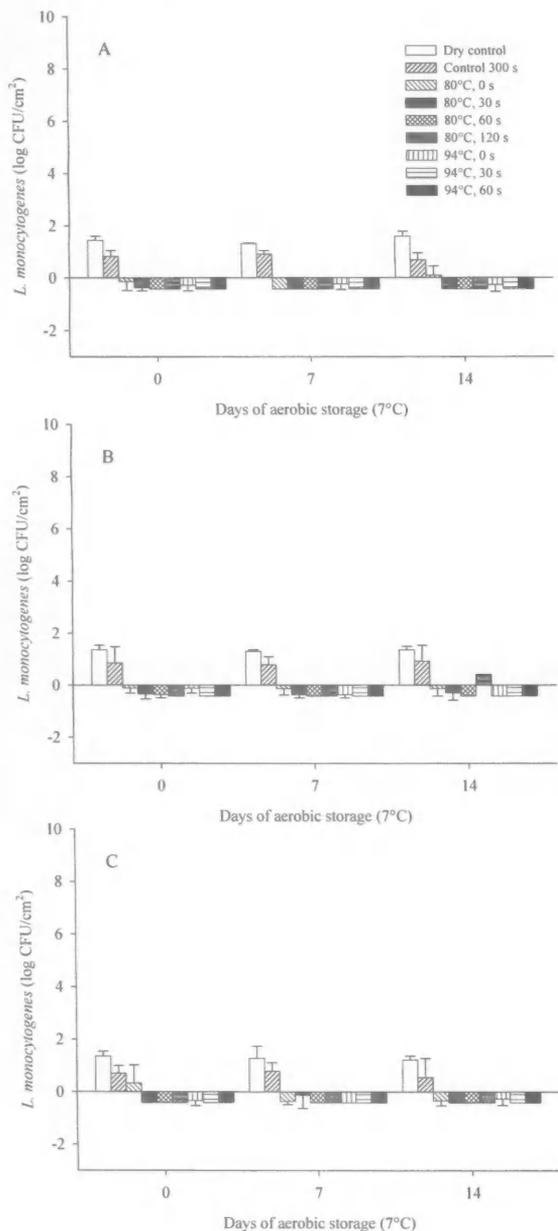
L. monocytogenes survivors in water

L. monocytogenes was detected (-0.7 ± 1.7 to $5.2 \pm 1.4 \log \text{CFU}/\text{ml}$) in the water used for the ambient (25°C) temperature water control treatments (Fig. 6), indicating that cells were transferred from the frankfurters into the water. However, no survivors were found remaining, by direct plating or enrichment, in any of the heated water samples, regardless of frankfurter formulation. It is thus important to devise treatments that destroy *L. monocytogenes*, not only on frankfurters but also in the water used for reheating, to avoid cross-contamination of the environment and other foods through the water (23).

Under the conditions of this study, results showed that *L. monocytogenes* contamination levels of $\leq 2 \log \text{CFU}/\text{cm}^2$ on frankfurters were reduced to below the level of detection ($< -0.4 \log \text{CFU}/\text{cm}^2$) with short-time exposure to hot water (at least 60 s at 94°C). However, when pathogen numbers on frankfurters increased to above $4 \log \text{CFU}/\text{cm}^2$ because of storage conditions, longer times (at least 300 s at 94°C) were needed. Treatments based on manufacturers' recommendations tested in this study ("boiling for 5 min" and "placing frankfurters in boiling water, remove from heat and let stand for 5–7 min") allowed for survival of *L. monocytogenes* detectable only by enrichment, even with initial numbers of up to $5.3 \log \text{CFU}/\text{cm}^2$. Boiling rendered water used for frankfurter reheating (at either 80 or 94°C) safe for discarding without risk of cross-contamination of other kitchen surfaces with *L. monocytogenes*.

It has been suggested that food labels are an important tool for providing consumers with critical information (4), such as reheating instructions and safe handling of the product. However, in order to provide consumers with reliable directions, cooking and reheating instructions on labels should be validated and based on scientific data. The data provided here may be useful to the industry in the development of science-based recommendations for reheating of frankfurters by consumers in their homes.

FIGURE 4. *Listeria monocytogenes* counts on frankfurters formulated with 1.5% potassium lactate and 0.1% sodium diacetate, after treatment with hot water at 18 (A), 40 (B) and 60 (C) days of storage (4°C) in vacuum packages followed by aerobic storage (7°C) for 14 days



ACKNOWLEDGMENTS

This work was supported by the National Integrated Food Safety Initiative of the United States Department of Agriculture Cooperative State Research, Education and Extension Service (agreements 2004-51110-02160 and

2005-51110-03278), and by the Colorado State University Agricultural Experiment Station.

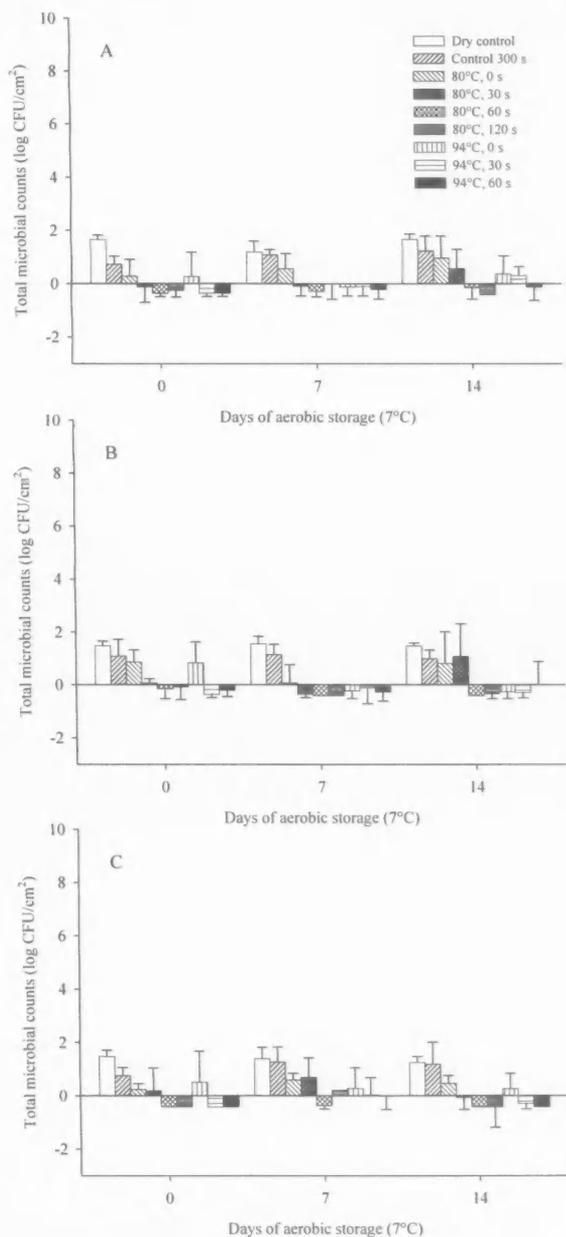
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FIGURE 5. Total microbial counts on frankfurters formulated with 1.5% potassium lactate and 0.1% sodium diacetate, after treatment with hot water at 18 (A), 40 (B) and 60 (C) days of storage (4°C) in vacuum packages followed by aerobic storage (7°C) for 14 days



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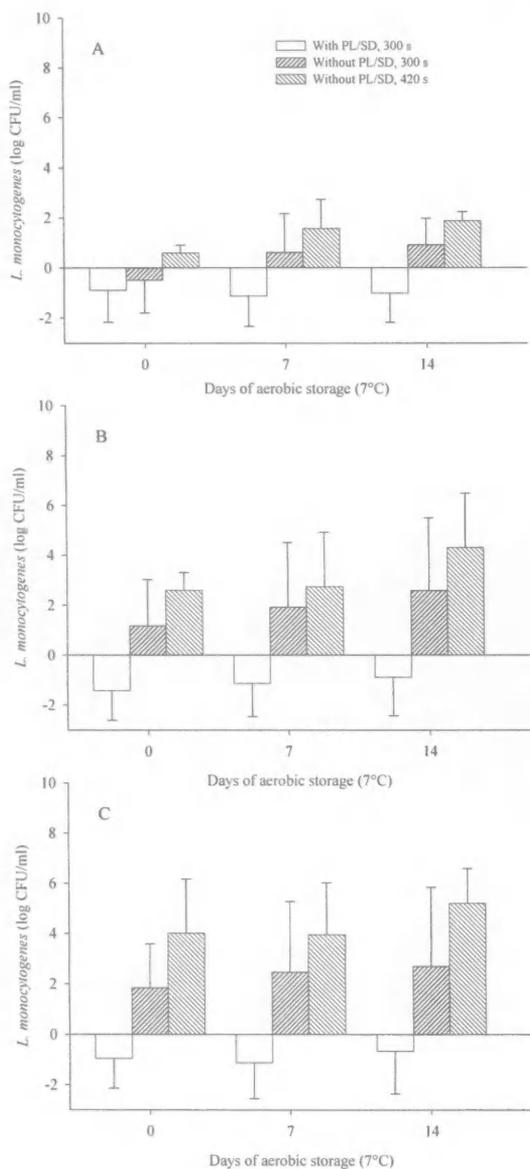
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FIGURE 6. *Listeria monocytogenes* counts in water used for ambient temperature (25°C) control treatments of frankfurters formulated with and without 1.5% potassium lactate and 0.1% sodium diacetate (PL/SD), at 18 (A), 40 (B) and 60 (C) days of storage (4°C) in vacuum packages followed by aerobic storage (7°C) for 14 days



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Optimization of Methodology to Enumerate *Lactobacillus delbrueckii* Phages

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ABSTRACT

The influence of incubation temperature, presence of calcium cations in soft-agar (double-layer plaque titration), nature of inoculum used (from broth or reconstituted skim milk, RSM) and addition of glycine on enumeration of *Lactobacillus delbrueckii* phages was studied. Assays were performed on two temperate and three virulent *Lactobacillus delbrueckii* phages. Results showed that the diverse conditions influenced the number and definition of phage plaques. The addition of calcium to the soft-agar increased (ANOVA test, $P < 0.05$) one log order the counts of all phages studied. The presence of glycine improved the definition and size of plaques for some phages, but not their counts. The origin of inoculum was important for phage Cb1/204, since plaques were more visible when an inoculum from RSM was used.

Some species of lactic acid bacteria phages are fastidious for counting, and an optimized methodology can allow overcoming this problem. This study demonstrates enhanced detection of phage particles, assuring the correctness of visualization and quantification of them.

INTRODUCTION

Bacteriophage infections are known to be one of the main causes of loss of starter acidifying activity at cheese and fermented milk factories (7, 8), leading to serious technological problems (1, 2, 4).

Economic losses due to phage infections make it necessary to detect and minimize their presence in both lab and industrial environments to reduce the attacks and obtain normal fermentations. To achieve this, an optimized methodology that allows precise enumeration and detection of lysis plaques is necessary.

The conventional method used to enumerate active phage particles is double-layer plaque titration (17). Several factors can influence the size and definition of plaques and affect phage counts. Although some phages need divalent cations (such as Ca^{2+} and Mg^{2+}) to complete the lytic cycle (11, 13, 14, 16, 18), most are able to infect bacterial cells in the absence of these ions (3, 10, 11, 14). In order to obtain the best results with the methodology used, it is fundamental that calcium is available for those systems that need it to complete the lytic cycle. Another important factor reported to obtain visible plaques is the presence of glycine (6) in the culture medium. However, the importance of glycine has not been demonstrated completely for *Lacto-*

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TABLE 1. Phages and their host strains used in this study

Phage	Phage type	Host strain
Cb1/204 ^a	Temperate	<i>L. delbrueckii</i> subsp. <i>lactis</i> 204 ^c
Cb1/342 ^a	Temperate	<i>L. delbrueckii</i> subsp. <i>bulgaricus</i> 342 ^c
BYM ^b	Virulent	<i>L. delbrueckii</i> subsp. <i>lactis</i> YSDV ^d
YAB ^b	Virulent	<i>L. delbrueckii</i> subsp. <i>lactis</i> Ab1 ^d
Ib3 ^b	Virulent	<i>L. delbrueckii</i> subsp. <i>bulgaricus</i> Ib3 ^d

^aisolated from commercial strain *L. delbrueckii* subsp. *lactis* Cb1

^bisolated from a failed manufacture of yogurt

^cwild strain isolated from natural whey starters

^dcommercial strain

FIGURE 1. Lysis plaques obtained for phage Cb1/204, using an inoculum of its host strain (*Lactobacillus delbrueckii* subsp. *lactis* 204) obtained from RSM diluted in MRS broth ($DO_{560nm} = 0.70$) and from MRS overnight diluted ($DO_{560nm} = 1$) and incubated at 34°C (A, B), 37°C (C, D) and 42°C (E, F)

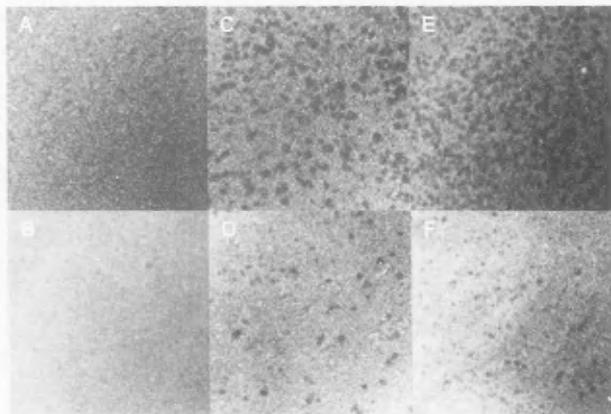
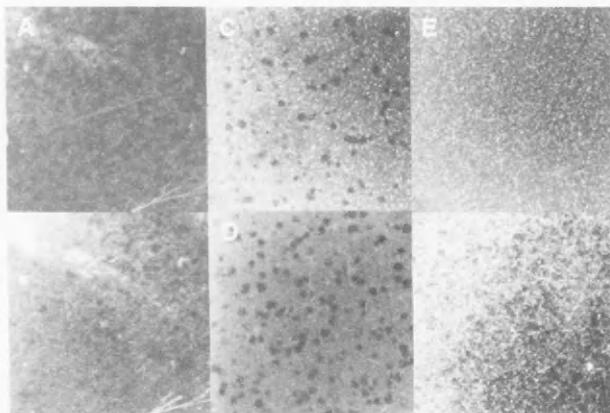


FIGURE 2. Lysis plaques obtained for phage Cb1/342, using an inoculum of its host strain (*Lactobacillus delbrueckii* subsp. *bulgaricus* 342) obtained from RSM diluted in MRS broth ($OD_{560nm} = 0.70$) and from MRS overnight diluted ($DO_{560nm} = 1$) and incubated at 34°C (A, B), 37°C (C, D) and 42°C (E, F)



bacillus delbrueckii bacteriophages, either virulent or temperate ones. In addition, growth temperature can influence the characteristics of the plaques, especially if the burst size is low. For this reason, it could be appropriate to incubate the host cells at suboptimal temperatures, providing each phage-strain system the most favorable conditions for plaque enumeration.

The aim of this study was to establish the best conditions for enumeration of *Lactobacillus delbrueckii* phages in order to optimize their counts.

MATERIALS AND METHODS

Bacterial strains and bacteriophages

Phages and their host strains used in this study are shown in Table 1. They were all isolated at INLAIN (Instituto de Lactología Industrial, Santa Fe, Argentina) from defective industrial processes of fermented milks (virulent phages Ib3, YAB and BYM) or by induction with mitomycin C (temperate phages Cb1/204 and Cb1/342) (16). *Lactobacillus delbrueckii* strains were grown and routinely reactivated overnight (42°C) in deMan Rogosa Sharpe (MRS) broth (Biokar, Beauvois, France). They were maintained as frozen (-80°C) stocks in sterile reconstituted (10% wt/vol) commercial nonfat dry skim milk (RSM). Phage stocks were prepared as described by Neviani et al. (9) and stored at 4°C (MRS broth) and -80°C (MRS broth with 15% vol/vol of glycerol).

TABLE 2. Statistical analysis (one-way ANOVA) of calcium availability influence on bacteriophage counts ($P < 005$)

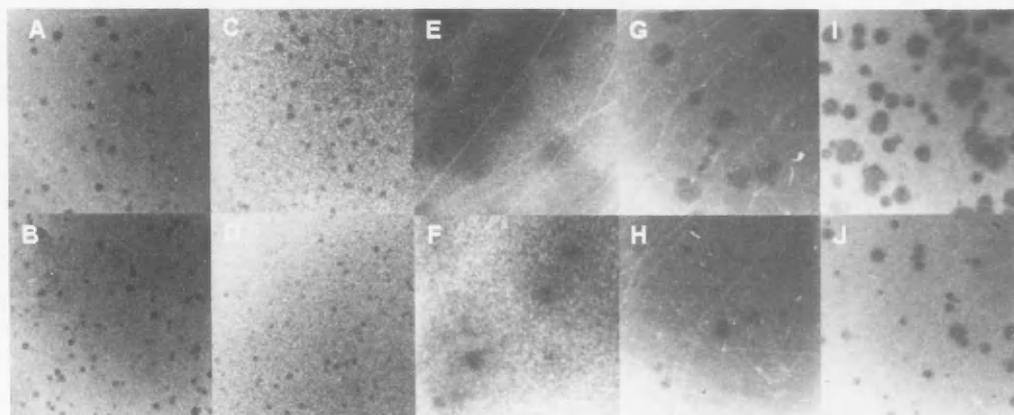
Phage	Probability level of statistic treatment (P) ^a between counts with addition of calcium in:		
	Agar and soft-agar layers vs. agar layer	Agar and soft-agar layers vs. soft-agar layer	Agar layer vs. soft-agar layer
Cb1/204 ^a	0.0264	0.6565	0.0007
Cb1/342 ^a	0.0198	0.8338	0.0337
BYM ^b	0.0263	0.6701	0.0001
YAB ^b	0.0008	0.2637	0.0001
Ib3 ^b	0.0054	0.6802	0.0159

^aTemperate phages isolated from commercial strain *L. delbrueckii* subsp. *lactis* Cb1

^bVirulent phages isolated from failed yogurt manufactures

^c $P < 0.05$ = statistically significant difference

FIGURE 3. Lysis plaques obtained with and without addition of glycine (100 mM) to MRS agar for temperate phages Cb1/342 (A, B) and Cb1/204 (C, D) and virulent phages YAB (E, F), Ib3 (G, H) and BYM (I, J)



Inoculum conditions and temperature influence

Host strains of respective phages were inoculated into plates from MRS broth and RSM (10% wt/vol) overnight cultures. The inoculum to make the enumeration from RSM was obtained after a dilution in MRS broth (final $OD_{560nm} = 0.70$), while the inoculum from MRS was obtained after a dilution in the same medium (final $OD_{560nm} = 1.05$).

Phage enumerations (plaque forming units per milliliter, PFU) were performed using the double-layer plaque titration method (17), using MRS as culture medium. Culture media were

prepared immediately before the assays. Three incubation temperatures (34, 37 and 42°C) were selected. All assays were performed in triplicate. The plaques were counted and the plates photographed to compare the size of lysis plaques.

Glycine and calcium influence

Assays were performed with and without the addition of glycine (final concentration 100 mM) in the MRS bottom layer for phage titrations (6).

The influence of calcium on bacteriophage plaque formation was studied, using the double-layer plate titration method modified as follows: MRS bot-

tom agar (1.2% w/v agar) layers with and without $CaCl_2$ (10 mM) and MRS soft (top; 0.6% w/v agar) agar layers with and without $CaCl_2$ (50 mM) were used. For these two determinations, virulent bacteriophages (Ib3, YAB and BYM) were included in the study. All tests were conducted in triplicate.

Statistical analysis

Statistical analysis was conducted using one-way ANOVA, taking a probability level of $P < 0.05$ to indicate statistical significance. This analysis was applied only to the results of tests of the influence of calcium on phage counts.

FIGURE 4. Lysis plaques obtained for phage Cb1/204, using CaCl₂ in both layers (agar and soft agar, 10 mM and 50 mM, respectively) (A), only in the bottom agar layer (B), and only in the soft agar layer (C); these conditions were the same for phage Cb1/342 (D, E and F)

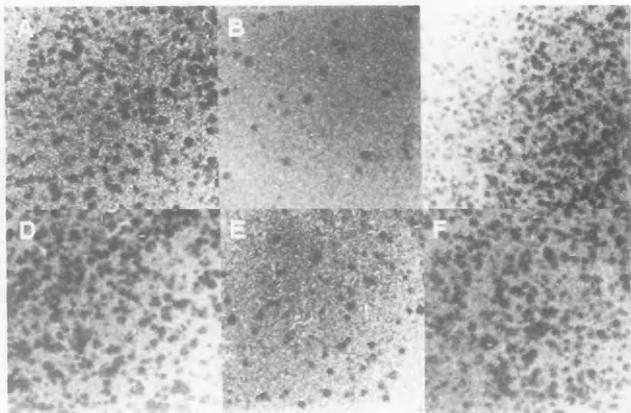
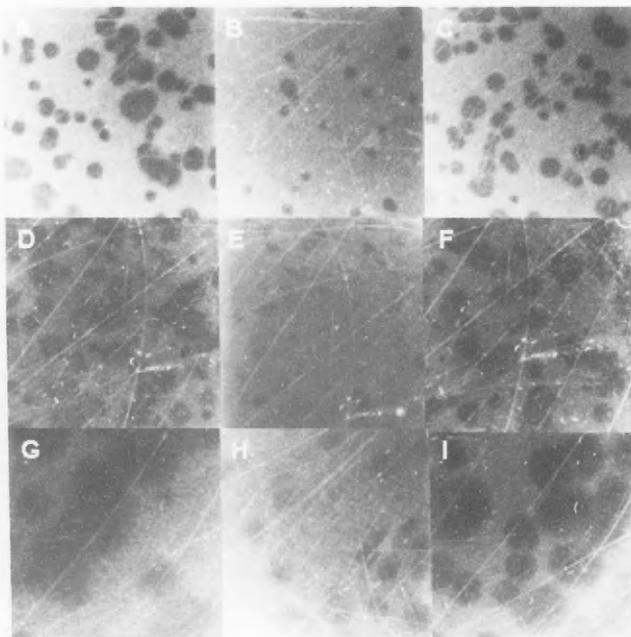


FIGURE 5. Lysis plaques obtained for phage BYM, using CaCl₂ in both layers (bottom and soft agar, 10 mM and 50 mM, respectively) (A) only in the bottom agar layer (B), and only in the soft agar layer (C); these conditions were the same for phages lb3 (D, E and F) and YAB (G, H and I)



RESULTS

The best visualization of plaques was obtained when an inoculum from a milk culture of the host strain (phage Cb1/204) (Fig. 1) and from an MRS

broth culture of the host strain (phage Cb1/342) (Fig. 2) were used. The inoculum used for phage titrations did not influence phage Cb1/342 counts. In contrast, phage Cb1/204 counts were lower when MRS cultures were used.

When plates were inoculated at 34°C, temperate phages did not produce lysis plaques. Temperatures of 37 and 42°C were favorable for enumeration of phage Cb1/204 plaques (Fig. 1), and similar counts were obtained at both temperatures. However, phage Cb1/342 revealed clearer plaques at 37°C (Fig. 2), showing slightly higher counts than those obtained at 42°C.

The presence of glycine influenced considerably the definition and size of lysis plaques for virulent phages, but not for temperate phages (Fig. 3). Plaque number was not affected by the presence of glycine, either for virulent or temperate phages (data not shown).

For all phages (temperate and virulent) the addition of calcium in the soft agar layer significantly altered their enumeration. In all cases, phage counts were at least one log order higher when calcium was used in the soft agar, whether or not the MRS agar contained calcium, in comparison to those titrations where calcium was not added to the soft agar layer (Fig. 4 and 5). Statistical analysis confirmed these differences ($P < 0.05$) (Table 2). On the other hand, we demonstrated that the addition of calcium to the bottom layer could be unnecessary, since no significant differences were observed in the counts, compared to the counts when calcium was added only to the soft layer.

DISCUSSION

In Argentina, phage control strategies are mainly used to protect thermophilic dairy starters (*Streptococcus thermophilus* and *L. delbrueckii*), which are widely used in cheese and fermented milk processes (12, 15). The double-layer plaque titration (17) is the method used worldwide as the reference for counting active phage particles. However, sometimes this methodology requires optimization, because its efficiency can vary depending upon the bacterium/phage system studied.

Several factors can affect the visualization of phage plaques and thus influence phage counts. A previous study (6) reported that the addition of glycine to the bottom layer improved the plaque size of poor plaque-producing temperate lactococcal bacteriophages. However, this variable was not tested for phages of other LAB species. In this work, the addition of glycine was tested on temp-

erate and virulent phages, demonstrating its influence on plaque size and definition in all cases, but mainly on the virulent phages studied (YAB, Ib3 and BYM). No significant effect on enumeration was observed.

A calcium ion requirement for proliferation and plaque formation for LAB bacteriophages has been demonstrated in several phage-cell systems. According to Sechaud et al. (13), Ca²⁺ (or Mg²⁺) ions not only stabilize the coiled DNA inside the phage capsid and greatly improve the adsorption rate but also regulate the penetration efficiency of phage DNA into bacterial cells. After adsorption (possibly at the DNA injection step), the divalent cations could act as counter-ions during translocation of the phage DNA across the cellular membrane (5) or be involved in DNA stabilization following the injection step. The conventional method of double-layer plaque titration uses Ca²⁺ in the support media (agarized). This study demonstrated that calcium addition to soft agar increased the availability of this cation for the bacteriophage. Significant differences in phage particle counts, of at least one log order, were found for all phages assayed. The data obtained for *L. delbrueckii* (temperate and virulent) phages studied in this work indicate the need to modify methodology for phage counting to include calcium.

In addition, the preparation of the inoculum used was important to define the methodology. The strains cultured overnight in broth and RSM were diluted in broth up to a carefully controlled OD_{560nm} value. This methodology implemented in our laboratory allowed us to increase counts of phage Cb1/204 and also to obtain more visible plaques. In contrast, for Cb1/342 phage, the MRS overnight inoculum was more suitable.

On the basis of our results, each phage/host strain system should be considered individually when performing detection and enumeration of bacteriophages. Even if all these modifications are implemented in other laboratories, at present there is no information about changes of the conventional methodology (17).

ACKNOWLEDGMENTS

This work was supported by the Universidad Nacional del Litoral (Santa Fe, Argentina) (C.A.I.+D. N° 37–200, Resolución C.S 119/06, 2006–2008) and the Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET, Argentina) (Project PIP N° 5321, 2006–2007).

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China International Food Safety & Quality Conference + Expo 2009



The Third China International Food Safety & Quality Conference (CIFSQ) + Expo was held in Beijing, China on November 4 and 5, 2009 with more than 1,000 attendees. IAFP is proud to be a supporting partner of this conference and assisted conference organizers by encouraging IAFP Members to participate in the program. In addition, many of

IAFP's corporate supporters extended their financial and physical support to this all important conference.

Katie Swanson, IAFP Secretary and David Tharp, Executive Director, represented IAFP at the conference and entertained many questions about Membership and involvement in IAFP. Formal pictures were taken with Minister Wang Yong both from the General





Administration of Quality Supervision, Inspection and Quarantine (AQSIQ). Mr. Ge Zhirong, Chairman of China Entry-Exit Inspection & Quarantine Association (CIQA) was also present to discuss cooperative efforts related to food safety. Katie and David delivered plenary presentations to attendees, providing information about IAFP and our activities.

More than 70 presentations over the two-day conference focused on ensuring global food safety through partnerships, trends in testing technologies, opportunities for collaboration between US and China, the EU-China food safety workshop, emerging food safety concerns and solutions, novel food safety management systems, among other topics. A substantial

portion of the program content was provided by IAFP Members including, T.J. Fu, Ram Rao, Les Bourquin, Kristin Woods, Hua Wang, Vihay Juneja, Jinru Chen, Julian Cox, Soo Chuah, Peter ben Embarek and Caroline Smith-DeWaal. Other IAFP Members also participated as speakers or in the exhibit hall. The World Health Organization and the Food and Agriculture Organization were also represented.

There were 42 exhibitors and sponsors for this year's event. Plans are now underway for the fourth CIFSQ Conference + Expo to be held in September of 2010. IAFP will again be an avid supporter and will continue our work of "Advancing Food Safety Worldwide."



Highlights of the Executive Board Meeting October 22–23, 2009 Des Moines, Iowa

Following is an unofficial summary of actions from the Executive Board Meeting held in Des Moines, Iowa on October 22–23, 2009:

Approved the following:

- Minutes of July 9–16, 2009 Executive Board Meeting
- For IAFP 2010, provide on-site, *JFP* citable abstract book for sale and make abstracts available for download prior to Annual Meeting
- Affiliate Charter for the China Association for Food Protection in North America

Discussed the following:

- Committee recommendations and how to restructure for 2010
- FAQ for Committee Chairs and Vice Chairs
- Organizational meeting for Pre-Harvest Food Safety PDG
- Organizational meeting for Food Defense PDG
- IAFP 2009 — review of financial results
- Annual Meeting Workshops — review of financial results
- IAFP 2009 — review of attendee and exhibitor surveys
- IAFP 2010 planning trip report
- IAFP 2010 – 3M Symposium, Foundation Fundraiser, other events
- IAFP 2013 contracts signed for Charlotte, North Carolina
- Planning for IAFP's long-range planning session, spring 2010
- European Symposium–Berlin
- International meetings updates – China, Korea, Dubai
- Future European and International Symposia — locations, logistics, partnerships

- Constitution amendment passed Membership vote
- Report on IAFP's participation in updating the APHA Compendium of Methods for the Microbiological Examinations of Foods
- Product Safety Recall Directory
- Input from professional societies — IAFP's role
- Consumer Goods Forum
- Non O157 *E. coli* white paper
- WHO-NGO update
- 3-A Sanitary Standards
- Bank signature cards updated
- IAFP Webinar efforts
- 100 year anniversary
- Investment results for 2008 and 2009 to date
- Annual Meeting future location planning

Reports received:

- *IAFP Report*
- *Food Protection Trends*
- *Journal of Food Protection*
- IAFP Web site
- Membership update
- Advertising / sponsorship update
- Financial statements
- Board Members attending Affiliate meetings
- *Affiliate View* newsletter
- Future Annual Meeting schedule
- Future Exhibiting by IAFP

Next Executive Board meeting – February 7, 2010.

SCOPE OF THE JOURNAL

Food Protection Trends (FPT) is a monthly publication of the International Association for Food Protection. It is targeted toward persons working in industry or regulatory agencies, individuals teaching in the field of food science, or anyone interested in food safety and food protection.

The major emphases include:

- news of activities and individuals in the field;
- news of the Association affiliate groups and their members;
- new product information;
- research reports as well as practical technical articles on food protection;
- excerpts of articles and information from other publications of interest to the readership.

SUBMITTING ARTICLES AND OTHER MATERIALS

All manuscripts or other acceptable material for publication should be submitted as an E-mail attachment to Donna Bahun, Production Editor (dbahun@foodprotection.org). Prospective authors with questions about the suitability of their material for publication are invited to request an opinion from the Scientific Editor.

TYPES OF ARTICLES

Readers of *FPT* are people working in the food industry and regulatory agencies, as well as teachers and researchers. *FPT* publishes a variety of papers for food safety professionals. Research and general interest manuscripts, book reviews, and short opinion papers are appropriate for publication in *FPT*. All manuscripts will be peer reviewed by experts in the related field.

Research Articles

FPT regularly publishes papers resulting from research related to various aspects of food safety and protection. These papers should be of interest to our members, whether they are in academics, industry, or government.

General Interest or Review Articles

FPT publishes papers that are of practical technical interest to most IAFFP members. These papers include topics such as the organization and application of food safety and quality control

programs, methods for solving food safety and protection problems, and experiences resulting from such activities. Presentations at affiliate and annual meetings can be adjusted to make them appropriate for *FPT* publication.

Book Reviews

Authors and publishers of books related to food safety are invited to submit their books to the Production Editor. Books will be reviewed by a specialist in the field covered by the book, and the review will be published in an issue of *FPT*.

Opinion-based Submissions

Opinion-based submissions (800–1,000 words) may be considered for publication only in "Thoughts on Today's Food Safety" columns. Full-length opinion-based articles will not be considered for publication in *FPT*.

Manuscripts of a Sensitive Nature

All involved in food production, processing, distribution, food service, and retail – including members of IAFFP are greatly concerned with bioterrorism and food defense. Manuscripts dealing with such sensitive issues are expected to approach the subject from a preventive stance and not provide a "how-to" guide. An unusually rigorous review policy governs the evaluation of manuscripts submitted for publication in journals printed by IAFFP, to minimize the possibility that use of their contents may pose a threat to the food supply.

LETTERS TO THE EDITOR POLICY

FPT invites Letters to the Editor. Letters commenting on articles printed in this publication are subject to review by the Scientific Editor before acceptance. Letters to the Editor are limited to no more than five double-spaced pages. The author of the article that is the focus of the letter is provided the opportunity to respond to the comments. This response is sent back to the author of the letter, who is then given the option of continuing with the publication process or withdrawing the Letter to the Editor. If the letter is withdrawn, neither it nor the author's response will be published. If not withdrawn, both the Letter to the Editor and the author's response will be published in their entirety. Please send all Letters to the Editor as an E-mail attachment to the Production Editor (dbahun@foodprotection.org).

PREPARATION OF ARTICLES

The Scientific Editor assumes that the senior author has received proper clearance from his/her organization and from coauthors for publication of the manuscript.

All parts of manuscripts, including references, tables, table captions, footnotes, and figure legends, must be typed, double-spaced, in at least 10-pt. type. Manuscripts must be in MS Word, WordPerfect or text formats. Page margins on all sides must be at least 1 in. (2.5 cm) wide. Lines throughout the manuscript must be numbered sequentially (i.e., not restarted on each page) to facilitate review of papers; however, final revised manuscripts must NOT have line numbers. Number all pages, including tables and figures. *FPT* uses English conventions of spelling and punctuation.

Manuscripts are divided into sections, which must be arranged in the following order:

TITLE PAGE

ABSTRACT

INTRODUCTION

MATERIALS AND METHODS

RESULTS

DISCUSSION

ACKNOWLEDGMENTS

REFERENCES

FIGURE LEGENDS

TABLES

FIGURES

Except for the Title Page and Introduction, all of these sections should have separate headings, which should appear in the manuscript worded exactly as stated above. Subheadings take the form of paragraph lead-ins. Paragraph lead-ins should be boldface and indented, and should run in with the text, separated by a period. Third-order subheadings will not be accepted.

FPT follows many of the recommendations for manuscript preparation in the *ASM Style Manual*, 2nd ed., 1991, published by the American Society for Microbiology. Authors will find useful guidance concerning scientific nomenclature, abbreviations, numbers and measurements, English, references, tables, and figures, as well as a helpful bibliography. For further reference, see *Scientific Style and Format: The CBE Manual*, 6th ed., Cambridge University Press, 1994, as well as *The Chicago Manual of Style*, 15th ed., University of Chicago Press, 2003, and the bibliographies in these guides. This information is also available at: http://md2.csa.com/ids70/serials_source_list.php?db=biolclust-set-c.

ORGANIZATION OF RESEARCH ARTICLES

Title Page

The title of the manuscript should appear at the top of the first page. It should be as brief as possible, contain no abbreviations, and be indicative of the subject of the manuscript. Avoid expressions such as "Effects of," "Influence of," "Studies on," etc.

Full names and, for each author, addresses of the institution(s) or organization(s) where the work was done should appear on the title page. When authors are affiliated with more than one department or unit within an institution or with more than one institution, superscript numbers are used to indicate each author's address. Footnotes can be used to give the present addresses of authors who are no longer at the institution(s) where the work was done. A footnote asterisk(*) should be placed after the name of the author to whom correspondence about the paper and proofs should be sent. The E-mail address and telephone and facsimile numbers of this author should be given at the bottom of the page. No text of the manuscript should appear on the title page.

Abstract

The Abstract should appear on a separate page directly following the title page and should not exceed 200 words. It should summarize the contents of the manuscript and be meaningful without the reader having to read the remaining pages. The Abstract should not contain references, diagrams, tables or unusual abbreviations.

Introduction

The Introduction should provide the reader with sufficient background information to evaluate the results of the research without an extensive review of literature. The rationale and objectives of the study should also be included.

Materials and Methods

Sufficient information should be provided to allow other researchers to repeat the experiments described in the paper. If reference is made to a method published elsewhere that is not readily available to most readers, details should be included. Sources (company, city, state or country) of chemicals, bacterial strains, reagents and equipment must be identified.

Results and Discussion

The Results section provides a synopsis of the data in text format, supported by tables and figures. Tables and figures must be numbered in the order in which they are mentioned in the text. All tables and figures must be cited in the text, but tables and figures reporting results should not be cited in the Materials and Methods section. Extensive interpretation of the results as they relate to the literature should be included.

Conclusions/Recommendations

Conclusions or recommendations based on the results should be included in this section.

Acknowledgments

Acknowledge financial and personal assistance (sources other than your institution) or any potential conflicts of interest.

References

Number and order the references alphabetically, between references and within each reference, by the last names of the authors. Order references chronologically only when all authors' names are the same. Only the first author's name and initials are inverted. All references must be cited in the text by italicized numbers in parentheses, with a space between the numbers of the references: (3, 7, 22). Journal names are italicized and abbreviated according to the style of BIOSIS. References may be made to papers that are in press, i.e., that have been accepted for publication. References for papers not yet published should be listed by the authors' names, as "submitted for publication," "accepted for publication," or "in press." The Editor reserves the option of requesting copies of such papers if needed to evaluate the manuscript in question. Examples of different types of references are given below.

Paper in journal

Byelashov, O. A., P. A. Kendall, K. E. Belk, J. A. Scanga, and J. N. Sofos. 2008. Control of *Listeria monocytogenes* on vacuum-packaged frankfurters sprayed with lactic acid alone or in combination with sodium lauryl sulfate. *J. Food Prot.* 71:728–34.

Paper in book

West, D. I., and L. B. Bullerman. 1992. Physical and chemical separation of mycotoxins from agricultural products, p. 52–57. In J. E. Smith (ed.), *Mycotoxins and animal feed stuffs*, vol. 4. CRC Press, Boca Raton, FL.

Book by author(s)

Cramer, M. M. 2006. *Food plant sanitation: Design, maintenance, and good manufacturing practices*. CRC Press, Boca Raton, FL.

Book by editor(s)

Doyle, M. P. and L. R. Beuchat (ed.). 2007. *Food microbiology: fundamentals and frontiers*. Third Edition. ASM Press, Washington, D.C.

Patent

Yee, J. J., and C. C. Hunt. 2003. Processed cheese with improved firmness using cross-linking enzymes. U.S. Pat. 7,267,831. Sept. 4.

Publication with no identifiable author or editor

Anonymous. 1998. Guide to minimize microbial food safety hazards for fresh fruits and vegetables. U.S. Department of Health and Human Services, Food and Drug Administration, Center for Food Safety and Applied Nutrition, Washington, D.C.

Unpublished data, personal and electronic communications

References citing "personal communication" or "unpublished data" are discouraged, although it is recognized that sometimes their use is unavoidable. An author may be asked to provide evidence of such

references. If the communication was done via e-mail, the citation should include the name of the person who sent the message, the date, the subject, the sender's E-mail address, and availability (if appropriate).

Notaro, J. 13 June 1994. Banned in the USA [E-mail:jnotaro@ukans.edu]. Available from: the author at Smith@odo.msos.edu.

If the subject is not available, the message should be listed as a Personal Communication.

Sofos, J. N. 3 January 2001. Personal communication [E-mail:jsfos@ceres.agsci.colostate.edu].

Web citations

Include author, date, title, availability information, and accession date.

Anonymous. 19 February 2000. Avis du Centre national de reference des Listeria de l'Institut Pasteur [press release]. Available at: <http://www.agriculture.gouv.fr/actu/doss/com190200.htm>. Accessed 27 January 2002.

U.S. Food and Drug Administration. 2008. Guidance for industry: Guide to minimize microbial food safety hazards of fresh-cut fruits and vegetables. Available at: <http://www.cfsan.fda.gov/~dms/prodgui4.html>. Accessed 15 March 2008.

Wang, S. L., and G. C. L. Chu. 2001. Evaluation of modified atmosphere packaging systems for retaining freshness of Ontario's fruit and vegetables. Available at <http://gov.on.ca/>

OMAFRA.../archives/researchfund/ofpdocs/fp4041.html. Accessed 9 November 2001.

ORGANIZATION OF REVIEW OR GENERAL INTEREST PAPERS

Review or general interest papers must have a title page and an abstract as described in the section on research articles. The remainder of the text begins with an introduction and is then divided into appropriate sections with headings and subheadings. An acknowledgment section may come at the end of the text, followed by the references as described for a research paper.

PREPARATION OF TABLES

If tables are submitted, the format must be that of Excel or Word documents. Each table, comprising the title, body, and footnotes, must be typed double-spaced on a separate page from the body of the paper. Number tables consecutively as cited in the text. The title must be brief but fully descriptive of the information in the table. Headings and subheadings must be concise; abbreviations may be used. Use no vertical rules and only three full horizontal rules: under the title, under the box heads, and at the bottom of the table. Use italic superscript letters for footnotes. Like data in columns reads down, not across. A well-organized table should be understandable without extensive reference to the text.

PREPARATION OF ILLUSTRATIONS, PHOTOGRAPHS, AND FIGURES

FPT allows liberal use of illustrations (graphics, drawings) and photographs, finding that these increase the appeal of the journal to readers. Submitted manuscripts must have all illustrations, photographs, and figures incorporated in the same electronic file as the text of the manuscript.

When electronic figures are submitted, the preferred formats are high resolution JPEG, TIFF or EPS. The following native application file formats are also acceptable: Adobe Photoshop, Adobe Acrobat, Illustrator, PowerPoint, Word, Excel, InDesign and QuarkXPress. The resolution required for halftone and color images is a minimum of 300 pixels per inch (ppi); resolution for line art should be 1,200 ppi. Please note that images in GIF format are not acceptable for printing. Digital color files must be submitted in CMYK mode.

Figure legends should be double spaced in a list on a page separate from the figures. Number figures consecutively as cited in the text. Figures containing multiple components (e.g., IA, IB, IC, etc.) should have all components on the same page, with appropriate labels. Place the figure number on the upper right hand corner of the page. Data presented in figures must not be repeated in the tables. A well-prepared figure should be understandable without reference to the text of the paper.

Photographs

Photographs that are submitted should have sharp images, with good contrast. Photographs can be printed in color, but the additional cost of doing so must be incurred by the author. Authors wishing to publish color photographs should contact Donna Bahun, Production Editor, for cost estimates.

COMMON ABBREVIATIONS

Frequently used acceptable abbreviations are given below. For further details on abbreviations, see the current edition of the ASM Style Manual. Note that a period is used with some but not all abbreviations. Abbreviations of non-SI units (e.g., atm) must be followed by the corresponding converted quantity and SI unit in parentheses: 1 atm = 101.29 kPa. (Exception: lb/in².)

ångström, Å
atmosphere, atm
base pairs, bp
British thermal unit, BTU
calorie, cal
centimeter, cm
CFU (never spelled out: colony-forming units)
cubic centimeter, cm³
day (never abbreviated)
degree Celsius, °C
degree Fahrenheit, °F
diameter, diam
enzyme-linked immunosorbent assay, ELISA

equivalent weight, equiv wt
fluid ounce, fl oz
foot (feet), ft
gallon, gal
gram, g
gravity, g
hour(s), h
inch, in
international unit, IU
intramuscular, i.m.
intraperitoneal, i.p.
intravenous, i.v.
kilocalorie, kcal
kilogram, kg
kilometer, km
lethal dose, median, LD₅₀
liter (no abbreviation)
logarithm (base 10), log
logarithm (base e), ln
lumen, lm
lux, lx
meter, m
microequivalent, µeq
microgram, µg
microliter, µl
micrometer, µm
micromole, µmol
milliequivalent, meq
milligram, mg
milliliter, ml
millimeter, mm
millimolar, mM
minute(s), min
molar, M
mole, mol
most probable number, MPN
nanometer, nm
normal, N
number, no.
parts per billion, ppb
parts per million, ppm
percent, %
PCR (never spelled out: polymerase chain reaction)
pound, lb
pounds per square inch, lb/in²
Pulsed-Field Gel Electrophoresis (PFGE)
revolutions per minute, rpm
second, s
species (singular), sp.
species (plural), spp.
specific activity, sp act
UV (never spelled out: ultraviolet)
volume, vol
weight, wt

POLICY ON COMMERCIALISM

Manuscripts submitted for consideration for publication in *FPT* are not to be used as a platform for commercialism or the promotion of branded products or services. References to branded products or services, except as may be warranted by scientific merit and research data or as are necessary for the understanding, evaluation and replication of the work described, are to be avoided. However, scientific merit should not be diluted by proprietary secrecy. The excessive use of brand names, product names, logos or trade names, failure to substantiate performance claims, and the failure to objectively discuss alternative methods, processes, products and equipment may be considered indicators of commercialism. Disclosure and acknowledgment of both funding sources and any conflicts of interest by the authors is encouraged. In general, the spirit and principles of the International Association for Food Protection Policy on Commercialism also apply to manuscripts submitted for consideration of publication in *FPT*. The Scientific Editor shall, at his or her sole discretion, determine whether a submitted manuscript violates this policy on commercialism.

REVIEW PROCEDURE

Membership of the author in the Association is not a prerequisite for acceptance of a manuscript for publication. Non-member scientists are invited to submit papers for consideration for publication. The Scientific Editor assumes that the corresponding author has received proper clearance from his or her organization and from all co-authors prior to review and publication of the paper. It is also assumed that the paper is not being considered for publication in any other journal or publication. The manuscript number assigned at the time of submission must be included for identification in all future correspondence and on the revised manuscript. Manuscripts are accepted for publication only after they have been reviewed by two or more members of the Editorial Board or by others with the requisite expertise. After review, the manuscript is returned to the author for revision in accord with suggestions made by the reviewers and the Editor. Authors can hasten publication of their papers by submitting well-written manuscripts conforming to *FPT* style and by revising and returning manuscripts promptly. If, after review of a manuscript is completed, the author chooses to withdraw rather than to revise the paper, the Scientific Editor must be notified promptly. If the author does not respond within two months after a reviewed paper is returned, the paper will be considered withdrawn. Authors are notified by E-mail when a manuscript has or has not been accepted for publication. Page proofs of accepted

manuscripts are sent to the author for correction. They should be proofread carefully according to the instructions attached and returned within four days. Authors will be charged for major revisions to their page proofs.

Authors are responsible for the scientific accuracy of their papers. *FPT* assumes no responsibility for errors made, including those that may be made in the copyediting process, or conclusions reached by authors.

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MANUSCRIPT PUBLICATION CHARGE

There are no page charges for manuscripts published in *Food Protection Trends*. All manuscripts and figures will be published in black and white. Color can be added to any manuscript for \$150 for each page on which color appears.

REPRINTS

Reprints of a paper may be ordered by the author when the page proofs are returned. Reprint orders must be received prior to the printing of the issue of the journal in which the paper is published. An appropriate form for this purpose is attached to the proofs. Paper or electronic reprints are available. The cost varies according to the number of pages in a paper and whether or not covers are ordered. No free reprints are provided.

INDEXES

Food Protection Trends is indexed in *Agricola*, *Food Science and Technology Abstracts*, and *CAB Abstracts*.

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AWARD NOMINATIONS

The International Association for Food Protection welcomes your nominations for our Association Awards. Nominate your colleagues for one of the Awards listed below. You do not have to be an IAFP Member to nominate a deserving professional. Nomination criteria is available at:

www.foodprotection.org

Nominations deadline is February 16, 2010

You may make multiple nominations. All nominations must be received at the IAFP office by February 16, 2010.

- ◆ Persons nominated for individual awards must be current IAFP Members. Black Pearl Award nominees must be companies employing current IAFP Members. GMA Food Safety Award and Frozen Food Foundation Research nominees do not have to be IAFP Members.
- ◆ Previous award winners are not eligible for the same award.
- ◆ Executive Board Members and Awards Selection Committee Members are not eligible for nomination.
- ◆ Presentation of awards will be during the Awards Banquet on August 4, at IAFP 2010 in Anaheim, California.

Contact IAFP for questions regarding nominations.



International Association for
Food Protection®

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E-mail: info@foodprotection.org

Nominations will be accepted for the following Awards:

Black Pearl Award

Award Showcasing the Black Pearl
*Sponsored by Wilbur Feagan
and F&H Food Equipment Company*

Presented in recognition of a company's outstanding commitment to, and achievement in, corporate excellence in food safety and quality.

Fellow Award

Distinguished Plaque

Presented to Member(s) who have contributed to IAFP and its Affiliates with distinction over an extended period of time.

Honorary Life Membership Award

Plaque and Lifetime Membership in IAFP

Presented to Member(s) for their dedication to the high ideals and objectives of IAFP and for their service to the Association.

Harry Haverland Citation Award

Plaque and \$1,500 Honorarium
Sponsored by ConAgra Foods, Inc.

Presented to an individual for many years of dedication and devotion to the Association ideals and its objectives.

Food Safety Innovation Award

Plaque and \$2,500 Honorarium
Sponsored by Walmart

Presented to a Member or organization for creating a new idea, practice or product that has had a positive impact on food safety, thus, improving public health and the quality of life.

International Leadership Award

Plaque, \$1,500 Honorarium
and Reimbursement to attend IAFP 2010
Sponsored by Cargill, Inc.

Presented to an individual for dedication to the high ideals and objectives of IAFP and for promotion of the mission of the Association in countries outside of the United States and Canada.

GMA Food Safety Award

Plaque and \$3,000 Honorarium
Sponsored by Grocery Manufacturers Association

This Award alternates between individuals and groups or organizations. In 2010, the award will be presented to a group or organization in recognition of a long history of outstanding contributions to food safety research and education.

Frozen Food Foundation Freezing Research Award

Plaque and \$2,000 Honorarium
Sponsored by the Frozen Food Foundation

Presented to an individual, group or organization for preeminence and outstanding contributions in research that impacts food-safety attributes of freezing.

Maurice Weber Laboratorian Award

Plaque and \$1,500 Honorarium
Sponsored by Weber Scientific

Presented to an individual for outstanding contributions in the laboratory, recognizing a commitment to the development of innovative and practical analytical approaches in support of food safety.

Larry Beuchat Young Researcher Award

Plaque and \$2,000 Honorarium
Sponsored by bioMérieux, Inc.

Presented to a young researcher who has shown outstanding ability and professional promise in the early years of their career.

Sanitarian Award

Plaque and \$1,500 Honorarium
Sponsored by Ecolab Inc.

Presented to an individual for dedicated and exceptional service to the profession of Sanitarian, serving the public and the food industry.

Elmer Marth Educator Award

Plaque and \$1,500 Honorarium
Sponsored by Nelson-Jameson, Inc.

Presented to an individual for dedicated and exceptional contributions to the profession of the Educator.

Harold Barnum Industry Award

Plaque and \$1,500 Honorarium
Sponsored by Nasco International, Inc.

Presented to an individual for dedication and exceptional service to IAFP, the public, and the food industry.



NEW MEMBERS

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Universidad Nac Rio Cuarto
Rio Cuarto, Cordoba

BELGIUM

Debby Polet
3M Belgium
Diegem

Peter Van Landschoot
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Glen Carbon

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Julie A. Curtis
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Minneapolis

Michele Perpich
3M Food Safety
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St. Paul

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MARS Petcare
Kansas City

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Riverstone Health
Billings

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Campbell Soup Co.
Camden

John L. Miller
SGS-CTS
Fairfield

Sarah Vandunk
The Brentwood Group
Kinnelon

Jianrong Zhang
Hartz Mountain Corporation
Bloomfield

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Mesquite

OHIO

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Battelle
Columbus

OKLAHOMA

Mike Sipp
Bar-S Foods
Lawton

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Bureau Veritas Certification NA Inc.
Houston

UTAH

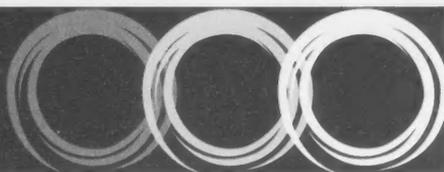
Kevin Fish
American Fork

WASHINGTON

Jeff Freshley
USDA
Seattle

Susan E. Shelton
Benton-Franklin Health District
Kennewick

WHAT'S HAPPENING IN FOOD SAFETY



2010 Crumbine Award Guidelines Released

The Foodservice Packaging Institute (FPI) released the guidelines for the 2010 Samuel J. Crumbine Award for Excellence in Food Protection at the Local Level, which annually recognizes excellence in food protection services by local environmental health jurisdictions in the United States and Canada.

Named for one of America's most renowned health officers and health educators – Samuel J. Crumbine, M.D. (1862–1954) – the award has elevated the importance of food protection programs within government departments and agencies and has inspired excellence in the planning and delivery of those services.

Entries for the Crumbine Award competition are limited to US and Canadian local environmental health jurisdictions (county, district, city, town or township) that provide food protection services to their communities under authority of a statute or ordinance. The US Uniformed Services and US Indian Health Service area programs are also invited to compete, if they are not monitored by a state, county or city health unit. Past winners may apply five years after receiving the award.

The guidelines are the basis for all Crumbine Award applications and must be followed in order to be considered for the award. The basic award criteria, by which achievement is measured, are:

- Sustained improvements and excellence, as documented by specific outcomes and achievements, over the preceding four to six years, as evidenced by continual improvements in the basic components of a comprehensive program;
- Innovative and effective use of program methods and problem solving to identify and reduce risk factors that are known to cause foodborne illness;
- Demonstrated improvements in planning, managing and evaluating a comprehensive program; and
- Targeted outreach; forming partnerships; and participating in forums that foster communication and information exchange among the regulators, industry and consumer representatives.

The winner of the award is selected by an independent panel of food protection practitioners who are qualified by education and experience to discern excellence in a program of food and beverage sanitation. They represent various interests, including leading public health and environmental health associations, past Crumbine Award winners, consumer advocates and the food industry. The jury makes its award selection each spring in a judging process administered by FPI. The application deadline for the award is March 13, 2010.

The Crumbine Award is supported by the Conference for Food Protection in cooperation with the American Academy of Sanitarians, American Public Health Association, Association of Food & Drug Officials, Foodservice Packaging Institute, International Association for Food Protection, International Food Safety Council, National Association of County and City Health Officials, National Environmental Health Association, NSF International and Underwriters Laboratories, Inc. For more information about the Crumbine Award, including the 2010 award guidelines, go to FPI's Web site at www.fpi.org.

(in the "Awards" section); or contact Lynn Dyer at FPI by phone at 703.538.3551 or by E-mail at ldyer@fpi.org.

USDA Report Reveals Highest Rate of Food Insecurity Since Report Was Initiated in 1995

USDA's Economic Research Service's (ERS) has released its annual report on Household Food Security in the United States, which revealed that in 2008, 17 million households, or 14.6 percent, were food insecure and families had difficulty putting enough food on the table at times during the year. This is an increase from 13 million households, or 11.1 percent, in 2007. The 2008 figures represent the highest level observed since nationally representative food security surveys were initiated in 1995. The full study is available at www.ers.usda.gov/features/householdfoodsecurity/.

"The Obama Administration has put in place unprecedented measures to promote job creation and combat hunger in our Nation, a problem that the American sense of fairness should not tolerate and American ingenuity can overcome," said Agriculture Secretary Tom Vilsack. "The Department of Agriculture's nutrition assistance programs provide a safety net that improves food access to those with critical needs, but addressing the root of hunger requires a broader strategy. By improving access to federal nutrition programs and working with our partners at all levels of government and society, we can make progress in our effort to reduce and eventually eliminate childhood hunger."



This year's report also reveals that one third of food insecure households had very low food security (food intake of some household members was reduced and their eating patterns disrupted at times during the year). This is 5.7 percent of all US households or about 6.7 million. This is up from 4.7 million households (4.1 percent) in 2007, and the highest level observed since nationally representative food security surveys were initiated in 1995.

Even when resources are inadequate to provide food for the entire family, children are usually shielded from the disrupted eating patterns and reduced food intake that characterize very low food security. However, children as well as adults experienced instances of very low food security in 506,000 households (1.3 percent of households with children) in 2008, up from 323,000 households (0.8 percent of households with children) in 2007.

The fundamental cause of food insecurity and hunger in the United States is poverty — marked by a lack of adequate resources to address basic needs such as food, shelter and health care. The Obama Administration has taken aggressive action on these fronts through the expansion of critical services for Americans most in need. The historic investments of the American Recovery and Reinvestment Act of 2009, with a focus on long-term job creation, are a major part of this effort. The Recovery Act provides tax relief for working families, job training, unemployment insurance, income support and affordable housing to needy Americans and their children.

A central part of the Recovery Act included a significant increase in nutrition assistance benefits for the 36.5 million people (half of whom are children) who participate

in USDA's Supplemental Nutrition Assistance Program (SNAP), formerly the Food Stamp Program. It also provides resources to the state agencies that administer the program, helping them to deal efficiently with increased caseloads.

"As the Obama Administration works to foster a robust recovery for all, it's important to recognize that we have another opportunity to improve the health and nutrition of our children when Congress begins to debate the Child Nutrition Reauthorization. It is vital that we make it easier for families and administrators to bring eligible children into the program and to eliminate gap periods when children struggle to find the nutrition assistance they need — at breakfast, during summer, and in after-school settings," said Mr. Vilsack.

USDA's National School Lunch program serves 31 million children a healthy meal each school day — for some children in need, this is their most important meal that day. USDA is working with states to increase the use of technology to make low-income children whose families already receive SNAP automatically certified for free school meals and to promote policies that make it easier for eligible families to participate in SNAP. Also, the Special Supplemental Nutrition Program for Women, Infants and Children, or WIC program, ensures mothers and their children have access to nutritious options as well. Nearly half of all infants in this country participate in WIC.

"During challenging economic times, the pool of those in need of vital food assistance expands. USDA's role — along with our partners — is to ensure individuals do not fall through the cracks, and can access nutritional services with dignity and respect," said Mr. Vilsack.

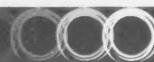
NSF International Becomes First North American Certification Body to Receive ANSI Accreditation for Both BRC and SQF Standards

NSF International has announced that it is the first organization in North America to obtain both British Retail Consortium (BRC) and Safe Quality Food (SQF) accreditation from the American National Standards Institute (ANSI). This accreditation from ANSI, the authority on US standards and conformity assessment systems, expands the scope of NSF's Global Food Safety Initiative (GFSI)-recognized accreditation to include BRC, enabling NSF to help more companies throughout the food supply chain strengthen their quality assurance programs.

GFSI has emerged as a way to better address the safety and quality of the global food supply. NSF offers certification to GFSI-benchmarked food safety standards, such as BRC and SQF. These global food safety certification systems promote consistency across the supply chain and provide independent certification that a product, process or service complies with international, regulatory and other specified standards.

BRC, a GFSI-benchmarked food safety standard developed by the British Retail Consortium, integrates Hazard Analysis Critical Control Points (HACCP) systems, factory environment, process control, quality management system, product control and personnel training. Adding BRC accreditation through ANSI enables NSF to provide clients with the food safety certification services they need to compete in today's global marketplace.

Also recognized under the GFSI-benchmarked standards, SQF is designed to provide certification that food safety and quality management systems comply with international and domestic food



safety regulations. NSF International is recognized by the SQF Institute as an approved certification body and accredited by ANSI to provide SQF certifications. NSF was one of the first certifiers to receive SQF accreditation from ANSI.

Receiving ANSI accreditation to both BRC and SQF illustrates NSF's commitment to excellence in certification program management with BRC, SQF and other global food safety standards.

"NSF has trained over 38 new auditors to BRC and SQF over the last 18 months and is now in the unique position to offer audits a few weeks out rather than several months out. This proactive approach helps address the audit availability issue that the demand for GFSI-benchmarked audits has far exceeded the supply of available auditors," said Tom Chestnut, vice president, Supply Chain Food Safety and Quality.

To achieve BRC accreditation, NSF underwent a field audit review and a quality systems process audit at NSF headquarters in Ann Arbor, Michigan. The activities included the review of documentation, records, personnel qualifications, training programs, as well as extensive interviews with NSF staff.

"BRC is very pleased to work with NSF as a key partner in satisfying the demand for the BRC Global Standard for Food Safety," said John Kukoly, senior technical marketing representative in North America for BRC. "Our accredited certification bodies, like NSF, have stepped up to the challenge of providing qualified auditors for this program, as its popularity in the Americas continues to increase. We are proud to recognize NSF for their work and dedication to the BRC program."

NSF also offers certification to other food safety standards, including GlobalGAP (Good Agricultural Practices), International Food Standard (IFS), Food Safety System Certification (FSSC), among oth-

ers. NSF lead auditors have been trained and qualified in each of these standards and specialize in specific food areas.

FDA Statement on *Vibrio vulnificus* in Raw Oysters

Several weeks ago, the FDA announced its intent to change, by summer 2011, its policy regarding the post-harvest processing of raw Gulf Coast oysters harvested in the warmer months. The intent of this change in policy, which would affect about 25% of the total annual harvest, would be to substantially reduce the number of Americans who suffer severe and painful illness and death from the *Vibrio vulnificus* bacteria. The FDA's announced change in policy was modeled on a successful California initiative that was implemented in 2003.

As a public health agency, the FDA is committed to identifying reasonable and workable approaches to reduce unnecessary suffering and death from preventable causes. The FDA staff work every day with state and local counterparts around the country to stop outbreaks of all types of infectious disease. Illnesses from bacteria like *Vibrio vulnificus* are particularly important to prevent because they can cause loss of skin, kidney failure, amputations, excruciating pain, and death.

Since making its initial announcement, the FDA has heard from Gulf Coast oyster harvesters, state officials, and elected representatives from across the region about the feasibility of implementing post-harvest processing or other equivalent controls by the summer of 2011. These are legitimate concerns.

It is clear to the FDA from our discussions to date that there is a need to further examine both the process and timing for large and small oyster harvesters to gain access to processing facilities or equivalent controls in order to address this important public health goal. Therefore, before proceeding, we

will conduct an independent study to assess how post-harvest processing or other equivalent controls can be feasibly implemented in the Gulf Coast in the fastest, safest and most economical way.

While this study is ongoing, the FDA will continue to reach out to state authorities and the Gulf Coast industry to discuss their concerns about the agency's policy and measures the industry is pursuing to make oysters safer. The FDA is committed to assisting local farmers in the implementation of post-harvest processing through all possible means.

The agency looks forward to working with Gulf Coast officials and industry to accomplish the goal of protecting consumers from *Vibrio vulnificus* in a manner that is feasible and minimizes impacts on the oyster industry.

Some actions that the FDA will undertake over the next weeks and months include:

1. Continuing to discuss future collaboration with the Interstate Shellfish Sanitation Conference to address *Vibrio vulnificus* in the region, including discussing the scope of needed studies, and meeting with the Board in March 2010.
2. Working in conjunction with the National Marine Fisheries Service, the FDA will offer technical assistance to facilitate implementation of post-harvest processing or equally effective alternatives, including:
 - a. Validation of processing parameters that can be applied to post-harvest processes to achieve non-detectable levels of *Vibrio vulnificus*, while also preserving acceptable taste and texture, and ensuring that this information is in the public domain so



- that all processors can use it.
- b. Studying alternatives to post-harvest processing, including off-shore relaying in which oysters are harvested and moved to salty waters where the high salinity kills *Vibrio vulnificus*.
 - c. Providing technical assistance to firms in development of their post-harvest processing processes and HACCP plans.
3. The FDA will work with other federal agencies, such as the USDA and the National Oceanic and Atmospheric Administration in the Department of Commerce to review what types of grants and other forms of economic assistance may be available to support establishment of processing cooperatives or other mechanisms to ensure widespread access to post-harvest processing facilities.
 4. As USTR and the oyster industry work to foster wider access to international markets that are now closed because of concerns about *Vibrio vulnificus*, FDA's new approach should provide public health and science data to support the safety of these products for human consumption in the US and abroad.

First Ingredient Distributor to be NSF GMP Certified

American Ingredients, Inc., a subsidiary of Pharmachem Laboratories, Inc., and supplier of premium ingredients to the dietary supplement and food industries announced that it has received Good Manufacturing Practices (GMP) certification for its

facility in Anaheim, CA. American Ingredients is the first ingredient distributor to be GMP certified by NSF International following a site inspection.

GMPs for the NSF Dietary Supplements Program are included in NSF American National Standard 173: *Dietary Supplements*, the only American National Standard for dietary supplements, and are consistent with the requirements that the Food and Drug Administration (FDA) has included in 21 CFR § 111. GMPs provide guidelines that cover every aspect of manufacturing, including facility design and maintenance, raw material specification and control, supplier qualification, product design and testing, employee training, process control and finished product release. These guidelines provide a system of processes, procedures and documentation to assure the product manufactured has the identity, strength, composition, quality and purity that appears on the product label.

"The NSF GMP certification program is one of the more recognizable and comprehensive audit programs in our industry," said George Joseph, vice president/general manager. "We are very proud to have successfully completed their stringent audit and to have been awarded this certification. Our customers can be assured that American Ingredients is committed to meeting all of the new FDA GMP regulations that govern our industry and have confidence that all raw materials purchased from our facility have been qualified and verified."

FMI Presents Lifetime Achievement Award to National Grocers Association's Tom Zaucha

Food Marketing Institute (FMI) recognized Tom Zaucha, president and chief executive officer of the National Grocers Association (N.G.A.) with a lifetime

achievement award for more than 40 years of stellar service to the food industry, including 27 years at the helm of N.G.A. FMI President and Chief Executive Officer Leslie G. Sarasin presented the award to Mr. Zaucha at the FMI board of directors' meeting in Toronto, Canada in October.

"Tom's leadership has enriched the industry in countless ways. His support for the entrepreneurs who innovate and help set the standard for customer service is a significant accomplishment," said Ms. Sarasin.

"In my short time at FMI, it has been my pleasure to work closely with Tom to increase the cooperation between N.G.A. and FMI. The success of the Washington Public Policy Conference is the result of our organizations coming together and partnering on issues important to the industry," she said.

Mr. Zaucha has represented virtually every segment of the food industry, beginning at the National Canners Association where he oversaw government and industry relations. He also spent time as the director of public affairs at the National Association of Food Chains and held a similar position at A&P.

In 1978 he moved to the wholesale side of the industry, where he became the president of the Cooperative Food Dealers Association (CFDA). He understood the interdependence of retailers and wholesalers and was instrumental when he became the founding president and chief executive officer of NGA in 1982 — a merger that joined CFDA with the National Association of Retail Grocers of the US.

"Under Tom's leadership, N.G.A. has become a champion and guardian of independent food retailers, helping preserve one of our industry's most precious assets," said Ms. Sarasin who also noted Mr. Zaucha's plans to retire next year. "Tom is leaving a strong and lasting legacy."



NCFST Director to Become New Chief of Food and Nutritional Sciences at Australia's CSIRO

The National Center for Food Safety and Technology (NCFST), Illinois Institute of Technology (IIT), has announced that Martin Cole, Ph.D., director, will be leaving NCFST to become chief of the Commonwealth Scientific and Industrial Research Organization's (CSIRO) Division of Food and Nutritional Sciences (FNS) in Sydney, Australia. He will begin his duties in January 2010.

During his five-year tenure at NCFST, Dr. Cole directed the center's day-to-day staff and activities and shepherded the implementation of strategic operational plans and food safety and nutrition research. Under his leadership, NCFST experienced steady growth in industry membership, graduate student enrollment, and published research publications and projects. Dr. Cole also facilitated expansion of NCFST's capabilities through the opening of the Clinical Nutrition Research Center, the introduction of a BSL-3 laboratory and biocontainment plant, as well as helped drive the consortium's collaborative development of a novel food safety technology, pressure-assisted thermal sterilization (PATS), which garnered FDA acceptance in February 2009.

Before joining NCFST in 2004, Dr. Cole was based at Food Science Australia (FSA), a joint venture between CSIRO and the Victorian State Government and the predecessor to FNS, for nearly six years. His time at FSA included 15 months as acting CEO. CSIRO established FNS in July in a new research collaboration with the Victorian State Government to continue the research capability and portfolio operated by FSA.

"I have been tremendously honored to be a part of the Center's long-tradition of collaborative scientific excellence," said Dr. Cole. "While at NCFST, my goals have included helping the organization reach a new level of excellence to protect and enhance public health objectives in food safety and nutrition. I am proud of the strides we've made in the last five years, and I will miss the terrific staff, members and colleagues who have been such an instrumental part of the Center's growth and successes. Their dedication is one of the reasons I believe that NCFST is on track for continued success as a leader in collaborative food science research."

DPC® Elects New Board and Honorary Life Members at the 2009 Annual Meeting

The Dairy Practices Council® held its annual meeting at the Holiday Inn Express & Suites, Latham, NY, November 4-6, 2009.

There were members from Canada and 24 States in attendance. The International Milk Haulers Association held their Board Meeting in conjunction with the DPC® meeting.

Longtime member and past DPC® Executive Vice President Terry Musson was honored by the Board and membership with Honorary Life Membership. Mr. Musson also received a special award for his eleven-year service as DPC® executive vice president.

New Board Members were elected. Michael Schutz, Purdue University was elected president, replacing outgoing president Don Breiner. Rebecca Piston, HP Hood, LLC was elected vice president. Patrick Healy, milk market administrator, was elected to the Board to replace the position vacated by Kelly Wedding. The remainder of the DPC® Board are: Ellen Fitzgibbons, MA Dept. of Public Health; Chris

Thompson, KY Division of Regulatory Services; Greg Leach, Losurdo Foods; Neil Bendixen, Dairy Marketing Services; Meile Brewster, Charm Sciences, Inc.; Lloyd Kinzel, Food and Drug Administration; Chuck Boeneke, Louisiana State University; Robert Peters, University of Maryland and, Joseph Zulovich, University of Missouri.

The president appointed one new Task Force director with the Executive Board consent. Dan Scruton, VT Agency of Agriculture, Food, and Markets was appointed director of the Small Ruminants Task Force VI, replacing outgoing director, Lynne Hinckley.

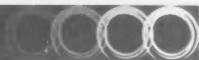
The remainder of the DPC® Task Force directors are: Task Force I Robert Graves, The Pennsylvania State University; Task Force II John Partridge, University of Michigan, Task Force III Nancy Carey, Cornell University, Task Force IV Philip Wolff, USDA, and Task Force V Miles Beard, IBA Inc.

Craig Herkert Elected to FMI Board

Food Marketing Institute (FMI) has announced the election of Craig Herkert, president and chief executive officer of SUPERVALU INC. to the FMI board of directors.

"Craig's involvement with FMI will help all our businesses thrive thanks to his facility in leading change and his tremendous energy," said Leslie G. Sarasin, FMI president and chief executive officer. "He is a wonderful addition to the FMI Board of Directors and we look forward to working with him."

Mr. Herkert joined SUPERVALU in 2009 from Walmart, where he served as president and CEO of the Americas. Prior to joining Walmart, Herkert spent 23 years with American Stores and Albertsons. He was executive vice presi-



dent of marketing for Albertsons and previously served as president of Acme Markets. He began his career in food retail as a teenager employed at Jewel-Osco in Chicago.

Mr. Herkert holds a master's of business administration from Northern Illinois University and a bachelor's degree in marketing from St. Francis College in Joliet, IL.

Land O'Frost Vice President of Research Receives Scientific Achievement Award from American Meat Institute Foundation

Land O'Frost has announced that its Vice President of Research John Butts, Ph.D., was honored with the American Meat Institute Foundation's prestigious Scientific Achievement Award.

Throughout his 35 year career at Land O'Frost, Dr. Butts has been leading the company and the meat industry in food safety efforts. Dr. Butts developed the "Seek and Destroy" process for investigating sanitation and sanitary design problems, which has been adopted industry wide.

"We are extremely proud of John Butts' achievement and recognition for this highly esteemed award. His contributions to improving food safety technology and practices makes John a valuable asset to not only just Land O'Frost, but also the industry as a whole," said David Van Eekeren, president of Land O'Frost. "Food safety has always been a priority for Land O'Frost. John's dedication and knowledge in food safety has helped us become one of the leading lunchmeat brands on the market today."

In late '80s, Dr. Butts introduced a pasteurization step and a one-way product process that separated the raw and ready-to-eat areas of the plant. Through Butts' leadership, Land O'Frost implemented Hazard Analysis Critical Control Points (HACCP) years before it became mandated by USDA.

Dr. Butts served as chairman of the American Meat Institute's (AMI) Scientific Affairs Committee from 2001 to 2003, co-authored AMI's *Listeria* Prevention and Control Program and is a regular and well-respected instructor for the AMI's *Listeria* Intervention and Control Workshops. He serves on the AMI Inspection Committee, AMIF Research Advisory Committee and served on the AMI Facility Design Task Force.

AACC International Installs New Board Members for 2009-2010

AACC International installed its new board members at the conclusion of the association's annual meeting, held in September 2009, in Baltimore, MD.

Barry McCleary, president-elect, is founder, owner, and CEO of Megazyme International Ireland Limited. He is also an adjunct professor of agriculture, food, and natural resources at the University of Sydney. His research has focused on the use of enzymes to modify, characterize, and measure carbohydrate polymers, and the development of improved methods for measurement of enzyme activity and various components of cereals, fruits, and foods that dictate quality.

Rodney Booth, director, is the managing director of Newport Scientific Pty. Ltd., a scientific instrument developer and manufacturer located in Sydney, Australia. He established Newport Scientific in 1985 to commercialize the RVA. Mr. Booth and Newport Scientific (now a part of Perten Instruments, Sweden) continue to develop new instruments and applications in the field of cereal chemistry.

Lydia Tooker Midness, director, is vice president of research and development, and nutrition and regulatory for Cereal Partners Worldwide—a joint venture between Nestlé S.A. and General Mills Inc., headquartered in Lausanne, Switzerland. She is a registered dietitian and previously held positions in nutritional patient care and food service. Ms. Tooker Midness is also active in a number of professional and community-based organizations and is currently vice president of the European Breakfast Cereal Association (CEEREAL).

Khalil Khan began his term as AACC Intl. president at the conclusion of the annual meeting. Khan is a professor in the Department of Cereal and Food Sciences at North Dakota State University, Fargo, ND, where he is involved in teaching and research on wheat proteins in relation to structure-function relationships in bread and pasta-making.

Other members of the 2009-2010 board include: Mary Ellen Camire, chair of the board; Laura Hansen, treasurer; Gerard Downey, director; Craig Morris, director; Maureen Olewnik, director; and Sergio O. Serna-Saldivar, director.

INDUSTRY PRODUCTS



Biohit Inc.

Get Safer, More Accurate Pipetting from Biohit!

Biohit has introduced its new SafetySpace™ Filter Tips that provide better accuracy and safety in pipetting.

The unique SafetySpace Filter Tips have more space between the sample and the filter than conventional filter tips. With SafetySpace Filter Tips the user does not need to worry about the sample touching the filter regardless of the pipetting technique or type of liquid being handled.

When using SafetySpace Filter Tips the user gets accurate and precise results even with foaming liquids like buffers and proteins. Unlike other filter tips on the market, SafetySpace Filter Tips are also suitable for reverse pipetting as well as for multiple dispensing with electronic pipettes.

Biohit's SafetySpace Filter Tips have been designed to meet high quality and purity demands. They are an ideal tool for any scientist and particularly useful in molecular biology, microbiology and cell culture applications, as well as radioactive work.

The SafetySpace Filter Tip range covers seven different sizes from 10 µl up to 1200 µl, packed in color-coded single tray boxes. The tips are certified DNase, RNase and endotoxin free and are pre-sterilized. They are compatible with all Biohit pipettes and most other pipette brands.

Biohit Tips are made of ecologically friendly polypropylene according to strict quality and environmental standards.

Biohit Inc.
800.922.0784
Neptune, NJ
www.us.biohit.com

Onset Announces Measurement and Verification System

Onset, a supplier of data loggers, has announced the HOBOWare® Measurement & Verification System, a portable energy logging system for measuring, analyzing and documenting building energy performance.

The self-contained kit makes it convenient and economical for energy performance contractors, energy consultants, and building energy managers to track the performance of building systems, such as chillers and packaged HVAC units, and verify the impact of energy efficiency improvements.

"Due to the large amount of energy efficiency-related dollars being distributed through the American Recovery and Reinvestment Act, regulators are demanding greater accountability when it comes to building energy performance data," said Frank Deshaies, product marketing manager for Onset. "The new HOBOWare Measurement & Verification System provides everything an energy engineer needs – straight out of the box – to handle a variety of M&V projects with a great deal of accuracy and reliability."

The system, which is housed in a rugged, heavy-duty carrying case, provides pre-wired sensors for quick set up, and includes magnetic mounting feet for fast, secure placement in electrical panels.

Users can plot and analyze energy performance data with the accompanying HOBOWare® software. HOBOWare provides an intuitive, graphical user interface that enables users to quickly and easily graph, analyze and print data files, as well as export the data to Microsoft Excel and other spreadsheet programs.

The HOBOWare Measurement & Verification System is available in both single-phase and three-phase models. Both models include a 4-channel HOBOWare Micro Station data logger, energy sensors, software, and associated cables and accessories.

Onset Computer Corporation
800.564.4377
Bourne, MA
www.onsetcomp.com

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

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INDUSTRY PRODUCTS



Torrey Pines Scientific, Inc.

New 5-Position Stirring Hot Plate from Torrey Pines Scientific, Inc.

Torrey Pines Scientific, Inc. announces its new 5-position Model HS15 stirring hot plate with individual stirring control for each vessel.

The large 12" (30.48 cm) square ceramic heater top has a temperature range to 450°C. The unit can heat and stir 5–800 ml beakers. Stirring range is from 100 to 1500 rpm.

The unit measures 19" (43.2 cm) deep by 12.5" (31.75 cm) wide by 5.25" (13.4 cm) tall. It can support more than 50 pounds (22.6 kg) on the plate surface, and the chassis is designed to keep spills out of the interior of the unit.

All controls are mounted well in front of the heater surface to protect against accidental burns.

The HS15 is available in 100VAC/50Hz, 115VAC/60Hz, 220VAC/60Hz and 230VAC/50Hz. It is fused for safety and is supplied with user's manual and detachable line cord for the country of use. It is UL, CSA and CE or equivalent rated.

Torrey Pines Scientific, Inc.
866.573.9104
San Marcos, CA
www.torreypinesscientific.com

Eriez' E-Z Tec® DSP Narrow Profile Liquid Line Metal Detectors Provide Protection from Contamination and Equipment Damage

Eriez' E-Z Tec® DSP Narrow Profile Liquid Line Metal Detectors are used to detect the presence of ferrous, nonferrous and stainless metal contaminants in viscous products such as liquids, slurries, syrups, pastes and many other pumped materials.

Besides enhancing product purity, Eriez® Liquid Line Systems can protect vital downstream equipment from metal in the product stream, thereby reducing machinery downtime and maintenance costs.

When metal is detected in the product flow, a reject signal is channeled to one of the available output relays. The output relay can be used to activate a ball valve, control a visual or audio alarm or send a signal to a PLC.

Complete systems can be provided in pipe sizes ranging from one-inch (25 mm) to six-inch (150 mm) diameter.

Eriez
888.300.ERIEZ (3743)
Erie, PA
www.eriez.com

Nucor Steel Improves Worker Hearing Protection with New Howard Leight Technology

Though most companies are committed to employee hearing conservation programs, many still struggle to obtain a true assessment of the specific effectiveness of their efforts – and of the individual hearing protection products they deploy – on a worker-by-worker basis.

A new free case study, "Nucor Provides Measurable Worker Hearing Protection with Howard Leight Technology" details how Nucor Steel is using new state-of-the-art VeriPRO® earplug fit testing technology from Howard Leight® to evaluate whether each individual employee is receiving optimal on-the-job hearing protection.

The case study is available free to download from: <http://www.hearforever.org/nucor>.

"You could look at an earplug and the NRR rating on it but you weren't actually sure which earplug gave the best protection for a specific individual," explained Randy Cooper, site manager of safety, health, and security at Nucor Corporation complex in Huger, South Carolina.

"There was never a way to actually measure the fit and ultimately workers risk hearing loss while companies risked monetary damages and potential regulatory citations," he said.

VeriPRO measures attenuation of earplugs by having the user balance tones presented to each ear at easily-heard levels. This means there is no need for a sound booth or quiet room. Accurate VeriPRO earplug fit testing can even be administered in moderate background noise.

At Nucor, the reportable Personal Attenuation Rating (PAR) measurements, provided by VeriPRO aid managers with the transition to the EPA's recent Noise Reduction Rating (NRR) change from a fixed number to a range.

In addition, the VeriPRO earplug fit testing system also lets Nucor managers determine whether employees are receiving optimal protection, require additional training on earplug fit testing, or should try a different model.

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

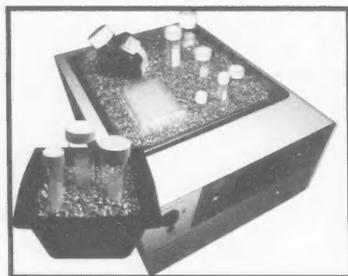
INDUSTRY PRODUCTS

The case study details Nucor's use of VeriPRO technology to:

- Obtain objective data to fit the best earplugs for each employee
- Provide breakthrough measurement of in-ear noise exposure on the job
- Document information to help prevent worker compensation claims
- Improve resources for the company's hearing protection and successful Hearing Conservation Programs

Download the free case study, "Nucor Provides Measurable Worker Hearing Protection with Howard Leight Technology" at <http://www.hearforever.org/nucor>.

**Howard Leight/Sperian
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800.430.5490
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Lab Armor, Inc.

Lab Armor Introduces Their New Bath Armor™ Bath

Lab Armor™ has introduced their new Bath Armor™ Beads. The eco-friendly and low-maintenance

metallic beads that replace water in water baths, aluminum blocks in dry baths and even ice in ice buckets.

Bath Armor Beads are ideal for laboratory use because they eliminate the need for water and ice thus reducing the chance of contamination, the need to regularly change water, and the need for ice machines.

Bath Armor Beads thaw, warm and chill samples with high thermal efficiency, while avoiding common temperature fluctuations caused by evaporation.

Bath Armor Beads are self-supporting, so the racks and clips normally required to hold sample containers in position are eliminated and sample containers can actually be positioned at an angle.

Lab Armor, Inc.
800.210.8612
San Antonio, TX
www.LabArmor.com

Farr Air Pollution Control Portable Pulse-cleaned Dust and Fume Collector Offers Three-stage Filtration

Farr Air Pollution Control (APC) has introduced an updated portable dust and fume collector that combines three-stage filtration with versatility and ease of use. The new "Zephyr® III" collector now comes with a choice of three main filters and is ideal for portable handling of industrial process contamination, source capture or periodic dust collection at various locations.

Applications include welding fumes, grinding dusts, dry dusts, soldering fumes and other airborne particles.

Equipped with large wheels and brakes for easy movement and positioning, the Zephyr III collector is a self-contained unit. The user simply plugs in the 110v/1 Ph. 60 Hz power cord and compressed air line, installs the fume arm, and the unit is ready to capture dust and fumes. Contaminants entering the collector are removed by three stages of filtration: a metal filter that functions as a spark trap, a main filter for fine particle removal, and a carbon final filter for odors and gases.

The user can select from three main filters: the award-winning Gold Cone® HemiPleat® filter with fire retardant media in either standard efficiency (MERV 12 or 99.99 percent on 0.5 micron and larger particles) or high efficiency (MERV 16 or 99.999 percent efficiency); or a DuraPleat® washable filter (MERV 12 or 99.99 percent efficiency). A Venturi-assisted pulse cleaning system can be manually activated at any time.

Additional features include:

- New quick-clamp system for reliable cartridge sealing and ease of removal;
- Airflow capacity of 700 CFM at the capture hood (1,250 CFM free air);
- Durable powder-coated surface finish inside and out;
- Roll-out dust drawer with grid to minimize dust re-entrainment.

Farr APC Control
800.479.6801
Jonesboro, AR
www.farrapc.com

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

COMING EVENTS

JANUARY

- **31-Feb. 3, NMC 49th Annual Meeting**, Albuquerque, NM. For more information, go to www.nmconline.org.

FEBRUARY

- **1-2, FSRC Workshop: Assuring Safety of Imported Foods: Public and Private Roles in a Risk-Based System**, Washington, D.C. For more information, go to www.thefsrc.org/importsafety.htm.
- **3-5, Global Food Safety Conference 2010**, Hotel JW Marriott, Washington, D.C. For more information, go to www.ciesfoodsafety.com.
- **16-19, 2010 Public Health Preparedness Summit**, Atlanta, GA. For more information, go to www.phprep.org.
- **21-24, 5th Dubai International Food Safety Conference**, Dubai Convention and Exhibition Center, Dubai, United Arab Emirates. For more information, go to www.foodsafetydubai.com.
- **23-25, Food Claims and Litigation Conference**, Barton Creek Resort and Spa, Austin, TX. For more information, go to www.gmlitigationconference.com.
- **27-March 3, AFFI Frozen Food Convention**, Manchester Grand Hyatt, San Diego, CA. For more information, go to www.affi.com.

MARCH

- **2-3, Better Process Cheese School**, Madison, WI. For more information, go to <http://fri.wisc.edu>.
- **8-9, 2010 Lean and Six Sigma Conference**, Pointe Hilton Tapatio Cliffs Hotel, Phoenix, AZ. For more information, call 800.248.1946 or go to www.asq.org.
- **14-17, FMI Asset Protection Conference**, Ritz-Carlton Hotel, Dallas, TX. For more information, call Aileen Dullaghan Munster at 202.220.0704 or go to www.fmi.org.

- **23-26, 2010 Food Safety Education Conference, *Advancements in Food Safety Education: Trends, Tools and Technologies***, Hyatt Regency Atlanta, Atlanta, GA. For more information, go to www.fsis.usda.gov/Atlanta2010.
- **24-26, Michigan Environmental Health Association Annual Education Conference**, Doubletree Hotel, Bay City-Riverfront, Bay City, MI. For more information, go to www.meha.net.

APRIL

- **9-14, Conference for Food Protection 2010 Biennial Meeting**, Providence, RI. For more information, call 916.645.2439 or go to www.foodprotect.org.
- **12-14, 2010 Food Safety Summit**, Washington, D.C. For more information, go to www.foodsafetysummit.com.
- **18-21, TAPPI 2010 PLACE Conference**, Albuquerque, New Mexico. For more information, call 800.332.8686 or go to www.tappi.org.
- **25-27, ADPI/ABI Annual Conference**, Hyatt Regency, Chicago, IL. For more information, go to www.adpi.org.

MAY

- **5, Carolinas Association for Food Protection Annual Meeting**, North Carolina Research Campus, Kannapolis, NC. For more information, contact Steve Tracey at smtracey@foodlion.com.
- **5, Florida Association for Food Protection Annual Educational Conference**, International Plaza Resort and Spa, Orlando, FL. For more information, contact Zeb Blanton at 407.618.4893 or go to www.fafp.net.
- **5-8, ISOPOL XVII International Symposium on Problems of Listeriosis**, Alfundega Congress Centre, Porto, Portugal. For more information, go to www.esb.ucp.pt/isopol2010.

- **6, Metropolitan Association for Food Protection Spring Seminar**, Rutgers University, Cook College Campus, New Brunswick, NJ. For more information, contact Carol Schwar at 908.475.7960; E-mail: cschwar@co.warren.nj.us.
- **6-7, Associated Illinois Milk, Food and Environmental Sanitarians Spring Conference**, Eastland Suites, Bloomington, IL. For more information, contact Steve DiVencenzo at Steve.DiVencenzo@illinois.gov.
- **6-8, High-throughput Methods for Detecting Foodborne Pathogens Workshop**, York College, Jamaica, NY. For more information, go to www.york.cuny.edu/conted/fdaworkshops/2008-fda-workshop/preliminary-program.
- **11-13, FMI 2010**, Mandalay Bay Convention Center, Las Vegas, NV. For more information, go to www.fmi.org/events.
- **17-21, 3-A 2010 Education Program and Annual Meeting**, Wyndham Milwaukee Airport Hotel and Convention Center, Milwaukee, WI. For more information, go to www.3-a.org.
- **23-27, 110th General Meeting of the American Society for Microbiology**, San Diego Convention Center, San Diego, CA. For more information, go to www.asm.org.

IAFP UPCOMING MEETINGS

AUGUST 1-4, 2010
Anaheim, California

JULY 31-AUGUST 1, 2011
Milwaukee, Wisconsin

JULY 22-25, 2012
Providence, Rhode Island

**INTERNATIONAL ASSOCIATION
FOR FOOD PROTECTION**

**General Fund Statement of Activity
For the Year Ended August 31, 2009**

Revenue:

Advertising	\$114,258
Membership & Administration	349,157
Communication	717,497
Annual Meeting	932,214
Workshops & Symposia	84,953
International Symposia	141,946
Total revenue	\$2,340,025

Expense:

Advertising	88,710
Membership & Administration	817,481
Communication	800,797
Annual Meeting	867,697
Workshops & Symposia	56,607
International Symposia	108,755
Total expense	\$2,740,047

Change in General Fund **\$(400,022)**

Net Assets as of 8/31/09:

General Fund	268,614
Foundation Fund	700,252
Restricted Fund	27,111
Speaker Travel Fund	146,982
Total net assets	\$1,142,959

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ISSN 0022-428X
Official Publication



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Vol. 72

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* Author is available for correspondence.

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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 Services, 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.

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