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Food Protection Trends

Science and News from the International Association for Food Protection

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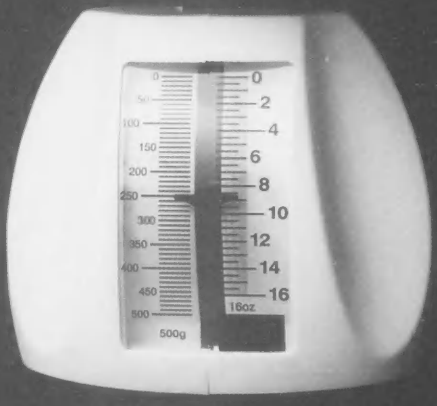

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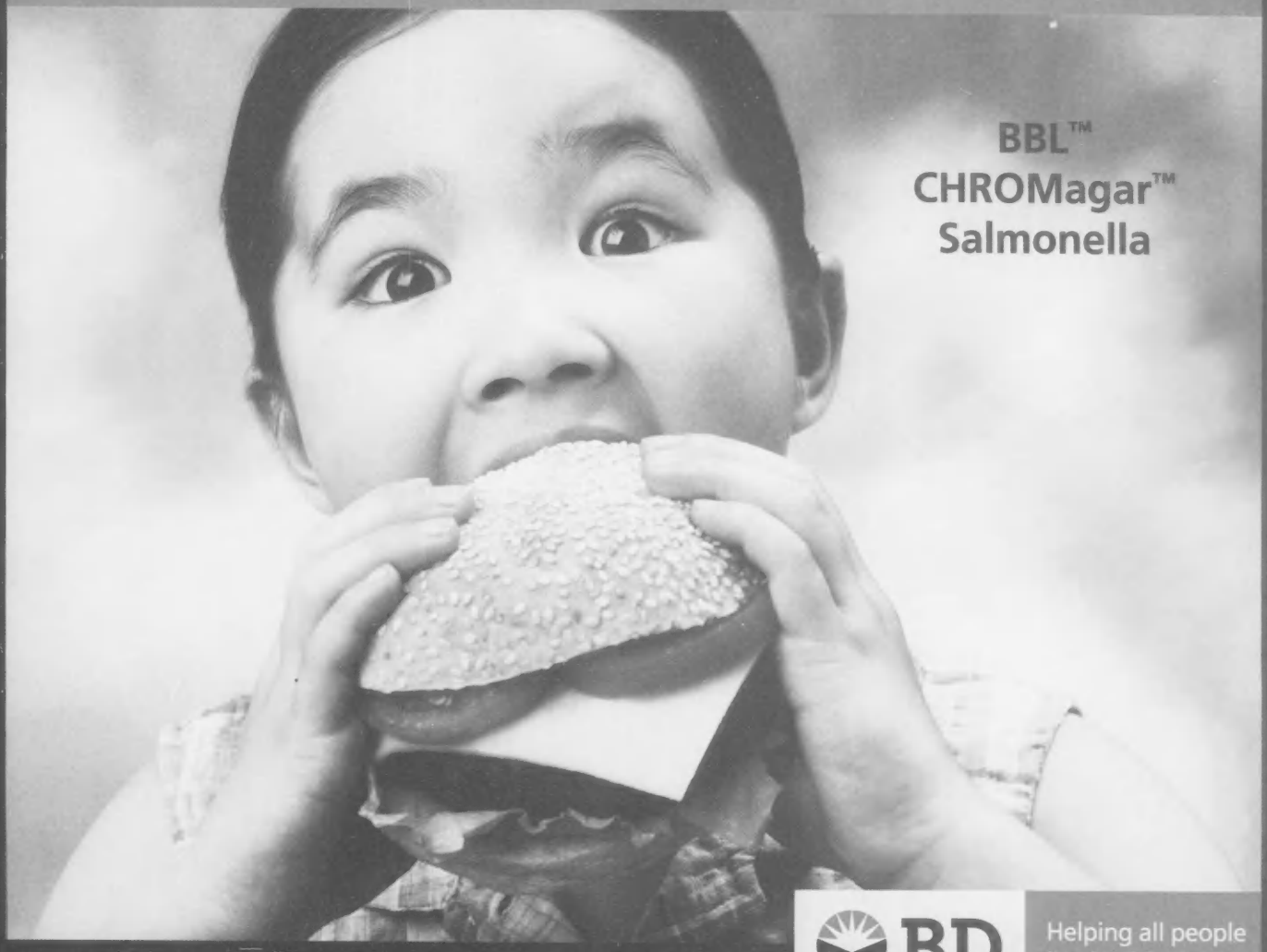

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Rose, Bonnie E. 2001. Isolation and identification of *Salmonella* from meat, poultry and egg products in Microbiology laboratory guidebook, 3rd ed. Food Safety and Inspection Services, U.S. Department of Agriculture, Washington, D.C.

U.S. Food and Drug Administration. 2003. Bacteriological Analytical Manual (online). AOAC International, Gaithersburg, MD.

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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International Association for Food Protection

FOOD PROTECTION TRENDS

VOLUME 29, NO. 6

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IAFP 2009

JULY 12–15

Gaylord Texan Resort
Grapevine, Texas

IAFP 2010

AUGUST 1–4

Anaheim Convention Center
Anaheim, California

IAFP 2011

JULY 31–AUGUST 3

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FOOD PROTECTION TRENDS

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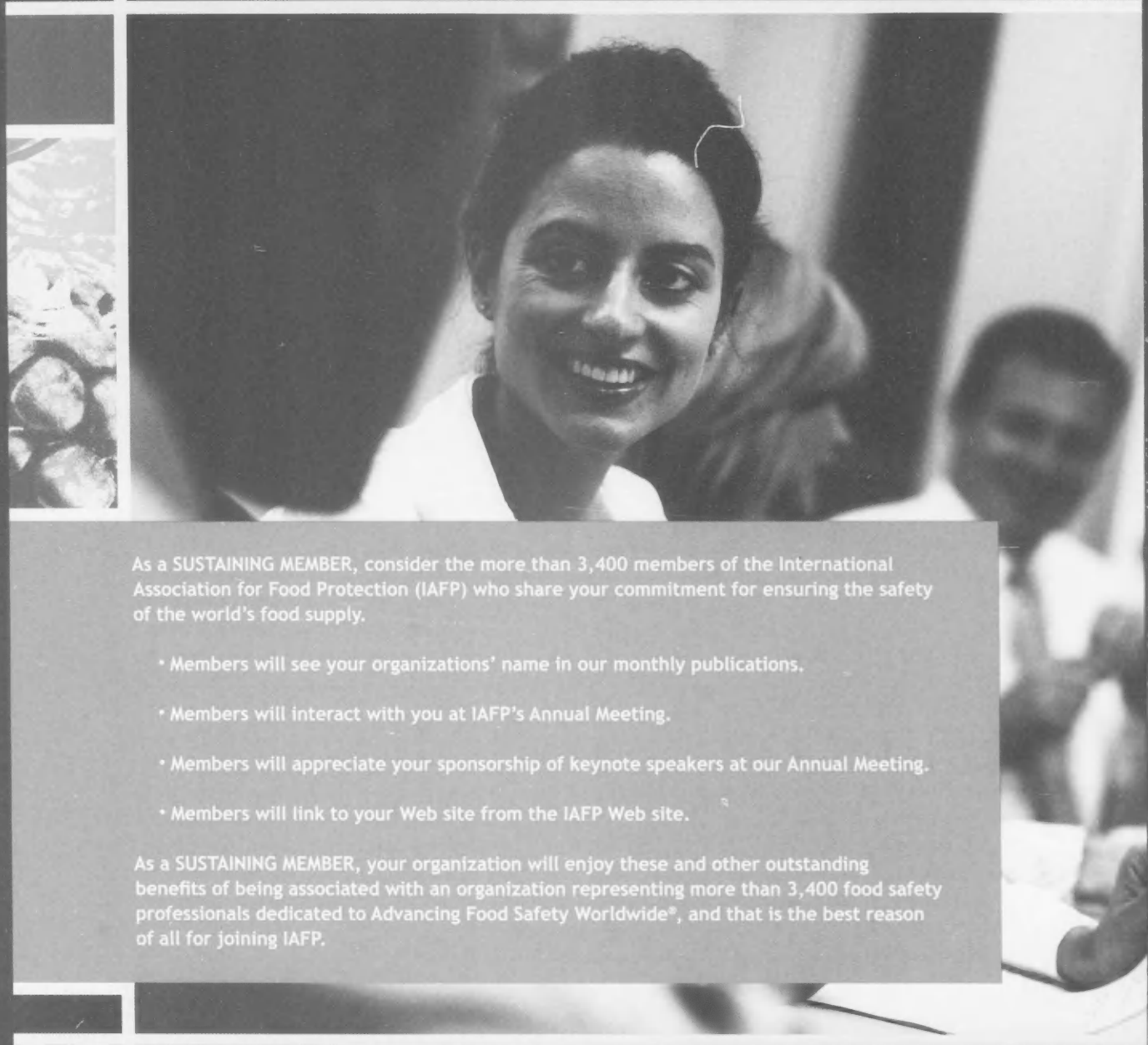

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"PERSPECTIVES" FROM YOUR PRESIDENT

By **STAN BAILEY**
PRESIDENT

"As those of you who regularly attend the IAFP Annual Meeting know, the biggest problem that you will have all week is deciding which session to go to at any given time"

It is almost time for the 2009 Annual Meeting. Hopefully, you have your hotel room reserved, your meeting registration, your plane ticket, and are ready to go. As I mentioned in my April column, the hotel and meeting space this year is excellent. The Scientific Program this year is as strong as ever. From the opening session Ivan Parkin lecture, *Navigating Food Safety through Times of Economic Chaos: A Call to Action*, by Dr. Paul Hall, through the over 500 technical presentations and posters, 29 symposia, and two round-table discussions to the Wednesday afternoon John H. Silliker lecture, *The 2008 Irish Dioxin Crisis: A Public Health, Food Safety, Economic, Legal or Risk Communication Challenge* by Dr. Patrick Wall, there will be many presentations that will be informative and interesting to you. As those of you who regularly attend the IAFP Annual Meeting know, the biggest problem that you will have all week is deciding which session to go to at any given time. You can see the full program on the recently redesigned IAFP Web site, www.foodprotection.org.

In addition to the scientific program, I wanted to highlight the three excellent pre-meeting workshops that we have organized this year. The two-day workshop this year, *Your Toolkit for Cleaning by Design – What Can Go Right* will address everything to do with cleaning of equipment in the food processing environment. Whether building a new facility, remodeling an existing food plant and retail establishment, purchasing new equipment, or simply repairing existing structures or equipment, participants will receive practical information from experts in meat, liquid, dry, and retail food processes in designing cleaning and sanitation programs that can be implemented to advance food safety and quality. On Saturday, the first workshop, *Microbiological Sampling and Testing in Food Safety Management* will (re-) introduce participants to the principles and limitations of microbiological sampling and testing for food safety assurance. Participants will learn how the performance of a sampling can be determined and how suitable sampling plans for particular pathogens and foods and intended consumers are established. The use of sampling and testing in food safety management will be discussed and illustrated from both the governmental and industry perspectives. The second workshop on Saturday, *Beyond Food Safety Management – How to Create a Food Safety Culture* will give participants a real working knowledge of different behavioral change theories, key elements of an effective food safety culture, and a thorough understanding of the differences between a traditional food safety management system versus a behavior-based food safety approach. As a take-away resource, participants will also receive an autographed copy of Frank Yiannas' new book, *Food Safety Culture, Creating a Behavior-based Food Safety Management System*.

As most of you reading this column know, the IAFP Annual Meeting is considered by most food safety professionals to be the best scientific meeting they attend each year. From the quality of the scientific program to the social activities associated with the meeting, your Annual Meeting does not just happen. Four to five years before the Annual Meeting, the Executive Board determines what area of the country we would like to hold the meeting, and David Tharp, Executive Director and Lisa Hovey, Assistant Director begin to identify cities with acceptable hotel and convention space to host the meeting. They usually identify two or three choices and present these to the Executive Board who ultimately decide on the location. David and Lisa then negotiate a contract with the hotel and convention center. Approximately a year ahead of the meeting, the Program Committee, working with the different Professional Development Groups begins to develop the scientific program and workshops. The IAFP staff working

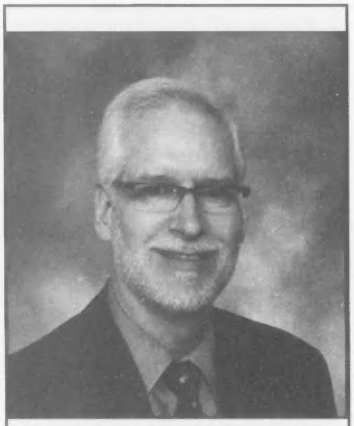
with local affiliates set up tours and activities for Annual Meeting attendees and guests. About six months before the meeting, David and Lisa finalize arrangements with the hotel and convention center. The IAFP staff then completes the logistics of the meeting including room assignments for all symposia and technical presentations, organizing poster board placements, assignment of booth space for exhibitors, developing advertising and sending our meeting notices, and taking reservations. Once the meeting starts, David, Lisa and staff work 14 to 15 hours a day from the Friday before the meeting until the Wednesday night banquet to make sure everything runs smoothly.

For all of the time and effort the staff puts into the Annual Meeting, this is only a small portion of their workload. IAFP is now the principal organizer and responsible for most of the logistics for two additional meetings every year. IAFP's Fifth Annual European Symposium on Food Safety will be held in Berlin, Germany on October 7–9, 2009, and the Second International (non-North America or Europe) Meeting will be held November 11–13, in Seoul Korea. At the same time that these meetings are being planned and organized, the staff is supporting publication of the *Journal of Food Protection*, *Food Protection Trends* and the monthly electronic newsletter, handling the IAFP Audiovisual Library, supporting the 43 IAFP affiliates and organizing travel for Foundation Fund-sponsored student travel scholarship recipients.

In addition to the activities mentioned above, membership support to the over 3,400 IAFP Members is very efficiently handled by David Tharp and his ten dedicated professional staff members (it is hard to believe that 10 people can do this much work). As a member of the Executive Board for the past four years, I have had the pleasure of getting to know and working with each of the staff members, and I must tell you that IAFP could not be in better hands. When you see the different staff members around the hotel and meeting space in Grapevine (you will be able to recognize them because they will wear color coordinated shirts each day) please take a minute to say thank you for the job they are doing.

As always, I welcome your comments or feedback. Please E-mail me at stan.bailey@na.biomerieux.com. Please join us in Grapevine, Texas for the IAFP 96th Annual Meeting on July 12–15, 2009.

"COMMENTARY" FROM THE EXECUTIVE DIRECTOR



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

"Attend our Committee and PDG meetings and become active in your Association"

Are you planning your trip to IAFP 2009 in Grapevine, Texas? If yes, we look forward to seeing you there! If no, we realize the economy has affected a number of companies and organizations this year, so we hope you will be back with us next year for IAFP 2010!

Let's look ahead to July and the Annual Meeting – this issue of *Food Protection Trends* is the Annual Meeting issue, after all! Three IAFP Workshops will start off this year's meeting on Friday and Saturday. Detailed descriptions on the Workshops start on page 400. Titles include: 1. Your Toolkit for Cleaning by Design...What Can Go Right, 2. Microbiological Sampling and Testing in Food Safety Management, and 3. Beyond Food Safety Management – How to Create a Food Safety Culture. Many attendees enjoy the more in-depth look at subject matter allowed in a workshop setting – you may want to consider signing up for one this year! Either way, you will want to be sure to plan in advance so that you arrive in time for the Saturday afternoon Welcome Reception. It starts at 5:00 p.m.! You can meet new friends and re-establish old acquaintances – all while enjoying food and beverages at the Welcome Reception!

Also on Saturday, we begin with a few specialized Committee meetings and one PDG meeting. The Membership Committee, Past President's Committee and the International Food Protection Issues PDG all meet on Saturday. In fact, the International Food Protection Issues PDG planned a few timely presentations for their meeting that takes place from 2:00 p.m. until 5:00 p.m.

If you are more in the mood for fun on Saturday, we have two options for you to consider. You can take the JFK and Dallas City Tour to visit downtown Dallas and the Book Depository Museum to learn more about this historic city and the assassination of President Kennedy in November of 1963. You might want to consider the IAFP best-ball golf tournament that tees off Saturday morning. The course, Tour 18-Dallas, has recreated golf holes that mimic some of the greatest holes in golf! Courses represented include Sawgrass (#17), Crooked Stick (#15), Doral (#18 "The Blue Monster"), and three holes from Augusta that make up Amen Corner (#11, #12 and #13). What better way to start off IAFP 2009? Why not begin with a little fun!

During the day Sunday, we have our full line-up of Committee and PDG meetings. Twenty-five meetings will take place with topics of interest to all attendees. If you have not attended these meetings in the past, we invite you to participate this year. By attending PDG and Committee meetings, you can meet new experts, share your knowledge with others, and become active in the Association! Many times through participation in PDG meetings, members are asked to present in symposia at the following year's meeting. We hope you consider this invitation, to attend our Committee and PDG meetings and become active in your Association!

Sunday evening begins with the Opening Session which includes the Ivan Parkin Lecture. Paul Hall, with AIV Microbiology and Food Safety Consultants, will present the lecture titled: "Navigating Food Safety through Times of Economic Chaos: A Call to Action." Following this, the Exhibit Hall opens up for the Opening Reception – a fitting way to end the day.

On Monday, we begin three days of sessions. The preliminary program is shown on page 393 with additional detail available at the IAFP Web site. We decided with recent cost savings measures, it was not cost effective to print the preliminary program in *Food Protection Trends* as it covers nearly 30 pages. By accessing it on IAFP's Web site, you now have the most current information at your disposal rather than reviewing a

printed program that may become outdated.

At IAFP 2009, there are two evening events that you should consider. First is the Monday Night Social – Texas Fun on the Ranch. This will be a fun evening of activities and socializing with colleagues. You might rope a longhorn, try your hand at quick-drawing or take in a horse-drawn hay wagon ride. Our second evening offering is on Tuesday and is our Foundation Fundraiser. For this event, we will have dinner at the Cowboys Golf Club, the only golf club owned by a NFL team. There will be a putting contest along with music, dinner and socializing! Both events provide you with a "diversion" from the day of sessions and learning.

One thing you might notice that changed are the poster sessions. Instead of half-day poster sessions, each poster session will begin in the morning and run through the end of the day. Presenters will stagger the presentation times (one group in the a.m. and one in the p.m.) so as to make for a better flow. This will allow a much greater time period when each poster is available for viewing during the day.

Another interesting change for 2009 is that symposia suggestions for IAFP 2010 will not be due onsite at IAFP 2009. The deadlire for submitting symposia has been moved to October to allow additional time to develop symposia ideas, identify experts to speak and gather your thoughts. In past years, it has been a rush to complete these submissions by Tuesday onsite at the Annual Meeting. Much of the PDG meeting time has been spent on symposia development and it is hoped that now, PDGs can use the time more effectively to discuss items of interest to the group (as was the original intent of the PDGs).

IAFP 2009 concludes on Wednesday with two "final" events. First, on Wednesday afternoon, Dr. Patrick Wall will present the John H. Silliker Lecture and speak about the 2008 Irish Dioxin Crisis. His presentation title explains the direction of his talk – "A Public Health, Food Safety, Economic, Legal, or a Risk Communication Challenge?" It is sure to give insight to behind the scenes during a crisis situation. Our second, "final event" is the Awards Banquet that takes place Wednesday evening. This year we recognize more than 20 individuals or groups for their food safety accomplishments and service to IAFP. This Banquet has been growing in attendance each year, so please plan to be present to honor your colleagues as they are recognized for their achievements. A list of Award recipients is shown on page 388.

We look forward to seeing everyone in Texas for IAFP 2009. All of our indicators are showing that this year will again be a very successful Annual Meeting for our attendees and the Association!

IAFP UPCOMING SYMPOSIA

Fifth European Symposium on Food Safety
October 7–9, 2009
Berlin, Germany

Asia Pacific Symposium on Food Safety
November 11–13, 2009
Seoul, Korea

ARTICLES

Food Protection Trends, Vol. 29, No. 6, Pages 332–334

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

International Association for Food Protection.

Survival of *Listeria monocytogenes* Inoculated onto Environmental Sampling Sponges Stored at 4°C

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SUMMARY

A major concern for processing plants is the amount of time that environmental sampling sponges can be held before shipping to independent labs for *Listeria* analysis. To answer this concern, environmental sampling sponges were inoculated with approximately 1 log or up to 3 log CFU/ml of a cocktail of *Listeria monocytogenes* strains and stored at 4°C for times up to 72 h. Ninety ml of UVM enrichment broth was added to each sponge and incubated overnight at 37°C. Serial dilutions were plated on modified Oxford agar and incubated at 37°C for 48 h. *L. monocytogenes* grew to over 8 log CFU/ml from the 3 log CFU/ml inoculation and over 6 log CFU/ml from the 1 log CFU/ml inoculations, regardless of storage times. Under the experimental conditions, holding times of up to 3 days at 4°C of inoculated environmental sampling sponges did not appear to have a detrimental effect on the survival of *L. monocytogenes*.

A peer-reviewed article

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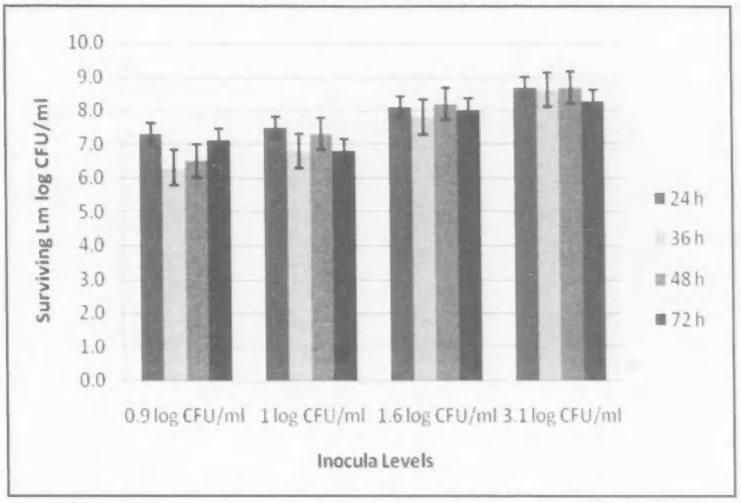
INTRODUCTION

Listeria monocytogenes is a Gram positive, non-spore forming foodborne pathogen that is ubiquitous in nature *(8)*. The pathogen is of great concern because *L. monocytogenes* infections may lead to a serious illness, listeriosis, which has a 28% fatality rate in immuno-compromised individuals, such as infants, fetuses, the elderly, and those persons with auto-immune diseases *(2, 3, 9)*.

The increased production and marketing of ready-to-eat (RTE) foods, which require little or no heating before consumption, has challenged the food industry to manufacture and distribute RTE products free from foodborne pathogens, particularly *L. monocytogenes*. The Food Safety and Inspection Service, United States Department of Agriculture by its Code of Federal Regulations 9CFR Section 430.4 requires that 25-gm samples of RTE foods be free of *L. monocytogenes (6)*. Although the

FIGURE 1. Recovery of *Listeria monocytogenes* inoculated at 0.9, 1.0, 1.6 and 3.1 log CFU/ml onto environmental sampling sponges, stored at refrigerated conditions for the times indicated, then incubated overnight (37°C) with UVM enrichment broth, and plated onto MOX agar. Standard error bars are shown. Significant differences among the means are marked with an asterisk.



RTE products are supposedly free of any foodborne pathogen immediately after the thermal lethality treatment, the post-processing, pre-packaging environment within the plants poses a threat of *L. monocytogenes* cross-contamination *(1)*. *L. monocytogenes* has the ability to survive in adverse environmental conditions such as temperature extremes, acid, and high salt conditions *(8)* often found in processing plants.

A large part of the strategy for controlling *L. monocytogenes* in RTE plants is strict sanitation procedures followed by environmental sampling of the surfaces of processing lines and equipment to verify cleaning methods. Various published articles have described techniques for accurate recovery and detection of *L. monocytogenes* within the processing environment, including articles on precise environmental sampling devices *(11)*, rapid detection *(4)* and the use of repair/selective enrichment media *(5)*. One of the environmental sampling methods most often used to detect *L. monocytogenes* involves the use of environmental sampling sponges. Proper sampling procedures typically include immediately shipping the sponges after environmental plant sampling to an independent research laboratory for *L. monocytogenes* analysis. A major concern of our industrial partner is the amount of time that a sample sponge can be stored under refrigerated conditions at the processing plant prior to shipping. Many of the commercial microbiology laboratories suggest that these sponges be mailed to the laboratory within 24 hours to prevent any loss in the viability of *L. monocytogenes*. However, the current guidelines on this time constraint are inconsistent. FSIS's directives allow the inspectors to hold environmental swab sponge samples over the weekend *(7)*. Silliker's® Swabbing Techniques for Sampling the Environment and Equipment (Silliker Inc., Homewood, IL) recommends that testing for presence of *L. monocytogenes* begin within 36 hours. In some instances this tight time schedule cannot be met, but it is vital that holding these environmental samples not compromise the ability to recover *L. monocytogenes*. The objective of this study, therefore, was to determine if longer holding times, up to 72 hours at 4°C, would adversely affect the *L. monocytogenes* presence or absence test.

MATERIALS AND METHODS

L. monocytogenes strains

Six strains of *L. monocytogenes* were used in the studies; five strains (ARS V67, ARS V72, ARS V113, ARS V125, and ARS 105) were obtained from Dr. M. E. Berrang at USDA Agricultural Research Service, Athens, GA and *L. monocytogenes* strain LCDC 81-861 (4b) was obtained from Dr. M. Johnson at the Department of Food Science, University of Arkansas, Fayetteville, AR. Stock cultures were maintained frozen at -80°C.

Preparation of inoculum

One loop of the frozen stock culture of each strain of *L. monocytogenes* was inoculated individually into Tryptic Soy Broth with 0.06% yeast extract (TSBYE, Becton Dickinson, Sparks, MD) and incubated at 37°C for 18–20 h. One loop of each strain was streaked separately onto modified Oxford medium agar (MOX, Becton Dickinson, USA) for isolation. Individual colonies were picked and inoculated into TSBYE incubated as before and passed three times. One ml of each *L. monocytogenes* culture was combined to form a cocktail culture (9 log CFU/ml). Appropriate serial dilutions were prepared to decrease the level of *L. monocytogenes* to approximately 0.9, 1, 1.6 or 3 log CFU/ml.

Inoculation onto sponge

Biotrace HydraSponges (BioTrace International, Bothell, WA), which are biocide-free cellulose sponges with 10 ml neutralizing buffer, were used in this study. The sterile sample bags containing the sponges were placed in a Labconco Class II Biosafety Cabinet. Each bag containing a sponge was opened aseptically and one ml of the appropriate dilution of the *L. monocytogenes* cocktail was added onto the surface of a sponge. Identical samples were either processed immediately for 0 h (control) sampling time, or stored at 4°C for 24, 36, 48, or 72 h. At each sampling time, 90 ml of UVM Modified Listeria Enrichment Broth (Acumedia, Lansing, Michigan) was added to the sample bag containing the sponge, hand-massaged for two minutes, and incubated overnight at 37°C to permit recovery of the *L. monocytogenes*. The following day, samples were massaged again for two minutes and one ml of the suspension was serially diluted and plated onto MOX agar. Plates were incubated at 37°C for 48 h, organisms were enumerated, and data were analyzed using Microsoft Excel and JMP 6.0.2 from SAS. There were three replications of each of the four levels of inoculum.

RESULTS

These studies evaluated effects of time on the survival of *L. monocytogenes* on inoculated sponges held at 4°C for time periods of 0 (control), 24, 36, 48, or 72 h, as shown in Fig. 1. All four studies (three replications for each sampling time) indicated ample detection levels at all sampling times. Tukey-Kramer comparison of means indicated that there were no significant differences among the means during storage at the higher inoculation levels. However, there were significant differences among the means at the lowest (0.9 log) level of inoculation.

DISCUSSION

Results of these studies indicate that storing environmental sampling sponges at refrigerated temperatures (4°C) for up to 72 h does not adversely affect the survival of *L. monocytogenes* inoculated onto environmental sponges at less than 1 log up to 3 log CFU. The enhancement of *L. monocytogenes* replication, due to the addition of UVM enrichment broth and overnight incubation at 37°C, replenishes and aids in the survival of *L. monocytogenes* at low CFUs and therefore allows for valid positive/negative identification even at the lower inoculation levels (1 log CFU/ml). It was interesting that in all four studies, there was a slight drop in recovery of survivors at 36 h. We are assuming that this may be a reflection of the lag phase in *L. monocytogenes* replication. Although these studies encompassed holding times of only up to 72 h with no difference in the ability of *L. monocytogenes* to replicate and survive under refrigerated conditions *(8)*, it is possible that cells of *L. monocytogenes* may survive at 4°C on environmental sampling sponges past the 72 h time limit of these studies, although we do not have data to suggest this possibility.

ACKNOWLEDGMENTS

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REFERENCES

1. Bernard, D. T., and V. N. Scott. 1999. *Listeria monocytogenes* in meats: new strategies are needed. Food Technol. 53:124–130.
2. Centers for Disease Control and Prevention (CDC). 2002. Public Health Dispatch: Outbreak of Listeriosis – Northeastern United States, 2002. Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5142a3.htm. Accessed 7 May 07.
3. Centers for Disease Control and Prevention. 2005. Listeriosis. Available at: http://www.cdc.gov/ncidod/dbmd/diseaseinfo/listeriosis_g.htm. Accessed 7 May 07.
4. Firstenberg-Eden, R., and L. A. Shelef. 2000. A new rapid automated method for the detection of *Listeria* from environmental swabs and sponges. Int. J. Food Microbiol. 56:231–237.
5. Flanders, K. J., T. J. Pritchard and C. W. Donnelly. 1995. Enhanced recovery of *Listeria* from dairy-plant processing environments through combined use of repair enrichment and selective enrichment/detection procedures. J. Food Prot. 58:404–409.
6. Food Safety and Inspection Service, USDA. 9 CFR 430.4. 2005. Control of *Listeria monocytogenes* in post-lethality exposed ready-to-eat products.
7. FSIS. 2006. Updated questions and answers. Available at: http://www.fsis.usda.gov/OPPDE/rdad/fsisdirectives/10240.4/resource_3.pdf Accessed 21 Aug 2008.
8. Jay, J. M., M. J. Loessner, and D. A. Golden. 2005. Foodborne listeriosis, p. 610–611. *In* Modern Food Microbiology 7th Edition. Springer, Maryland, USA.
9. Mead, P. S., L. Slutsker, V. Dietz, L. F. McCaig, J. S. Bresee, C. Shapiro, P. M. Griffin, and R. V. Tauxe. 1999. Food-related illness and death in the United States. Emerg. Infect. Dis. 5:607–625.
10. US Department of Agriculture, Food Safety and Inspection Service. 2005. Control of *Listeria monocytogenes* in post-lethality exposed ready-to-eat products. 9 CFR 430.4.
11. Vorst, K. L., E. C. D. Todd, and E. T. Ryser. 2004. Improved quantitative recovery of *Listeria monocytogenes* from stainless steel surfaces using a one-ply composite tissue. J. Food Prot. 67:2212–2217.

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Label Instructions and Cooking Times for Retail Frozen Ground Beef Patties

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SUMMARY

Cooking instructions on 37 retail packages of frozen ground beef patties were recorded at 16 retail stores in four western states. The labels of eleven packages contained suggested cooking times, which varied from 1.5 to 8 minutes per side for 113 g patties. Times required to cook frozen patties to 71.1°C were determined using consumer conditions, including a fry pan on an electric stove and a propane grill. Variables included initial temperature of the frozen patty, pre-heating of the fry pan, cooking temperature, and patty fat content. The patty internal temperature was measured with five beaded wire type K thermocouples (TC). The average time required to cook a frozen (-18°C) 113 g 20% fat ground beef patty to 71.1°C (as registered on all five TCs) was 7 min 39 s when the pan was pre-heated to 163°C (medium stove burner setting). Starting with a 20°C pan increased average cook time by 4 min. Starting with a -26°C patty did not significantly affect cook time. Patty cooking times on a propane grill were more variable than those in a fry pan on an electric stove. The cooking times suggested on labels of three of the packages would be inadequate to produce a safely cooked patty.

INTRODUCTION

Consumers have developed *Escherichia coli* O157:H7 infections from consumption of undercooked ground beef. The most well known case is that in which over 500 consumers became ill and four died in 1993 as a result of consuming undercooked ground beef patties at a fast food chain *(5)*. In 2002, home preparation of *E. coli* O157:H7-contaminated ground beef sickened 28 consumers and caused a nationwide recall of 18.6 million lbs of fresh and frozen ground beef and beef trimmings *(6)*. During 2007, there were 19 recalls of ground beef totaling over 30 million pounds, of which less than 3 million pounds was recovered *(23)*. Outbreaks from *E. coli* O157:H7 are most commonly linked to beef; during the period 1990 to 2005, 56% of *E. coli* O157:H7 outbreaks were attributed to beef *(8)*. Cases of consumer illness from ground beef consumption continue to be reported, with recent cases of illness associated with ground beef purchased at retail meat cases of a large midwest grocery chain *(22)*.

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FIGURE 1. Teflon disk with thermocouples for measuring patty temperature.

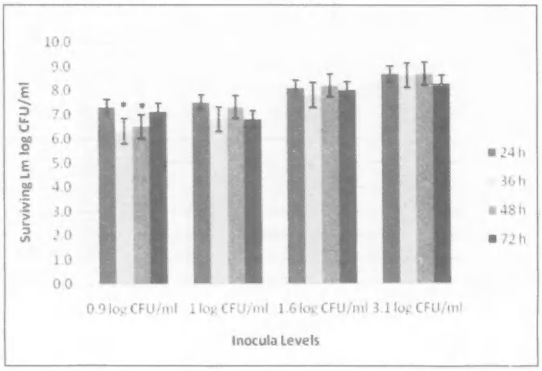
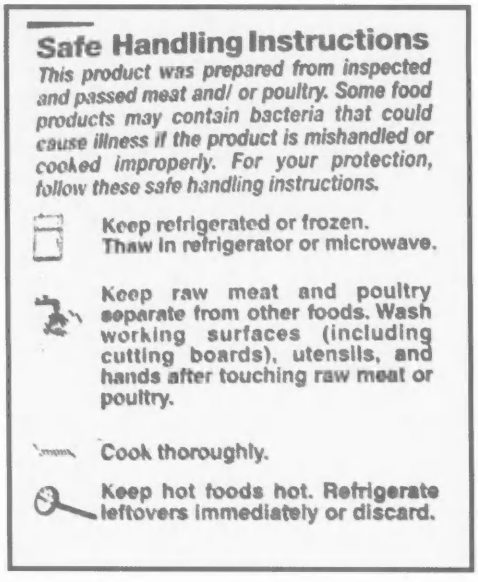


FIGURE 2. Safe handling instructions were displayed on all the observed packages of frozen ground patties, as required.



Contracting an *E. coli* O157:H7 infection causes hospitalization in about 17% of cases, usually due to extreme diarrhea or kidney failure, and results in death in an estimated 0.5% of cases *(17)*. *E. coli* O157:H7 infections are the leading cause of hemolytic uremic syndrome in children *(19)*.

Destruction of pathogens that may be present in raw ground beef requires a cooking procedure that heats the beef to an internal temperature of 160°F *(24)*. Ground beef is made from 'beef trimmings' *(12)*, which often include trim from the exterior of carcasses and which may carry pathogens. The process of grinding distributes any pathogens present throughout the meat. Although the presence of *E. coli* O157:H7 in ground beef was declared adulturation in 1994 *(26)*, 0.23% of ground beef samples tested in 2007 by the Food Safety and Inspection Service were positive for this pathogen *(21)*.

Consumers are encouraged to use a food thermometer to determine that the internal temperature of ground beef patties they cook have reached 160°F *(15, 20)*. Prior to 1997, consumers were encouraged to cook ground beef until "brown" in the middle to assure a safe temperature had been reached *(14)*. However, research conducted in the 1990s determined that cooked ground beef color does not correlate to safe endpoint temperature *(2, 9, 10, 14)*. The Food Safety and Inspection Service launched a national consumer education campaign to promote the use of food thermometers in the home in May, 2000 *(27)*. Yet, the 2006 FDA/USDA Food Safety Survey of consumers indicated that only 13% of consumers always or often use a thermometer when cooking or grilling hamburgers *(11)* and an American Dietetics Association survey in 2002 indicated that 25% of consumers use a meat thermometer always or most of the time to check doneness for red meat, pork or poultry *(7)*.

Ground beef patties are the most popular beef item for United States consumers; nearly 12 billion hamburgers were consumed by Americans in 2007 *(3)*. Ground beef patties are the most frequently grilled meat *(1)*. Frozen ground beef patties are convenient and popular; sales of frozen ground beef was almost $336 million in 2007, with most being patties *(4)*.

Since 1994, federal regulations require a Safe Handling Label, which includes information about storing, cooking, and avoiding cross contamination, on all consumer packages of ground beef (and other raw meat) *(16)*. USDA approves the labels of meat and poultry products prior to market use. If cooking instructions are provided, it is expected that they will provide adequate information for consumers to prepare a safe cooked product *(25)*. Furthermore, consumers should be able to expect the cooking instructions on packages of the frozen ground beef patties they purchase to be adequate to produce a safe, pathogen-free hamburger and to reflect current information about the preparation of ground beef patties. We surveyed label cooking instructions on packages of frozen raw ground beef patties and assessed the times required to cook the patties to the safe level of doneness when using several cooking parameters.

TABLE 1. Cooking time suggestions[a] provided on labels of 11 packages of frozen, ground beef patties[b] for various cook methods[c]

Cooking Method	Minutes/side Minutes	Number of packages	Total cooking time Minutes (1 package each)
Pan frying	8	2	13–14, turn every 3–4
	4	2	7–10
	4, then 2.5 to 3[d]	1	
	3–4	1	
	2	1	
	1.5	2	
Grilling	9, then 3–4[d]	1	11–12
	8	2	7–10
	4	2	
	3–4	1	
	3	1	
	1.5	2	
Broiling	7, then 2.5[d]	1	15–16, turn halfway through time
	4	1	7–10

[a]Cooking time suggestions were either in minutes/side or total cook time.

[b]Patty weight = 113 g.

[c]Not all cook methods were provided on all packages.

[d]Indicates number of minutes on one side, then a different number of minutes for the other side.

MATERIALS AND METHODS

For the survey of label cooking instructions, the label information on 37 unique packages of frozen ground beef patties was recorded, using a convenience sample of 16 grocery stores in four western states (WA, ID, CA, NV) over the period December 2006 to March 2007.

To assess the accuracy of package cooking times, several variables to simulate consumer practice were selected: frozen patty initial temperature (-18°C and -26°C), patty fat content (10%, 15%, and 20%), patty heating method, and cooking temperature (three settings). Frozen patties (113 g) were cooked, one at a time, turning the patty over every 2 minutes to facilitate even cooking *(18)*. Two minutes was chosen as the turnover interval because juices began to pool on the surface of the patty at this time. Eight of 37 package labels suggested use of "pooling juices" as a cue for turning the patty over during cooking.

In experiment 1, the effects of three cooking temperatures and two methods (electric stove and propane grill) on cooking times were assessed. Each 20% fat, frozen patty (initial temperature -18°C) was cooked either in a pre-heated (3 min) 21-cm Teflon-coated aluminum fry pan on an electric stove at settings of medium-low (121°C), medium (163°C), or medium-high (204°C) or on a Weber model Genesis Silver propane grill preheated for 10 min, at settings of medium (approximately 254°C), medium-high (approximately 271°C), or high (approximately 332°C), with the grill cover closed during cooking (except when the patty was turned). A medium-low setting for this propane grill did not cook frozen patties in a reasonable amount of time. The cooking temperatures reported are for the surfaces of the fry pan and grill bars. The surface temperatures were determined using an infrared thermometer (Omegaette OS542, Omega Engineering Inc.); the grill bar temperature was verified by wiring a 0.25 mm wire glass-insulated type K thermocouple to the grill bar for some cook procedures. Grill bar temperatures varied much more widely than fry pan surface temperatures. Order of cooking was randomized within the cook method.

In experiment 2, the effects of fat content and patty starting temperature on cooking times were assessed when cooking was done on the electric stove and propane grill. Frozen patties of three fat contents (10%, 15% and 20%) and at two initial temperatures (-18°C and -26°C) were cooked in either a room temperature or preheated 21-cm Teflon-coated aluminum fry pan on an electric stove (medium setting) and on a preheated propane grill (medium-high). The preheating period was 3 min for the fry pan and 10 min for the grill. Order of cooking was randomized within the cook method.

TABLE 2. Mean cooking times[a] required for frozen ground beef patties[b] to reach 71.1°C[c] when cooked at three heat settings using two methods of cooking[d]

Electric Stove Setting (pan surface temperature)	**3/5 TCs[e]**	**4/5 TCs[e]**	**5/5 TCs[e]**
Medium-low (121°C)	8:09 ± 0:15 A[f]	8:29 ± 0:27 A	9:14 ± 0:45 A
Medium (163°C)	6:35 ± 0:17 B	7:10 ± 0:40 B	7:39 ± 0:25 B
Medium-high (204°C)	6:25 ± 0:28 B	6:43 ± 0:49 B	7:00 ± 0:46 B
Propane Grill Setting (grill bar temperature)			
Medium (~254°C)	7:20 ± 1:17 A	7:38 ± 1:18 A	8:08 ± 1:27 A
Medium-high (~271°C)	6:17 ± 1:03 A	7:03 ± 1:53 A	7:35 ± 2:27 A
High (~332°C)	5:45 ± 1:16 A	6:02 ± 1:14 A	7:07 ± 1:42 A

[a]Mean cooking time = minutes:seconds ± standard deviation.

[b]Patty weight = 113 g.

[c]Endpoint temperatures were measured by five thermocouples (TCs) inserted to one-half of patty thickness.

[d]Methods of cooking were pan-frying (pre-heated pan) on an electric stove and grilling on a preheated propane grill.

[e]Represents number of thermocouples out of a total of five registering 71.1°C.

[f]Times within a column and cook method followed by different letters are significantly different ($P < 0.05$).

Patty internal temperature was measured with five beaded wire type K thermocouples that were secured through a 10-cm diameter Teflon disk (13 mm thick) with a handle on top (Fig. 1). The thermocouples were located in the center of the disc and in each quadrant, equidistant from the center and the edge. The thermocouple bead was adjusted to protrude exactly 0.5 cm from the bottom of the disc, a distance that corresponded to one-half the diameter of the frozen ground beef patties. The Teflon disc was applied to the top of the cooking hamburger when two thermocouples had reached 71.1°C; this approximate time was determined in preliminary trials. Data was acquired using a Measurement Computing TC data logger and TracerDAQ software (Measurement Computing, Norton, MA). Times for 3, 4 and 5 thermocouples to reach 71.1°C were recorded. Five patties were cooked for each variable. Cook time data was discarded and the trial re-run if the temperature differential among the five thermocouples was greater than 10°C at the end of cooking.

Cooking time data for the patties cooked on the electric stove and propane grill in experiments 1 and 2 were analyzed using Analysis of Variance for a completely randomized design. The Fisher Least Significant Difference test was used for separation of means. All statistical inferences were deemed significant assuming a 95% level of confidence.

RESULTS

All of the 37 unique packages of frozen ground beef patties included in the survey, which represented 20 brand names, displayed the Safe Handling Instructions, as required by USDA (Fig. 2). Twenty-three of the packages instructed that the patties should be cooked from a frozen state, while the other packages did not address this point. Pre-heating of the pan and/or grill was recommended on 11 of the package labels. Cooking temperatures were suggested on 7 of the labels; use a "medium setting or 325°F" was most frequently recommended, but medium-low and medium-high were also mentioned (1 package each). Cooking times were suggested by 11 packages and varied from 1.5 minutes to 8 minutes per side for the 4-ounce patties (Table 1). Thirty of the packages included instructions to cook the patties to a specified temperature, 160°F on 23 packages and 165°F on 7 packages. Six of the 37 packages correctly stated that color was not an indicator of a safely cooked patty, but 5 incorrectly stated that the patty should be cooked until no longer pink. In addition, one package told consumers "Please do not overcook," while another package stated "Do not undercook." One brand (which had 6 unique packages in the survey) included a picture of the Thermy™ cartoon character, which was developed by FSIS to promote consumer thermometer use *(27)*.

The results of experiment 1 to assess cooking times required at different heat settings (cooking temperatures) on an electric stove and a propane grill are shown in Table 2. When a frozen ground beef patty was cooked in a pre-heated frying pan, cooking times at the medium-low setting were significantly longer (roughly 1 to 2 min) than at the medium or medium-high settings, which were not significantly different from each other. On the electric stove for medium-low and medium settings, about 1 min longer was required for all 5 thermocouples to reach 71.1°C than for three thermocouples to

TABLE 3. Mean cooking times[a] required for frozen ground beef patties[b] containing three fat contents, or at two starting temperatures, to reach 71.1°C[c] when cooked using two methods[d]

Patty Fat Content (n = 20 for stove, n = 10 for grill)	Fry pan on electric stove at medium	Propane grill at medium-high
10% Fat	11:00 ± 2:48 A	8:07 ± 0:44 AB
15% Fat	9:03 ± 2:32 B	8:23 ± 0:46 A
20% Fat	9:53 ± 2:23 B	7:33 ± 0:38 B
Patty Starting Temperature (n = 30 for stove, n = 15 for grill)		
-18°C	9:50 ± 2:39 A	7:56 ± 0:47 A
-26°C	10:08 ± 2:44 A	8:06 ± 0:47 A
Pan Starting Temperature (n = 30)		
Room Temperature	12:11 ± 1:29 A	NA
Preheated 3 min	7:47 ± 1:27 B	

[a]Mean cooking time = minutes:seconds ± standard deviation.

[b]Patty weight = 113 g.

[c]Endpoint temperatures were measured by five thermocouples inserted to one-half of patty thickness, all reaching 71.1°C.

[d]Times within a column (cook method) and cook parameter (patty fat content, patty starting temperature, pan starting temperature) followed by different letters are significantly different ($P < 0.05$).

reach this temperature, and about 0.5 min longer was required for this to occur at the medium-high setting. For the propane grill, an additional 50 s to 1 min 20 s was required to fully cook the patty (all 5 TCs at 71.1°C) beyond the time required for 3 thermocouples to reach 71.1°C. For the propane grill, even though the trends of cooking times are similar to those achieved with the electric stove, there was no significant difference among the cooking times at the medium, medium-high and high settings due to the high variation among the five cooking replications. The difference in cook times within a replication of 5 patties cooked was as high as 4 min. The standard deviations for propane grill cooked patties were always larger than those cooked on the electric stove in experiment 1 (Table 2).

The results of experiment 2 to assess cooking times required for frozen patties of varying fat content and at two starting temperatures, when cooked in either a room temperature or preheated fry pan or on a propane grill, are shown in Table 3 (only the times for all five thermocouples to reach 71.1°C are shown). The cooking times were significantly affected by patty fat content and by pan temperature, but not by patty starting temperature; there was no significant statistical interaction among treatments. The statistical analysis was conducted within each cooking method and parameter, and thus statistical comparisons across cooking methods or parameters cannot be inferred.

Frozen patties with a lower fat content (10%) required a significantly longer cooking time than those with 15% or 20% fat when cooked on an electric stove. For patties cooked on the propane grill, 15% fat patties had the longest cooking time, though not significantly different than 10% fat patties. Preheating the fry pan for 3 min before starting to cook frozen patties significantly shortened the cooking time, by over 4 min. The higher standard deviations for electric stove cooking times in experiment 2 is a result of the higher number of observations and cook parameters.

DISCUSSION

The store survey of package cooking instructions on labels of frozen ground beef patties revealed a wide range of cooking suggestions. It is useful that most of the packages (30 of 37) instructed consumers to cook ground beef patties to the USDA-recommended endpoint temperature of 160°F (71.1°C) or higher. However, since most consumers do not use a food thermometer to determine the doneness of ground beef patties *(11)*, accurate cooking instructions are also needed. The wide range of recommended cooking times, 1.5 to 8 minutes per side for 113 g patties, and the conflicting information about the use of color to predict doneness of cooked meat and about avoiding both overcooking and undercooking, provide an array of confusing instructions for consumers who may buy a variety of package types when selecting frozen ground beef patties over time.

Our study to verify package cooking time recommendations using a variety of possible consumer practices indicated

that cooking times of less than 3 min/side would not produce a safely cooked product. Three package labels in the survey suggested cooking times of 1.5 to 2 min/side. For 20% fat patties on electric stove in a preheated pan, the longest total cooking time, 9 min 14 s, occurred at the medium-low setting. The shortest total cook time, 7 min, occurred at the medium-high setting, although this was not significantly different from the average of 7 min 39 s required at medium heat. Using a fry pan that is not preheated extends the cooking time by about 4 min (Table 3). For 20% fat patties on a preheated propane grill, the total cooking time required was 7 to 8 min (Table 2). The propane grill produced more variability in cook times than did a fry pan on the electric stove. Measurement of grill bar temperatures before cooking commenced showed variations of 40°C during repeated measurements due to the on-off cycling of the heat source. Variations in fry pan surface temperature were much lower, about 5°C. The variability of cooking times for patties, particularly when a propane grill is used, makes it difficult to accurately label cooking times. Under many cooking conditions, 4 or 5 min/side would be necessary to produce a safely cooked product.

Although the effect of patty fat content on cooking time was not consistent, the 10% fat patties cooked more slowly than those containing 15% or 20% fat on the electric stove. Others have reported longer cooking times when fat level was decreased in ground beef patties *(2, 13)*.

In this work, five thermocouples were used to measure patty cooking temperature. All of the thermocouples did not reach the endpoint of 71.1°C at the same time (Table 2). In fact, after three thermocouples registered 71.1°C, an average of up to an additional min or more of cooking was required for thermocouples in all locations to register 71.1°C. Additionally, the lowest temperature is not always in the center of the patty, as has been previously observed *(18)*. Although this work did not quantify post-cooking temperature rise in the patties, this rise has been well documented *(2)* and amounts to about 2° to 5°C, depending on patty size and cooking method. This effect reduces the likelihood of an undercooked patty resulting from measuring temperature in one location.

This study reveals that cooking instructions on some packages of frozen ground beef patties are inadequate to produce a safely cooked patty. The wide variations in cooking times, particularly for grilled patties, confirm that the use of a thermometer is the preferred method for assessing endpoint when cooking frozen ground beef patties. Package instructions should strongly encourage consumers to use an instant-read thermometer to cook patties to 160°F and indicate that patties should be checked in several locations. If cooking times are suggested on package labels, they should be described as guidelines as to when to check the internal patty temperature.

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REFERENCES

1. American Meat Institute. 2007. Grills to Sizzle Over Holiday Weekend, May 26. http://www.meatami.com/ht/d/ReleaseDetails/i/3023.
2. Berry, B. W., and M.E. Bigner-George. 2000. Factors affecting color properties of beef patties cooked on an outdoor gas grill. J. Muscle Foods 11:213–226.
3. Cattleman's Beef Board. 2008. "I'll take a burger with a side of burger," CBB Checkoff News, http://www.beefboard.org. Accessed July 11, 2008.
4. Cattlemen's Beef Board & National Cattlemen's Beef Association. 2008. Beef Retail Sales Data, http://www.beefretail.org/uDocs/refrigeratedandfrozencategorysales.pdf and Redson, B. A. personal communication, October 27, 2008.
5. CDC. 1993. Update: Multistate outbreak of *Escherichia coli* O157:H7 infections from hamburgers — Western United States, 1992–1993, Morb. Mortal. Weekly Rep. 42(14):258–263.
6. CDC. 2002. Multistate outbreak of *Escherichia coli* O157:H7 infections associated with eating ground beef — United States, June–July 2002, Morb. Mortal. Weekly Rep. 51(29):637–639.
7. Cody, M. M., and M. A Hogue. 2003. Results of the home food safety—It's in Your Hands 2002 survey: Comparison to the 1999 benchmark survey and Healthy People 2010 food safety behaviors objective. J. Am. Diet. Assoc. 103(9):1115–1125.
8. DeWaal, C. S., and F. Bhuiya. 2007. Outbreak Alert! Center for Science in the Public Interest, page 12, http://www.cspinet.org/foodsafety/outbreak_alert.pdf.
9. Hague, M. A., K. E. Warren, M. C. Hunt, D. H. Kropf, C. L. Kastner, S. L. Stroda, and D. E. Johnson. 1994. Endpoint temperature, internal cooked color, and expressible juice color relationships in ground beef patties. J. Food Sci. 59(3):465–470.
10. Killinger, K. M., M. C. Hunt, R. E. Campbell, and D. H. Kropf. 2000. Factors affecting premature browning during cooking of store-purchased ground beef. J. Food Sci. 65(4):585–587.
11. Lando, A., and L. Verrill. 2008. 2006 FDA/FSIS Food Safety Survey, http://www.cfsan.fda.gov/~comm/crnutri7.html.
12. Lange, L. 2008. Beef trim baseline results and how FSIS will use, presentation at *E. coli* public meeting, April 9, Washington, D.C., http://www.fsis.usda.gov/PPT/Beef_Trim_Baseline_040908.ppt. Accessed October 8, 2008.
13. Lui, M. N., and B. W. Berry. 1996. Variability in color, cooking times and internal temperature of beef patties under controlled cooking conditions. J. Food Prot. 59(9):969–975.
14. Lyon, B. G., B. W. Berry, D. Soderberg, and N. Clinch. 2000. Visual color and doneness indicators and the incidence of premature brown color in beef patties cooked to four end point temperatures. J. Food Prot. 63(10):1389–1398.
15. McCurdy, S. M., M. T. Takeuchi, Z. Edwards, M. Edlefsen, D-H. Kang, V. E. Mayes, and V. N. Hillers. 2006. Food safety education initiative to increase consumer use of food thermometers in the United States. Brit. Food J. 108:775–794.
16. Ralston, K. L., and Lin, C. T. J. 2001. US Safe Handling Labels for Meat and Poultry: A Case Study in Information Policy. Consumer Interests Annual, Volume 47, http://

www.foodrisk.org/downloads/acci_2001_paper.pdf.
17. Rangel, J. M., P. H. Sparling, C. Crowe, P. M. Griffin, and D. L. Swerdlow. 2005. Epidemiology of *Escherichia coli* O157:H7 outbreaks, United States, 1982–2002. Emerging Infect. Dis. 11(4):603–609.
18. Rhee, M. S., S. Y. Lee, V. N. Hillers, S. M. McCurdy, and D-H. Kang. 2003. Evaluation of consumer-style cooking methods for reduction of *Escherichia coli* O157:H7 in ground beef. J. Food Prot. 66:1030–1034.
19. Slutsker, L., A. A. Ries, K. Maloney, J. G. Wells, K. D. Greene, and P. M. Griffin. 1998. A nationwide case-control study of *Escherichia coli* O157:H7 infection in the United States. J. Infect. Dis. 177:962–966.
20. US Department of Agriculture, Food Safety and Inspection Service. 2008a. Food Safety Education: Thermy™, http://www.fsis.usda.gov/food_safety_education/thermy/index.asp, accessed June 30, 2008.
21. US Department of Agriculture, Food Safety and Inspection Service. 2008b. Microbiological results of raw ground beef products analyzed for *Escherichia coli* O157:H7, http://www.fsis.usda.gov/Science/Ground_Beef_*E. coli*_Testing_Results/index.asp, accessed June 30, 2008.
22. US Department of Agriculture, Food Safety and Inspection Service. 2008c. Ohio firm recalls ground beef products due to possible *E.coli* O157:H7 contamination, Retail Recall Release, FSIS-R01-2008, Class I Recall, June 25, http://www.fsis.usda.gov/News_&_Events/R01-2008_release/index.asp, accessed June 30, 2008.
23. US Department of Agriculture, Food Safety and Inspection Service. 2007. Recall Case Archive – 2007 http://www.fsis.usda.gov/fsis_recalls/Recall_Case_Archive_2007/index.asp, accessed August 28, 2008.
24. US Department of Agriculture, Food Safety and Inspection Service. 2003a. Color of cooked ground beef as it relates to doneness, http://www.fsis.usda.gov/FactSheets/Color_of_Cooked_Ground_Beef/index.asp.
25. US Department of Agriculture, Food Safety and Inspection Service. 2003b. Labeling and Consumer Protection Labeling 101 Presentation, Slide 24, http://www.fsis.usda.gov/Frame/FrameRedirect.asp?main=http://www.fsis.usda.gov/OPPDE/larc/Policies/Label101/Index.htm, October 15.
26. US Department of Agriculture, Food Safety and Inspection Service. 2002. Backgrounder: New measures to address *E. coli* O157:H7 contamination. http://www.fsis.usda.gov/OA/background/ec0902.pdf, accessed June 30, 2008.
27. US Department of Agriculture, Food Safety and Inspection Service News Release. 2000. USDA launches food thermometer education campaign, Release No. 0177.00, May 25, http://www.fsis.usda.gov/oa/thermy/usda_rls.htm.

Control of *Salmonella* in Low-Moisture Foods I: Minimizing Entry of *Salmonella* into a Processing Facility

Part one of a three-part series

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ABSTRACT

There is a common misconception that low numbers of *Salmonella* are not a problem in low-moisture foods because these products do not support *Salmonella* growth. However, low numbers of *Salmonella* in foods can cause illness, and the presence of the organism in low-moisture ready-to-eat foods must be prevented. Over the past several decades, a number of outbreaks of salmonellosis have been associated with the consumption of ready-to-eat low-moisture products, including chocolate, powdered infant formula, raw almonds, toasted oats breakfast cereal, dry seasonings, paprika-seasoned potato chips, dried coconut, infant cereals and, more recently, peanut butter, products containing peanut-derived ingredients, and children's snacks made of puffed rice and corn with a vegetable seasoning. These outbreaks underscore the difficulty of eradicating *Salmonella* from the environment of dry product manufacturing facilities and highlight the need to reinforce industry preventive control measures through guidance based on the best available information. To address the need for industry-wide guidance, the Grocery Manufacturers Association formed a *Salmonella* Control Task Force to develop, through a review and synthesis of industry programs and information from the literature, this guidance document, which includes seven elements for the control of *Salmonella* in the manufacture of low-moisture foods. Two of the control elements, preventing ingress or spread in a facility and controlling raw materials, are described in this paper, along with background information on outbreaks and an overview of current industry practices. This is the first in a three-part series of articles.

INTRODUCTION

Low-moisture products such as peanut butter, infant formula, toasted cereals, and dry aniseed are characteristically low water activity (a_w) foods that do not support the growth of *Salmonella*. Yet all of these products have been implicated in outbreaks of salmonellosis. Investigations of these outbreaks indicate that *Salmonella* cross contamination in low-moisture foods occurred because of poor sanitation practices, poor equipment design, improper maintenance or poor ingredient control. As a result of an outbreak of *Salmonella enterica* serotype Tennessee infections associated with the consumption of peanut butter in 2006–2007 *(12)*, intensified efforts have been taken to reassess industry practices for controlling *Salmonella* in low-moisture products. These products include those exposed to the processing environment following a final lethality step, products that are not subjected to an inactivation step, or products in which *Salmonella*-sensitive ingredients are added after an inactivation step.

To address the need for industry-wide guidance, the Grocery Manufacturers Association (GMA) formed a *Salmonella* Control Task Force to develop a guidance document through a review and synthesis of industry programs as well as information from the literature. The industry practices in this document have been collated by the Task Force to provide guidance on approaches to control *Salmonella* and help assure the microbial safety of low-moisture products. The information in the guidance document is being published here in three general interest papers in order to ensure wide dissemination of the information.

OUTBREAKS AND RECALLS DUE TO *SALMONELLA* IN LOW-MOISTURE PRODUCTS

Salmonella outbreaks from low-moisture products are relatively rare but often impact large numbers of people. In the US between 1996 and 2006, of 64 outbreaks (with 5,981 cases) of salmonellosis reported for FDA-regulated foods (exclud-

TABLE 1. Selected *Salmonella* outbreaks associated with low-moisture products

Year	Product implicated	Etiologic agent	Country	Reference
1970	Chocolate	*S.* Durham	Sweden	*(38)*
1972	Fishmeal[a]	*S.* Agona	US	*(21)*
1973	Milk powder	*S.* Derby	Trinidad	*(27)*
1982–83	Chocolate	*S.* Napoli	UK	*(43)*
1985–86	Chocolate	*S.* Nima	Canada, US	*(47)*
1987	Chocolate	*S.* Typhimurium	Norway, Finland	*(54)*
1993	Paprika-seasoned potato chips	*S.* Saintpaul, *S.* Javiana, *S.* Rubislaw	Germany	*(57)*
1993	Powdered infant formula	*S.* Tennessee	Canada, US	*(9)*
1995	Infant cereals	*S.* Senftenberg	UK	*(67)*
1996	Peanut butter	*S.* Mbandaka	Australia	*(64)*
1996	Peanut-flavored maize snack	*S.* Agona	Multiple countries[b]	*(55, 71)*
1998	Toasted oats cereals	*S.* Agona	US	*(10)*
2000–01	Raw almonds	*S.* Enteritidis	US, Canada	*(11)*
2001	Peanuts	*S.* Stanley, *S.* Newport	Multiple countries[c]	*(59)*
2001	Chocolate	*S.* Oranienburg	Multiple countries[d]	*(31, 36, 39, 79)*
2002	Tahini and Halva	*S.* Montevideo	Australia	*(75)*
2003–04	Raw almonds	*S.* Enteritidis	US, Canada	*(11)*
2006	Chocolate	*S.* Montevideo	UK	*(37)*
2006–07	Peanut butter	*S.*Tennessee	US	*(12)*
2007	Children's snack	*S.* Wandsworth, *S.*Typhimurium	US	*(13)*
2008	Puffed cereals	*S.* Agona	US[e]	*(14)*
2008	Powdered infant formula	*S.* Give	France	*(53)*
2008–09	Peanut butter, peanut butter-containing products	*S.* Typhimurium	US, Canada[f]	*(17)*

[a]*Salmonella* in a poultry product associated with human illnesses was traced back to fishmeal

[b]Including UK, US, and Israel

[c]Including Australia, Canada, and UK

[d]Including illnesses in Germany, Denmark, Austria, Belgium, Finland, Netherlands, Sweden and positive products in Canada, Croatia, and Czech Republic

[e]Puffed rice cereals and puffed wheat cereals were implicated in the outbreak; the same *Salmonella* Agona strain from the same manufacturer was implicated in the 1998 outbreak involved toasted oats cereals

[f]One case was reported in Canada

ing eggs), only 2 were from low-moisture processed food products *(81)*. In addition, one outbreak resulted from cake batter ice cream in which the source of *Salmonella* Typhimurium was the cake batter mix *(33)*, which was not intended for use in a ready-to-eat food such as ice cream. However, the two outbreaks attributed to low-moisture food products (toasted oats cereal and peanut butter) involved a large number of illnesses. During the course of the outbreak investigations, CDC reported 209 cases attributed to toasted oats cereal in 11 states between April and June 1998 *(10)* and 628 cases attributed to peanut butter in 47 states between August 2006 and May 2007 *(12)*. These two outbreaks eventually accounted for 1,037 clinically confirmed cases of illness *(81)*. Moreover, a second major *Salmonella* outbreak in the US attributed to peanut butter and products containing peanut-derived ingredients *(17, 34)* involved more than 500 cases in 43 states between September 2008 and January 2009 and again highlighted the need to address the problem of *Salmonella* in low-moisture products. Because of the large number of unreported cases of salmonellosis for all types of products *(60)*, the actual number of cases was likely much higher.

Over the past several decades, a number of outbreaks of salmonellosis have been associated with the consumption of ready-to-eat low-moisture products, including chocolate, powdered infant formula, raw almonds, toasted oats breakfast cereals, dry seasonings, paprika-seasoned potato chips, dried coconut, infant cereals and, more recently, peanut butter and children's snacks made of puffed rice and corn with a vegetable seasoning (Table 1). A search of the EU pathogen alert system showed that *Salmonella* has been detected in coriander, dehydrated onions, dried mushrooms, sesame seeds, dried sage, spices, and soybean meal *(5)*. A review of recall records at FDA by Vij and colleagues *(77)* showed that from 1970 to 2003, there were 21 recalls involving spices and herbs contaminated with *Salmonella*. Sixteen of these recalls

TABLE 2. *Salmonella* levels in chocolate associated with outbreaks[a]

Year	Serovar	*Salmonella* level (CFU/g)	Vehicle[b]	Source of contamination	No. of illness cases	Country	References
1973–1974	*S.* Eastbourne	2.5	Chocolate balls from Canada	Cocoa beans	200	US, Canada	*(23, 24)*
1982	*S.* Napoli	2–23	Chocolate bars from Italy	Contaminated water (postulated)	272	England, Wales	*(40)*
1985–1986	*S.* Nima	0.04–0.24	Chocolate coins from Belgium	Unknown	_	Canada	*(47)*
1987	*S.* Typhimurium	≤1	Chocolate products from Norway (postulated)	Avian contamination	349	Norway, Finland	*(54)*
2001–2002	*S.* Oranienburg	1.1–2.8	Two chocolate brands from Germany	Unknown	439	Germany, other European countries	*(79)*

[a]Adapted from Werber et al.

[b]In each outbreak, the identified vehicles were traced to a single manufacturer.

occurred during 2001–2004, and 12 of them involved spices imported from around the world (India, Spain, Turkey, Egypt, Jamaica, Mexico, and Taiwan). The products in these recalls included ground black pepper, ground cumin, ground oregano, paprika, red pepper powder, ground sage, sesame seeds as well as ground thyme, and the herb basil leaves *(77)*.

The presence of *Salmonella* in low-moisture products is a concern because low numbers of *Salmonella* in foods can cause illness. This is contrary to a common misconception that low numbers of *Salmonella* are not a problem in low-moisture foods because these products do not support *Salmonella* growth. *Salmonella* does not need to grow to cause illness; in some instances, infection has occurred from consuming low-moisture products contaminated with less than 1 CFU/g, depending on the host, the product, and the *Salmonella* strain. For example, several incidents involving low numbers of salmonellae in chocolate have been reported over the years (Table 2). In an outbreak attributed to paprika and paprika-powdered potato chips *(57)*, *Salmonella* was found at 0.04–0.05 CFU/g in the snacks. In the 2006–2007 outbreak associated with peanut butter, *Salmonella* was found at 1.5 MPN/g in an unopened jar, and a lower level was found in another product sample *(83)*. Chocolate contaminated with low levels of *Salmonella* Montevideo was associated with a number of cases in the UK in 2006 *(2, 37)*. A chocolate-related outbreak provided the first strong evidence that large numbers of salmonellae were not necessarily a prerequisite for human infection *(25, 26, 27)* and that the composition of a food ingredient (e.g., high in fat) may protect *Salmonella* against the acidic conditions of the stomach, thus increasing the likelihood of illness from consuming low numbers of the organism. Even small numbers of salmonellae present in the product could colonize the lower gastrointestinal tract and produce clinical symptoms *(78)*.

Salmonella infections associated with the consumption of contaminated confectionery products such as chocolate, candy and cocoa powder, although rare, have been known since the late 1960s *(25, 50)*. For example, cocoa powder contaminated with *Salmonella* Durham was used in confectionery products that caused an outbreak affecting 110 people in Sweden *(38)*. Common to all reported chocolate outbreaks is the relatively long duration of the outbreak, wide geographic dissemination, and the large number of affected people, comprised mainly of children *(23, 24, 38, 40, 54)*. In addition, very small numbers of *Salmonella* recovered from chocolates in these outbreaks indicated a low infectious dose. In an international outbreak associated with chocolate made in Germany, estimates of the numbers of *Salmonella* Oranienburg ranged from 1.1 to 2.8 cells per gram *(79)*. *Salmonella* Nima was found at levels as low as 0.04 cells/g in Belgium-made chocolate coins implicated in an outbreak in Canada *(47)*.

Recommendations for control measures for *Salmonella* in dried milk products were established after outbreaks of salmonellosis traced to these products occurred in the 1960s and 1970s *(50, 61)*. However, outbreaks from low-moisture products have continued to occur periodically (Table 1). Notably, an outbreak associated with puffed wheat and rice cereal *(14)* involved the same strain of *Salmonella* Agona that had been implicated in an outbreak ten years earlier from a toasted oats cereal produced within the same manufacturing facility. Finding the same strain in products produced within the same facility suggests that this organism may have persisted within the facility over the 10-year time period. In addition to illnesses associated with the consumption of low-moisture products, a recent multistate outbreak in the US involved the handling of contaminated dry dog foods as the source of human infections of *Salmonella* Schwarzengrund *(15)*. The dog food manufacturer has since closed the implicated production facility because of a second recall linked to the same organism *(16)*. These outbreaks underscore the difficulty of eradicating *Salmonella* from the environment of dry products manufacturing facilities and illustrate the wide diversity of low-moisture products that can be contaminated with *Salmonella* and cause illness. These outbreaks also highlight the need to reinforce industry preventive control measures through guidance based on the best available information.

PERSISTENCE OF *SALMONELLA*

Salmonella can persist for long periods of time in the dry state and in low-moisture products. The ability of the organism to survive under dry and other adverse environmental conditions makes it difficult to control. Although some reduction of numbers occurs in low-moisture foods during storage, the degree of reduction depends on many factors, such as storage temperature and product formulation. In challenge studies, *Salmonella* was detected in chocolate

products after 1–9 months of storage at room temperature *(74)*, in peanut butter products after 6 months of storage at room temperature and after storage for more than 6 months at refrigeration temperature *(6)*. *Salmonella* Enteritidis PT 30, a strain associated with an outbreak from raw almonds, was isolated from an almond farm over a period of 5 years *(76)*. Although storage of high fat low-moisture products at low temperatures (e.g., refrigeration) may be beneficial in preventing oxidative rancidity, low temperatures may enhance the survival of *Salmonella*.

HEAT RESISTANCE OF *SALMONELLA*

Heat resistance of *Salmonella* is greatly increased at reduced water activities in food matrices (exceptions to this trend observed in laboratory media are discussed in a later section). *Salmonella* Typhimurium was reported to have a D-value of 816 min at 66°C in molten chocolate *(41)* and was more heat resistant than *Salmonella* Senftenberg 775W evaluated in the same product. Serovars of *Salmonella* (Agona, Enteritidis and Typhimurium) in peanut butter showed no significant differences in heat resistance *(70)*. When heat resistance parameters were determined based on the linear portion of the inactivation curve for *Salmonella* on oil-roasted almonds, the D-value was 0.85 min at 121°C and the z-value was 27°C *(46)*. The nonlinear Weibull model was also used to fit inactivation curves for *Salmonella* in heated peanut butter and on oil-roasted almonds. Based on this model, 42 ± 8 min at 90°C was needed to give a 5-log reduction of a mixture of three outbreak-associated *S.* Tennessee strains in peanut butter *(29)*, and more than 260 min was needed to reduce *Salmonella* by 7 log CFU/g at 70°C in peanut butter *(70)*. For oil-roasted almonds, 2.06 ± 0.57 min at 121°C was needed to achieve a 5-log reduction of *S.* Enteritidis PT 30 based on the Weibull model *(1)*, in comparison to 4.25 min at 121°C needed for 5-log reduction based on the D-value *(46)*. Increasing solids level in dried milk increased the heat resistance of *Salmonella* Alachua *(28)*. At 57°C, the D-value was 38, 12.5, and 1.6 min for *S.* Alachua in 51%, 42% and 10% milk solids concentrate, respectively. The z-value likewise increased as the solids level in the milk was increased. The z-value for *S.* Alachua was reported as 4.1, 6.2 and 6.9°C at 10, 42 and 51% milk solids, respectively.

The heat resistance of *Salmonella* is affected by many factors, including strain and serotypes tested, growth and storage conditions, food composition, test media and the media used to recover heat damaged cells. In some cases, setting process parameters based on D- and z-values would be a more conservative approach than setting them on the basis of the nonlinear Weibull model. Because of variations in these parameters, it is important, when published heat resistance data are applied to certain food processes, that the conditions under which the values were obtained not be significantly different from the product or process conditions used by the processor.

A REVIEW OF EXISTING INDUSTRY PRACTICES

A survey was conducted in May 2007 to obtain information from GMA members on current practices and measures the industry employs to control *Salmonella* in manufacturing low-moisture products, i.e., foods with a_w below 0.85, including products such as cereal, chocolate, spray-dried milk, infant formula, and peanut butter. A total of 17 companies/plants responded to the survey.

All respondents (100%) had standard operating procedures (SOPs) to eliminate or minimize cross contamination from raw ingredients or from the environment. Sixteen of 17 respondents (94%) required "*Salmonella*-sensitive" ingredients (those that could be potentially contaminated) to be sourced from an approved supplier. While 16 respondents (one did not respond to this question) had an environmental monitoring program for *Salmonella* on non-product contact surfaces, 2 of the 16 respondents (12.5%) monitored *Salmonella* on product contact surfaces on a routine basis. Fifteen of 17 respondents (88%) had an environmental monitoring program for non-product contact surfaces. The majority of respondents (80–90%) implemented the following practices: testing of "*Salmonella*-sensitive" ingredients (either in house or by the supplier); inclusion of equipment sanitary design review in the *Salmonella* control program; and vali-dation of the lethality of thermal processes for *Salmonella*.

Half or more of the respondents (50–70%) routinely analyzed finished products for *Salmonella* as part of quality assurance, established "high hygiene" zones with particularly stringent hygiene requirements and procedures, and analyzed the air systems (HVAC) for *Salmonella* as part of the environmental monitoring program. Fifty-three percent of respondents had manufacturing periods for the dry portion of their operations that extended 7 days or longer (several companies run production for 28 to 35 days) prior to shutting down for sanitation. Forty-seven percent of respondents had a captive shoes policy (i.e., shoes worn solely within the facility) in place for employees, including temporary contractors. In addition to being asked about industry practices, respondents were asked about situations that could introduce water into the facility, and 56% of them reported roof leaks or other water leak incidents into the production area.

Another survey was conducted several years ago by the Food Industry Microbiology Round Table *(56)* on industry practices of environmental monitoring for non-meat products. Among 20 respondents with programs to monitor the process environment for pathogens, 15 monitored for *Salmonella* weekly or monthly. Four companies monitored daily, two respondents monitored quarterly, and one monitored twice a year. For the number of samples taken at these frequencies, a slight majority (11 out of 20) obtained 10–20 samples, while others took either fewer than 10 or 21–50 samples. More than half of the respondents (12 out of 20) divided the process environment into zones, with samples being taken during production (6 out of 20), after sanitation (2 out of 20), or after sanitation and during production (6 out of 20 respondents). Some companies preset the sampling sites (8 out of 20), others randomly selected sites (9 out of 20), and still others did both (3 out of 20). The vast majority of the sampling was done by plant personnel (18 out of 20) but occasionally it was done by corporate personnel (1 out 20) or both (1 out of 20 respondents).

An expert meeting convened by the Food and Agriculture Organization and the World Health Organization (FAO/WHO) issued a report on *Enterobacter sakazakii* and *Salmonella* in powdered infant formula *(32)*. A detailed description on the management of *Salmonella* and *E. sakazakii* (*Cronobacter* spp.) in powdered infant formula was also published recently *(22)*. These reports included a summary of risk-reduction strategies the infant formula industry has taken for the past 30–40 years. Triggered by outbreaks or isolated cases associated with *Salmonella* and *E. sakazakii* in infant formula, the industry has implemented specific control measures to prevent contamination of products with *Salmonella*. The general principles described in the reports are as follows:

1. Avoid entrance of *Salmonella* into the processing facilities, particularly the zones from drying to filling that are considered as high hygiene areas.
2. Prevent *Salmonella* growth in case of entry and prevent the establishment of *Salmonella* niches in the facility.
3. Use hygienic design for high hygiene zones and equipment in these zones.
4. Use "*Salmonella*-negative" dry-mixed ingredients based on a sampling plan such as the ICMSF

case 15 (n = 60, c = 0, m = 0, size = 25 g), recognizing that the absence of *Salmonella* cannot be achieved based on product testing alone.

These general principles are considered applicable to *Salmonella* control for other reduced a_w products such as dried dairy products and dry-mixed ingredients (such as soy-based products) in which the organism is recognized as a significant hazard. Strategies considered effective for controlling *Salmonella* in confectionery products *(80)* include an understanding of the microbial ecology in the plant, process and production control, moisture control, testing of ingredients to be added after the inactivation step, and environmental monitoring.

GMA member companies producing products in the low-moisture product category apply HACCP principles to a wide range of products. HACCP includes the following seven principles *(63)*:

1. Conduct a hazard analysis.
2. Determine the critical control points (CCPs).
3. Establish critical limits.
4. Establish monitoring procedures.
5. Establish corrective actions.
6. Establish verification procedures.
7. Establish record-keeping and documentation procedures.

The basic concept underlying HACCP is to prevent the occurrence of food safety hazards in the finished product by building safety into the process. Prevention is a component of the overall food safety management system to control *Salmonella* in low-moisture products. One or more of the HACCP principles may be applied as part of a *Salmonella* control program, including conducting a hazard analysis on sensitive dry-mix ingredients, establishing critical control point(s) to eliminate *Salmonella*, validating critical limits, establishing verification procedures and assessing the risk of post-lethality recontamination. This guidance document reflects the application of HACCP principles founded on good manufacturing practices and other prerequisite programs to minimize the risk of *Salmonella* contamination in low-moisture products.

SCOPE OF THE GUIDANCE

This guidance describes practices for the control of *Salmonella* when manufacturing low-moisture foods with a_w below 0.85. The guidance is applicable to various products that include, but are not limited to, peanut butter, cereals, dry protein products (such as dried dairy products, soy protein, rice protein), confections (such as chocolate), snacks (such as corn chips), spices, animal feeds (both ingredients and finished products), pet foods and pet treats. Depending on the susceptibility of the product to *Salmonella* contamination, all or selected practices described in this guidance may be applied.

This guidance is based on the best available scientific data and information, as well as collective industry experiences. It is intended to be a living document that will be updated as new information or scientific data become available.

SALMONELLA CONTROL ELEMENTS

Contamination of low-moisture products with *Salmonella* is of concern in operations without an inactivation step (such as a dry-blending operation) or when contamination occurs after the inactivation step. *Salmonella* outbreaks associated with low-moisture products may occur because of the inclusion of contaminated raw ingredients, insufficient processing, or post-processing contamination *(8)*.

To minimize the risk of *Salmonella* contamination, the following seven elements should be applied to control *Salmonella* in low-moisture products:

1. Prevent ingress or spread of *Salmonella* in the processing facility.
2. Enhance the stringency of hygiene practices and controls in the Primary *Salmonella* Control Area.
3. Apply hygienic design principles to building and equipment design.
4. Prevent or minimize growth of *Salmonella* within the facility.
5. Establish a raw materials/ingredients control program.
6. Validate control measures to inactivate *Salmonella*.
7. Establish procedures for verification of *Salmonella* controls and corrective actions.

These seven elements of manufacturing practices are further elaborated in three publications, of which this is the first. Manufacturers of low-moisture products may consider modifying their programs where necessary, based upon this guidance. Basic principles for good manufacturing practices (GMPs; also referred to as good hygiene practices, GHPs) have been outlined elsewhere, e.g., in the FDA cGMP regulations 21 CFR 110 *(18)* and the Codex general principles of food hygiene *(7)*, as are HACCP principles and application guidelines *(7, 52, 63, 69)*. This guidance is not intended to be all-encompassing or to replace basic GMPs and the development of a product- and process-specific HACCP plan. Rather, the guidance serves to highlight practices important for control of *Salmonella* in low-moisture products. These guidelines may be used to develop a new food safety system or to augment an existing system already employed by a manufacturer or supplier.

This paper highlights Elements 1 and 5, both of which address measures to minimize the entry of *Salmonella* into a processing facility. Other elements are covered in subsequent papers *(19, 20)*.

SALMONELLA CONTROL ELEMENT 1: PREVENT INGRESS OR SPREAD OF *SALMONELLA* IN THE PROCESSING FACILITY

Facility maintenance, hygiene and pest control are necessary to avoid or minimize the ingress of *Salmonella* into the processing facility. Recognized vehicles for ingress and spread of *Salmonella* into the processing plant include sources related to raw ingredients (e.g., raw peanuts, bottom of pallets, floor of shipping trucks), integrity and design of the facility (e.g., leak from roof, inadequate separation of pre- and post-processing areas, poor equipment design), personnel (e.g., employee clothing/shoes, improper employee hygiene), and production-related processes (e.g., inadequate sanitation, improper traffic patterns) *(45, 62, 83)*. Raw materials used to manufacture low-moisture products, such as spices, raw cocoa beans, raw nuts, raw peanuts, flour and cereal grains, may be a potential source of *Salmonella*. Surveys reported the incidence of *Salmonella* ranged from 0.14% to 1.32% in wheat flour *(73)*, from 1.5% to 8.2% in untreated spice samples *(65)*, and was 1.5% in production samples and 1.1% in retail samples of dried spices and herbs in the UK *(68)*. Employees may carry *Salmonella* into the facility via shoes or clothing worn outside of the plant. Improper handling practices or traffic patterns, for both personnel and equipment, may also introduce *Salmonella* into the processing environment. Other potential sources of *Salmonella* include pests (e.g., birds, rodents and insects are known to carry *Salmonella* into, and spread it in, a manufacturing facility), improper air flow (e.g., air flow from non-ready-to-eat area to ready-to-eat area), poorly maintained ventilation units and employees with infections.

Adherence to basic GMPs for the facility, personnel and incoming materials is the foundation for *Salmonella* control. For example, holes in the roofs of buildings should be sealed off, bird nests should be removed, and overhang structures outside the facility that may attract birds should be re-designed *(42, 72)*. Since it is not possible to entirely prevent *Salmonella* from entering the facility, the raw materials handling area and other areas prior to inactivation steps should ideally be separated from the finished products handling area subsequent to the inactivation steps. A hygienic zoning concept should be applied to separate the facility into different areas, based upon their proximity to the

TABLE 3. Example check list related to potential *Salmonella* ingress and spread in a facility

Subject/Questions	Comments
PHYSICAL FACILITY & PLANT DESIGN	
1. Ceiling (drop ceilings) and walls clean and in good repair?	
• False ceilings designed with rigid insulating and proper sealing?	
• Any sign of leaks, condensate or stains?	
2. Deterioration or missing grout from floors, drains, brick? Cracks or delamination in wall/floor interfaces and along floor expansion joints?	
3. Floors constructed to prevent standing water and cleanable?	
• Floor drains corroded/rusted/joint cracks?	
• See page between rooms/doors noted?	
• Does the sub-floor have water flow ("aquifer") beneath the current floor?	
4. Sewer/drain back-up controls in place starting at the septic system moving to RTE areas (e.g., screens, backflow prevention device used)?	
• Drain mat covers (if applicable) properly maintained/cleaned/sanitized?	
• Trench drains adequately flushed and sanitized on a routine basis?	
5. HVAC refrigeration units cleaned and maintained on a periodic basis?	
• Any signs of leaks or condensate?	
• Is food dust getting on cooling or heating coils?	
• Is there a filter replacement SSOP?	
6. Condensate adequately controlled in processing zones to prevent product contamination?	
• Condensate piped to a sanitary drain or drip pans in place and maintained?	
7. Hoses in ready-to-eat filling areas free from leaks, clean, and kept off the floor during production?	
• Air, water, electrical hoses hanging over exposed product zones?	
EQUIPMENT DESIGN & CONDITION	
1. Equipment food contact surfaces (augers, belts, rollers, conveyors, filler hoppers, nozzles, blenders, cookers, slicers, etc.) free from cracks, chips, poor welds and microbial harborage points?	
• Hollow legs, handles, ladders, wheels, tools, in-floor scales, etc. exist which can collect stagnant water?	
• Non-product contact surfaces (framework, insulated lines, control panels, etc.) free of cracks, scratches, or potential harborage locations?	
2. Equipment (e.g., pipes, valves, hoses, belts, product & cooling lines, etc.) properly maintained and corrosion-free?	
• Unused supply lines removed in production areas?	
• Catwalks above product zones adequately cleaned and with splash guards in place?	
• Cooling water leaks from unpressurized equipment (e.g., chill roll, kettles, etc.)?	

finished product or relationship to the terminal *Salmonella* inactivation step.

Common Industry Practices

- ❑ Conduct a hazard analysis to determine potential sources of *Salmonella*. Take into consideration potential sources such as those associated with facility integrity, air flow and treatment, personnel and traffic movement, equipment design and incoming materials. For example:
  - Conduct an in-depth assessment of the facility, using a cross-functional team (and outside experts as appropriate) to identify potential problem areas and practices that could lead to *Salmonella* ingress or spread. Efforts should be made to ensure the integrity of the roof, floor and walls in the processing area and to minimize the use of drain pipes over processing lines (*7*).
  - Inspect intake vents to ensure that they are of sanitary design, cleanable, and fitted with appropriate filters.
  - Inspect exhaust vents to ensure they are hygienically designed to prevent condensate formation and accumulation around the vent exit and to prevent water dripping back into the facility. Ensure that exhaust ducts are of sanitary design and cleanable, and that "reverse air flow" does not occur.
  - Ensure that fire suppression systems internal to equipment (e.g., roasters, ovens, dryers and venting systems) are supplied with water of potable quality, that activation of suppression systems is logged, and that any resulting moisture is removed from internal surfaces of the equipment upon startup. For facility functions where no food contact takes place, "industrial water" (i.e., non-potable) may be utilized.

- ❑ Inspect the facility on a regular basis and repair and seal off any openings in a timely manner to ensure sound structure for the facility. An example of a check list for routine facility walk-through inspection is shown in Table 3.
  - Inspect the integrity of the facility for problems such as the presence of bird nests on the roof, roof overhang over a dock door that may become a place for birds to roost, pests in the facility, storage silos or bins without covers, roof leaks, and faulty sprinklers. Correct these problems in a timely manner and verify that the problems have been corrected by conducting enhanced environmental monitoring for the affected area according to procedures outlined in Element 7 *(20)*.
  - On a routine basis, review and assess adequacy of the pest control program, targeting pests such as insects, rodents, birds, reptiles, amphibians, etc. This may include the evaluation of the pest control contractor's program and walking through the facility to verify effectiveness of control (e.g., any evidence of pest activities). The building should be sealed to prevent pest entry.
  - Anticipate potential issues with facility integrity (e.g., a roof leak event) and put in place procedures to correct problems should they arise. To verify that the problems have been corrected, conduct enhanced environmental monitoring for the affected area according to procedures outlined in Element 7.
- ❑ Establish procedures to ensure that contaminated equipment is not brought into the facility.
  - Develop a sanitation SOP (SSOP) for new or used equipment prior to use.
  - Develop an SSOP for equipment acceptance and cleaning, sanitizing, and drying of equipment prior to allowing entry into the processing area. This is particularly important for used equipment, which may have been contaminated during its prior use.
- ❑ Establish controls to segregate ingredients known to be contaminated with *Salmonella*, such as raw nuts, flour, baker's yeast, spices, raw cocoa beans, grains, and meat and bone meals. Establish a supplier control prerequisite program to review and approve (raw) material suppliers. For ingredients that will be added to the finished product without a further inactivation step, more controls may be necessary, as elaborated in Element 5.
- ❑ Prevent or minimize cross contamination through procedures and activities such as the following:
  - Raw or unprocessed foods should be separated from processed/ready-to-use or ready-to-eat foods. Packaging materials should be protected from contamination during shipment, storage and use. Packaging should be inspected immediately prior to use to ensure that it is not contaminated or damaged.
  - Wherever possible, use dedicated forklifts, utensils, and maintenance tools for the Primary *Salmonella* Control Area (PSCA) or post-lethality area vs. raw or pre-lethality area. See Element 2 for more discussion *(19)*.
  - Outline traffic patterns properly and ensure employee compliance through education and training.
  - Inspect pallets and trailers regularly, keep them in good repair, and do not store them outside where they may be exposed to bird or pest activity.
  - Maintain the highest room air pressure in the PSCA or the post-lethality area and include the air handling system in the master sanitation schedule.
- ❑ Establish a program for water quality to minimize the risk of water as a potential carrier of *Salmonella*.
  - Establish procedures for sourcing and handling potable water within the facility.
  - Ensure that the water distribution system is properly maintained to prevent any leakage, especially in the PSCA. Use backflow prevention devices where needed.
  - Establish verification procedures to ensure that water brought into the facility is of adequate quality *(51)* and is not a source of *Salmonella*. This is also important for water for jacketed temperature controlled equipment, such as holding or mixing tanks that are double walled and filled with water to control temperature in the processing of chocolate, peanut butter, fat-based confections, etc. If the water quality in the system is not adequately maintained, contaminated water leakage through microfractures in the equipment could occur and result in the contamination of product being held or processed in the equipment.
  - When water usage is necessary in the processing area (e.g., for cleaning and sanitizing equipment), use minimal amounts. In particular, water usage in the PSCA should be avoided or kept to the very minimum. See Element 4 for further discussion *(19)*.
- ❑ Construction and major maintenance events should be coordinated so that the area under construction is contained.
  - Construction includes activities such as layout modifications requiring displacing pieces of equipment, resurfacing floors, cutting drains, cutting through walls, installing or removing exhaust ducts, etc. Because *Salmonella* can survive in dry environments for long periods of time, construction activities may release *Salmonella* from unknown harborage sites and contribute to the spread of the organism throughout the plant *(8)*.
  - Control measures during construction may include the following: isolate the construction areas, prevent/minimize dust and aerosols, control traffic patterns, use temporary partitions as appropriate, maintain negative air pressure in the construction area, intensify cleaning procedures, and enhance environmental monitoring during these activities, as described in Element 7.
- ❑ Put in place a training program to educate employees on the potential sources of contamination, adherence to traffic patterns, and proper hygienic practices to follow in order to minimize the ingress or spread of *Salmonella* in the processing area. Such training is particularly important for those who work in the PSCA, including personnel who enter the area on a temporary basis (e.g., maintenance crew, contractors).

TABLE 4. Examples of "*Salmonella*-sensitive" ingredients used in low-moisture products*

Chocolate, chocolate liquor, cocoa powder, chocolate chips, cocoa products
Nuts/nut products
Coconuts
Seeds/seed products
Grains/grain products (excluding starches)
Dried egg products
Fruits/fruit products (excluding candied or alcohol-packed fruits, jams or jellies)
Dairy ingredients and blends
Spices/herbs (excluding extracts), blended seasonings
Soy products
Gums/thickeners (excluding xanthan gum)
Yeast/yeast extract
Gelatin
Dry vegetables
Enzymes/rennets
Dry meat or meat byproducts

* This list is not inclusive of all sensitive ingredients.

SALMONELLA CONTROL ELEMENT 5: ESTABLISH A RAW MATERIALS/INGREDIENTS CONTROL PROGRAM

Low-moisture products may be manufactured in such a way that some ingredients are added after an inactivation step in the process or none of the ingredients are subjected to an inactivation step. For example, seasoning may be added to an extruded product after the heating step, ingredients for fortification may be added after milk pasteurization and spray drying, or products such as cold-pressed bars (e.g., nutrition bars) or dry blends may be produced by combining ingredients without an inactivation step. In order to prevent finished product contamination, it is essential not only to protect products from environmental contamination after the *Salmonella* inactivation step, but also to avoid introducing *Salmonella* from ingredients that are added without an inactivation step.

The addition of contaminated ingredients after the inactivation step has contributed to *Salmonella* contamination in finished products. For example, according to results from investigations of the 2007 *Salmonella* outbreak *(13)* associated with children's snacks, FDA found *Salmonella* Wandsworth in the broccoli powder used for seasoning the product after the inactivation step. Product samples obtained from the processing plant also tested positive for *Salmonella* Wandsworth and *Salmonella* Typhimurium, while samples taken from the plant environment tested negative *(58, 82)*. The manufacturer sourced ingredients from both domestic and international suppliers. An outbreak associated with potato chips in Germany *(57)* was traced to the use of contaminated paprika seasoning added after the inactivation step. In another instance, contaminated dried milk powder added to chocolate liquor after the *Salmonella* inactivation step (cocoa bean roasting) contributed to *Salmonella* in the finished milk chocolate. In the 2008–2009 outbreak of *Salmonella* Typhimurium attributed to peanut butter and peanut butter paste originating from a single processing plant *(17, 34)*, the potentially contaminated peanut butter and paste were distributed to more than 70 companies for use as an ingredient in hundreds of different products, including low-moisture products such as cookies, crackers, snack bars, cereal and candies. Because the peanut butter or paste was used in many products without a further inactivation step (e.g., peanut butter crackers, peanut butter snack bars) or the inactivation step was not fully validated (such as in peanut butter cookies subjected to baking), hundreds of product recalls by dozens of companies ensued *(17, 34)*. The latest outbreak and its cascade effects clearly illustrate the need to have knowledge about ingredient suppliers and their control programs and the need to verify that these programs are effective in controlling *Salmonella*.

FDA's inspection of the processing facility implicated in the *Salmonella* Typhimurium outbreak found a number of deficiencies *(35)*, including deficiencies in process control, e.g., lack of validation of the roasting step, and in GMPs, e.g., deficiencies in facility integrity and maintenance, plant construction and design, protection of equipment/containers/product against contamination, separation of raw and finished products, pest control, and sanitation program. Notably, FDA indicated that the plant did not clean a peanut paste line after *Salmonella* Typhimurium was isolated from the product, and continued manufacturing on the line for over three months *(35)*. FDA inspectors found that, in approximately a dozen instances, the plant released a product that had initially tested positive for *Salmonella* after retesting yielded negative results. Environmental samples collected by FDA inspectors at the facility tested positive for *Salmonella* Senftenberg and Mbandaka *(35)*. Such deficiencies can be uncovered by a robust supplier qualification and requalification process. Common industry practices outlined in the seven *Salmonella* control elements in this guidance may be used in evaluating whether a supplier has a comprehensive *Salmonella* control program in place.

"*Salmonella*-sensitive" ingredients are ingredients that have been historically associated with *Salmonella* (tested positive for the pathogen), have been implicated in past outbreaks, or are used to make products that are intended for at-risk individuals. When such ingredients are added to the finished product without further lethality, procedures should be in place to assure the control of *Salmonella* in these ingredients to avoid finished product contamination.

A supplier approval program should be developed to assess the adequacy of control measures the supplier has implemented for *Salmonella* control in sensitive ingredients. It is well known that the absence of *Salmonella* in sensitive ingredients, dry-mixed ingredients, or finished products cannot be assured through testing alone *(30, 32)*. Absence of *Salmonella* cannot be assured through acceptance or rejection of a lot according to requirements stated in a specification. The supplier approval program may include initial approval of the supplier; supplier audits; periodic requalification that takes into consideration key factors such as whether the supplier has a validated process and conducts microbiological monitoring of their process environment; and periodic raw material/ingredient testing upon receipt.

Common Industry Practices

- ❑ Create a list of "*Salmonella*-sensitive" ingredients, with an emphasis on those that are used without a further inactivation step in the finished product. Table 4 shows a list of "*Salmonella*-sensitive" ingredients commonly used in low-moisture products.
  - – Sensitive ingredients should be held under adequate hygiene conditions to avoid recontamination. Where feasible, sensitive ingredients should be stored in a segregated area.
  - – Before sensitive ingredients are brought into the PSCA, procedures should be in place to minimize cross contamination from packaging materials or containers used to transport bulk ingredients. For example, removal of the outer layer of multiple-layer bags prior to bringing the bags into the PSCA may be employed.
- ❑ Obtain sensitive ingredients from an approved supplier. An approved supplier is one that can provide a high degree of assurance that *Salmonella* is not likely to occur in the ingredient because appropriate process controls have been implemented. Establish a supplier approval program to ensure the adequacy of the supplier's food safety programs. The approval program should include components such as the following:
  - – Conduct an initial comprehensive audit of a supplier's food safety program.
  - – Use common practices outlined in the seven elements of this guidance where applicable as a basis for supplier approval. Industry practices from the GMA's Food Supply Chain Handbook *(44)* can also be applied as appropriate.
  - – Evaluate the supplier's food safety program for areas that include, but are not limited to, the following:
    - A pathogen environmental monitoring program
    - Sanitation practices
    - Raw materials/ingredients storage
    - A finished product hold and release testing program
    - Traceability
    - Process validation
    - A corrective action plan if positive *Salmonella* results are found, and an evaluation of the potential significance for other products or ingredients manufactured in the processing facility or on the line being evaluated
  - – Grant supplier approval that is specific to an individual facility or processing line.
  - – Conduct supplier requalification at a frequency based on risk. Consider that the supplier's history may not be a guarantee of future product safety and quality.
  - – Develop guidelines for adding and removing a supplier from the approval list based on the adequacy of its food safety program and its compliance to the program.
  - – Provide the supplier with ingredient specifications and ensure that the supplier is in agreement with the requirements. The specification should be lot-specific and include a requirement that the lot be *Salmonella*-negative. A complete microbiological criterion (sampling plan, methodology, etc.) should be defined. ICMSF or FDA BAM sampling plans *(3, 4, 48)* are commonly used as part of a criterion. Samples taken should be as representative as possible of the entire production lot.
- ❑ Develop a program for testing and using sensitive ingredients to be added to products without a lethality step or ingredients added after the lethality step. This is particularly important for situations involving new or unknown suppliers or where confidence in the supplier's *Salmonella* control program is lacking. The program should include components such as the following:
  - – Wherever possible, obtain a Certificate of Analysis (COA) from the supplier that includes results of *Salmonella* testing and sample size analyzed.
  - – Implement a hold and release testing program for COA verification or for ingredients that were obtained without a COA.
  - – Use approved testing labs (in-house or external). Laboratory approval should evaluate the ability of the laboratory to conduct *Salmonella* tests for the food(s) of interest. It may be of value to conduct this evaluation as an on-site laboratory audit. The laboratory must follow Good Laboratory Practices, which ideally should include proficiency testing (e.g., for *Salmonella* testing). Laboratories may or may not be certified (e.g., ISO 17025). These considerations should also be extended to the supplier's laboratory to ensure their COA results for sensitive ingredients are reliable.
  - – Use the FDA BAM or an ICMSF sampling plan (e.g., cases 10–15), depending on the ingredient and the robustness of the supplier's food safety program. The frequency of sampling may vary, e.g., once every lot (such as for a new ingredient from a new and unknown supplier), once every 6 lots, or less frequently, depending on the supplier.
  - – Make clear in the program that if a product sample tests positive for *Salmonella*, the tested lot is considered adulterated and it should not be released into commerce. It is important to note that retesting should not be conducted for the purpose of negating the initial test results (*49, 66*; see further discussion in Element 7). Conduct an evaluation of risk for *Salmonella* contamination to determine disposition of adjacent lots.
- ❑ Wherever possible, source an entire lot and strongly discourage being supplied with a split lot that has been distributed to multiple customers or multiple manufacturing plants. (This has the potential for one company's verification test to implicate another company's products.)
- ❑ All materials being tested for *Salmonella* should remain under manufacturer's control and be released for use only after acceptable test results are received.

SUMMARY AND CONCLUSIONS

Although *Salmonella* outbreaks from low-moisture products are relatively rare, they often impact large numbers of people. Human illnesses have been attributed to the handling of contaminated dry pet foods, as well as the consumption of a wide variety of contaminated low-moisture products. Control of *Salmonella* in low-moisture foods presents numerous challenges to manufacturers. The heat resistance of the organism can be

much greater at reduced a_w than in high-moisture foods, *Salmonella* can persist for extended periods of time in dry environments, prevention of recontamination requires stringent adherence to GMPs, and the presence of water in the environment can lead to growth niches that can be a source of contamination. To address the need for industry-wide guidance, the GMA *Salmonella* Control Task Force has developed guidance through a review and synthesis of industry programs and information from the literature. This paper described the *Salmonella* problem, the need for and the scope of the guidance and common industry practices to minimize the potential for *Salmonella* to enter the facility, including through stringent adherence to GMPs and control of raw materials/incoming ingredients. The two papers to follow outline additional practices that industry should follow to prevent product contamination.

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REFERENCES

1. Abd, S. J., K. L. McCarthy, and L. J. Harris. 2008. Use of the Weibull model to evaluate the impact of storage time and temperature on thermal inactivation of *Salmonella* Enteritidis PT 30 on oil-roasted almonds. P1–33, IAFP 2008 Abstract Book. IAFP Annual Meeting, August 3–6, Columbus, OH.
2. ACMSF (Advisory Committee on the Microbiological Safety of Food). 2006. Cadbury recall update 1 August 2006: Conclusion from ACMSF meeting 30 June. http://www.food.gov.uk/news/newsarchive/2006/aug/cadbury. Accessed October 28, 2008.
3. Andrews, W. H., and T. S. Hammack. 2003. Food sampling and preparation of sample homogenate, chap. 1. *In* US Food and Drug Administration Bacteriological Analytical Manual Online. Available at http://www.cfsan.fda.gov/~ebam/bam-1.html. Accessed October 28, 2008.
4. Andrews, W. H., and T. S. Hammack. 2007. *Salmonella*, chap. 5. *In* Food and Drug Administration Bacteriological Analytical Manual Online. Available at http://www.cfsan.fda.gov/~ebam/bam-5.html#Prep. Accessed October 28, 2008.
5. Betts, R. 2007. "Water, water, everywhere nor any drop to drink" – The problem of *Salmonella* in low-moisture foods. IAFP Special Interest Session on *Salmonella* growth, persistence and survival in low-moisture foods and their environment – strategies for control. IAFP Annual Meeting, July 8–11, Buena Vista, FL.
6. Burnett, S. L., E. R. Gehm, W. R. Weissinger, and L. R. Beuchat. 2000. Survival of *Salmonella* in peanut butter and peanut butter spread. J. Appl. Microbiol. 89:472–477.
7. CAC (Codex Alimentarius Commission). 2003. Recommended International Code of Practice General Principles of Food Hygiene. CAC/RCP 1–1969, Revision 4 (2003). World Health Organization-Food and Agriculture Organization of the United Nations, Rome, Italy. Available at http://www.codexalimentarius.net/web/standard_list.do?lang=en. Accessed October 28, 2008.
8. CAC (Codex Alimentarius Commission). 2008. Code of hygiene practice for powdered formulae for infants and young children. CAC/RCP 66. World Health Organization-Food and Agriculture Organization of the United Nations, Rome, Italy. Available at http://www.codexalimentarius.net/web/standard_list.do?lang=en. Accessed January 22, 2008.
9. CDC (Centers for Disease Control and Prevention). 1993. *Salmonella* serotype Tennessee in powdered milk products and infant formula — Canada and United States, 1993. Morb. Mortal. Wkly. Rep. 42:516–517.
10. CDC (Centers for Disease Control and Prevention). 1998. Multistate outbreak of *Salmonella* serotype Agona infections linked to toasted oats cereal – United States, April-May, 1998. Morb. Mortal. Wkly. Rep. 47:462–464.
11. CDC (Centers for Disease Control and Prevention). 2004. Outbreak of *Salmonella* serotype Enteritidis infections associated with raw almonds – United States and Canada, 2003–2004. Morb. Mortal. Wkly. Rep. 53:484–487.
12. CDC (Centers for Disease Control and Prevention). 2007. Multistate outbreak of *Salmonella* serotype Tennessee infections associated with peanut butter — United States, 2006–2007. Morb. Mortal. Wkly. Rep. 56:521–524.
13. CDC (Centers for Disease Control and Prevention). 2007. *Salmonella* Wandsworth outbreak investigation, June – July 2007. Information updated as of July 18, 2007. Available at http://198.246.98.21/*Salmonella*/wandsworth.htm. Accessed October 28, 2008.
14. CDC (Centers for Disease Control and Prevention). 2008. Investigation of outbreak of infections caused by *Salmonella* Agona. Available at http://198.246.98.21/*Salmonella*/agona/. Accessed September 2, 2008.
15. CDC (Centers for Disease Control and Prevention). 2008. Multistate outbreak of human *Salmonella* infections caused by contaminated dry dog food — United States, 2006–2007. Morb. Mortal. Wkly. Rep. 57:521–524.
16. CDC (Centers for Disease Control and Prevention). 2008. Update: Recall of dry dog and cat food products associated with human *Salmonella* Schwarzengrund infections — United States, 2008. Morb. Mortal. Wkly. Rep. 57:1200–1202.
17. CDC (Centers for Disease Control and Prevention). 2009. Multistate outbreak of *Salmonella* infections associated with peanut butter and peanut butter-containing products — United States, 2008–2009. Morb. Mortal. Wkly. Rep. 58:1–6.
18. CFR (Code of Federal Regulations). 2008. 21 CFR 110: Current good manufacturing practice in manufacturing, packing, or holding human food. Available at http://www.access.gpo.gov/nara/cfr/waisidx_08/21cfr110_08.html. Accessed January 31, 2009.
19. Chen, Y., V. N. Scott, T. A. Freier, J. Kuehm, M. Moorman, J. Meyer, T. Morille-Hinds, L. Post, L. A. Smoot, S. Hood, J. Shebuski, and J. Banks. 2009. Control of *Salmonella* in low-moisture foods II: hygiene practices to minimize *Salmonella* contamination and growth. Food Prot. Trends. Vol. 29 (7).
20. Chen, Y., V. N. Scott, T. A. Freier, J. Kuehm, M. Moorman, J. Meyer, T. Morille-Hinds, L. Post, L. A. Smoot, S. Hood, J. Shebuski, and J. Banks. 2009. Control of *Salmonella* in low-moisture foods III: process validation and environmental monitoring. Food Prot. Trends. Vol. 26 (8).
21. Clark, M., A. F. Kaufmann, and E. J. Gangarosa. 1973. Epidemiology of an international outbreak of *Salmonella agona*. Lancet 2:490–493.
22. Cordier, J.-L. 2008. Production of powdered infant formula and microbiological control measures, pp. 145–185. *In* J. M. Farber, and S. Forsythe (eds.). *Enterobacter sakazakii*. ASM Press. Washington, D.C.
23. Craven, P. C., W. B. Baine, D. C. Mackel, W. H. Barker, E. J. Gangarosa, M. Goldfield, H. Rosenfeld, R. Altman, G. Lachapelle, J. W. Davies, and R. C. Swanson. 1975. International outbreak of *Salmonella eastbourne* infection traced to contaminated chocolate. Lancet 1:788–793.
24. D'Aoust, J.-Y., B. J. Aris, P. Thisdele, A. Durante, N. Brisson, D. Dragon, G. Lachapelle, M. Johnston, and R. Laidley. 1975. *Salmonella eastbourne* outbreak associated with chocolate. Can. Inst. Food. Sci. Technol. J. 8:181–184.

25. D'Aoust, J.-Y. 1977. *Salmonella* and the chocolate industry: a review. J. Food Prot. 40:718–727.
26. D'Aoust, J.-Y. 1989. *Salmonella*, pp. 327–445. *In* M. P. Doyle (ed.). Foodborne Bacterial Pathogens. Marcel Dekker, New York.
27. D'Aoust, J.-Y., and J. Maurer. 2007. *Salmonella* species, pp. 187–236. *In* M. P. Doyle and L. R. Beuchat (eds.). Food Microbiology: Fundamentals and Frontiers. 3rd ed. ASM Press. Washington, D.C.
28. Dega, C. A., J. M. Goepfert, and C. H. Amundson. 1972. Heat resistance of salmonellae in concentrated milk. Appl. Microbiol. 23:415–420.
29. Doyle, M. P., and L. Ma. 4 February 2009. Recent findings from studies on the heat inactivation of *Salmonella* Tennessee and other isolates in peanut butter. Personal communication. [E-mail: mdoyle@uga.edu].
30. EFSA (European Food Safety Authority). 2008. Microbiological risk assessment in feeding stuffs for food-producing animals — scientific opinion of the panel on biological hazards. Adopted on June 5, 2008. Available at http://www.efsa.europa.eu/EFSA/efsa_locale-1178620753812_1211902004131.htm. Accessed October 28, 2008.
31. Ethelberg, S. 2002. International outbreak of *Salmonella* Oranienburg, October–December 2001, Part 2: Denmark. Euro Surveill. 6(3):pii=2006. Available at http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=2006. Accessed October 28, 2008.
32. FAO/WHO (Food and Agriculture Organization/World Health Organization). 2006. *Enterobacter sakazakii* and *Salmonella* in powdered infant formula. Microbiological Risk Assessment Series 10. Available at http://www.who.int/foodsafety/publications/micro/mra10/en/index.html. Accessed August 15, 2007.
33. FDA (Food and Drug Administration). 2005. FDA issues nationwide alert on possible health risk associated with cold stone creamery "cake batter" ice cream. Press release on July 1, 2005. Available at http://www.fda.gov/bbs/topics/NEWS/2005/NEW01200.html. Accessed October 28, 2008.
34. FDA (Food and Drug Administration). 2009. Recall of products containing peanut butter: *Salmonella* Typhimurium. Updated: January 28, 2009. Available at http://www.fda.gov/oc/opacom/hottopics/salmonellatyph.html. Accessed January 28, 2009.
35. FDA (Food and Drug Administration). 2009. Peanut Corporation of America (PCA), Blakely, GA: FDA form 483 (inspectional observations) Jan 9 – 27, 2008 [2009]. Available at http://www.fda.gov/ora/frequent/default.htm. Accessed January 28, 2009.
36. Fisher, I. S., B. de Jong, W. van Pelt, J. Aramini, C. Berghold, F. Matthys, J. Powling, and A. Siitonen. 2002. International outbreak of *Salmonella* Oranienburg, October–December 2001, Part 3: other countries. Euro Surveill. 6(3):pii=2007. http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=2007. Accessed October 28, 2008.
37. FSA (Food Standards Agency). 2006. Cadbury Schweppes plc recalls a range of its own brand chocolate products due to possible contamination with *Salmonella*. UK Food Standards Agency, Food Alerts June 23, 2006. Available at http://www.food.gov.uk/enforcement/alerts/2006/jun/cadburychoc. Accessed October 28, 2008.
38. Gastrin, B., A. Kampe, K. Nystrom, B. Oden-Johanson, G. Wessel, and B. Zetterberg. 1972. An epidemic of *Salmonella durham* caused by contaminated cocoa. Lakartidningen 69:5335–5338.
39. Gill, N., B. Reilly, and H. Smith. 2008. International surveillance network for the enteric infections *Salmonella* and VTEC O157 – Enter Net. Available at http://www.hpa.org.uk/hpa/inter/enter-net_outbreaks.htm. Accessed February 15, 2008.
40. Gill, O. N., P. N. Sockett, C. L. Bartlett, M. S. B. Vaile, B. Rowe, R. J. Gilbert, C. Dulake, H. C. Murrell, and S. Salmaso. 1983. Outbreak of *Salmonella napoli* infection caused by contaminated chocolate bars. Lancet i:574–577.
41. Goepfert, J. M., and R. A. Biggie. 1968. Heat resistance of *Salmonella typhimurium* and *Salmonella senftenberg* 775W in milk chocolate. Appl. Microbiol. 16:1939–1940.
42. Graham, D. J. 2007. Twenty-two common design errors that produce unsanitary conditions in a food plant. Graham Sanitary Design Consulting. Jackson, MI.
43. Greenwood, M. H., and W. L. Hooper. 1983. Chocolate bars contaminated with *Salmonella napoli*: an infectivity study. Brit. Med. J. 286:1394.
44. GMA (Grocery Manufacturers Association). 2008. Food Supply Chain Handbook. GMA, Washington, D.C. Available at http://www.gmabrands.com/publications/GMA_SupplyChain2.pdf. Accessed July 15, 2008.
45. Hall, P. 2007. *Salmonella* in low-moisture foods: learning from the past… looking to the future. IAFP Special Interest Session on *Salmonella* growth, persistence and survival in low-moisture foods and their environment – strategies for control. July 8–11, Buena Vista, FL.
46. Harris, L. J. 2008. *Salmonella* – factors affecting resistance to heat. IAFP Symposium S8 – Validating processes for reducing *Salmonella* in low water activity foods. IAFP Annual Meeting, August 3–6, Columbus, OH.
47. Hockin, J. C., J.-Y. D'Aoust, D. Bowering, J. H. Jessop, B. Khanna, H. Lior, M. E. Milling. 1989. An international outbreak of *Salmonella* Nima from imported chocolate. J. Food Prot. 52:51–54.
48. ICMSF (International Commission on Microbiological Specifications for Foods). 2002. Sampling plans and selection of cases and attributes plans, pp. 123–172. *In* Microorganisms in Foods 7: Microbiological Testing in Food Safety Management. Kluwer Academic/Plenum Publishers, New York.
49. ICMSF (International Commission on Microbiological Specifications for Foods). 2002. Experience in the use of two-class attributes plans for lot acceptance, pp. 183–197. *In* Microorganisms in Foods 7: Microbiological Testing in Food Safety Management. Kluwer Academic/Plenum Publishers, New York.
50. ICMSF (International Commission on Microbiological Specifications for Foods). 2005. Cocoa, chocolate, and confectionery, pp. 467–479. *In* Microorganisms in Foods 6: Microbial Ecology of Food Commodities. 2nd ed. Kluwer Academic/Plenum Publishers. New York.
51. ICMSF (International Commission on Microbiological Specifications for Foods). 2005. Water, pp. 574–596. *In* Microorganisms in Foods 6: Microbial Ecology of Food Commodities. 2nd ed. Kluwer Academic/Plenum Publishers. New York.
52. ISO (International Organization for Standardization). 2005. Food Safety Management Systems — Requirements for Any Organization in the Food Chain, ISO 22000:2005, 1st ed. Available at http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=35466.
53. Jourdan, N., S. Le Hello, G. Delmas, J. Clouzeau, C. Manteau, B. Désaubliaux, V. Chagnon, F. Thierry-Bled, N. Demare, F. X. Weill, and H. de Valk. 2008. Nationwide outbreak of *Salmonella enterica* serotype Give infections in infants in-France, linked to infant milk formula, September 2008. Euro Surveill. 13(39):pii=18994. Available at http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=18994. Accessed October 15, 2008.
54. Kapperud, G., S. Gustavsen, I. Hellesnes, A. H. Hansen, J. Lassen, J. Hirn, M. Jahkola, M. A. Montenegro, and R. Helmuth. 1990. Outbreak of *Salmonella typhimurium* infection traced to contaminated chocolate and caused by a strain lacking the 60-megadalton virulence plasmid. J. Clin. Microbiol. 28:2597-2601.
55. Killalea, D., L. R. Ward, D. Roberts, J. de Louvois, F. Sufi, J. M. Stuart, P. G. Wall, M. Susman, M. Schwieger, P. J. Sanderson, I. S. Fisher, P. S. Mead, O. N. Gill, C. L. Bartlett, B. Rowe. 1996. International epidemiological and microbiological study of outbreak of *Salmonella* Agona infection from a ready to eat savory snack — I: England and Wales and the United States. Brit. Med. J. 313:1105–1107.

56. Kuehm, J. 20 April 2007. Industry survey on environmental monitoring for pathogens, *Salmonella* methodology, and in process microbial control (non-meat processes). Presented at the 2002 Food Industry Microbiology Round Table. September 17, 2002. Chicago, IL. Personal communication. [E-mail: Jeff.Kuehm@fritolay.com].
57. Lehmacher, A., J. Bockemuhl, and S. Aleksic. 1995. Nationwide outbreak of human salmonellosis in Germany due to contaminated paprika and paprika-powdered potato chips. Epidemiol. Infect. 115:501–511.
58. Liang, A. 2008. Investigation and control of pathogens in dry foods and dry food processing environments. Presented at the Conference on Investigation and Control of Pathogens in Dry Foods and Dry Food Processing Environments. Bloomington, MN, October 6–7, 2008.
59. Little, C. 2001. *Salmonella* Stanley and *Salmonella* Newport in imported peanuts — update. Euro Surveill. 5(43):pii=2041. Available at http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=2041. Accessed January 28, 2008.
60. Mead, P. S., L. Slutsker, V. Dietz, L. F. McCaig, J. S. Bresee, C. Shapiro, P. M. Griffin, and R. V. Tauxe. 1999. Food-related illness and death in the United States. Emerg. Infect. Dis. 5:607–625.
61. Mettler, A. E. 1994. Present day requirements for effective pathogen control in spray dried milk powder production. J. Soc. Dairy Technol. 47:95–107.
62. McNamara, A.-M. 2007. *Salmonella*: the organism, its habitat, and testing. IAFP Special Interest Session on *Salmonella* growth, persistence and survival in low-moisture foods and their environment — strategies for control. IAFP Annual Meeting, July 8–11, Buena Vista, FL.
63. NACMCF (National Advisory Committee on Microbiological Criteria for Foods). 1998. Hazard Analysis Critical Control Point principles and applications guidelines. J. Food Prot. 61:762–775.
64. Ng, S., G. Rouch, R. Dedman, B. Harries, A, Boyden, L. McLennan, S. Beaton, A. Tan, S. Heaton, D. Lightfoot, M. Vulcanis, G. Hogg, W. Scheil, S. Cameron, M. Kirk, J. Feldheim, R. Holland, C. Murray, N. Rose, and P. Eckert. 1996. Human salmonellosis and peanut butter, Comm. Dis. Surveill. 20(14):326.
65. Pafumi, J. 1986. Assessment of the microbiological quality of spices and herbs. J. Food Prot. 49:958–963.
66. Rainosek, A. P. 1997. Inherent risks in acceptance sampling, p. 530–537. *In* R. E. Martin, R. L. Collette, and J. W. Slavin (eds.). Fish Inspection, Quality Control, and HACCP: A Global Focus Technomic Publishing Co., Inc. Lancaster, PA.
67. Rushdy, A. A., J. M. Stuart, L. R. Ward, J. Bruce, E. J. Threlfall, P. Punia, and J. R. Bailey. 1998. National outbreak of *Salmonella senftenberg* associated with infant food. Epidemiol. Infect. 120:125–128.
68. Sagoo, S. K., C. L. Little, M. Greenwood, V. Mithani, K. A. Grant, J. McLauchlin, E. de Pinna, and E. J. Threlfall. 2009. Assessment of the microbiological safety of dried spices and herbs from production and retail premises in the United Kingdom. Food Microbiol. 26:39–43.
69. Scott, V. N., and K. E. Stevenson (ed.). 2006. HACCP: A systematic approach to food safety, 4th ed. Food Products Association, Washington, D.C.
70. Shachar, D., and S. Yaron. 2006. Heat tolerance of *Salmonella enterica* serovars Agona, Enteritidis, and Typhimurium in peanut butter. J. Food Prot. 69:2687–2691.
71. Shohat, T., M. S. Green, D. Merom, O. N. Gill, A. Reisfeld, A. Matas, D. Blau, N. Gal, P. E. Slater. 1996. International epidemiological and microbiological study of outbreak of *Salmonella agona* infection from a ready to eat savoury snack–II: Israel. Brit Med. J. 313:1107–1109.
72. Silliker Laboratories. 2002. Controlling *Salmonella*: Strategies that work. IAFP AV Library. Available at http://www.foodprotection.org/memberinterest/AV_Library_Listing.pdf.
73. Sperber, W. H., and the North American Millers' Association Microbiology Working Group. 2007. Role of microbiological guidelines in the production and commercial use of milled cereal grains: A practical approach for the 21st century. J. Food Prot. 70: 1041–1053.
74. Tamminga, S. K., R. R. Beumer, E. H. Kampelmacher, and F. M. van Leusden. 1976. Survival of *Salmonella eastbourne* and *Salmonella typhimurium* in chocolate. J. Hig. (London). 76:41–47.
75. Tauxe, R. V., S. J. O'Brian, and M. Kirk. 2008. Outbreaks of foodborne diseases related to the international food trade. pp. 69–112. *In* M. P. Doyle, and M. C. Erickson (eds). Imported Food: Microbiological Issues and Challenges. ASM Press. Washington, D.C.
76. Uesugi, A. R., M. D. Danyluk, R. E. Mandrell, and L. J. Harris. 2007. Isolation of *Salmonella* Enteritidis phage type 30 from a single almond orchard over a 5-year period. J. Food Prot. 70:1784–1789.
77. Vij, V., E. Ailes, C. Wolyniak, F. J. Angulo, and K. C. Klontz. 2006. Recalls of spices due to bacterial contamination monitored by the US Food and Drug Administration: the predominance of salmonellae. J. Food Prot. 69:233–237.
78. Waterman, S. R., and P. L. C. Small. 1998. Acid-sensitive enteric pathogens are protected from killing under extremely acidic conditions of pH 2.5 when they are inoculated onto certain solid food sources. Appl. Environ. Microbiol. 64:3882–3886.
79. Werber, D., J. Dreesman, F. Feil, U. van Treeck, G. Fell, S. Ethelberg, A. M. Hauri, P. Roggentin, R. Prager, I. S. T. Fisher, S. C. Behnke, E. Bartelt, E. Weise, A. Ellis, A. Siitonen, Y. Andersson, H. Tschäpe, M. H.Kramer, and A. Ammon. 2005. International outbreak of *Salmonella* Oranienburg due to German chocolate. BMC Infect. Dis. 5:7doi:10.1186/1471-2334-5-7. http://www.biomedcentral.com/1471-2334/5/7. Accessed January 28, 2009.
80. Williams Jr., J., R. Clavero, J. H. Silliker, and R. S. Flowers. 2006. Microbial control for confectionery plants. The Manufacturing Confectioner, April 2006, pp. 75–78.
81. Zink, D. 2007. The return of *Salmonella*. IAFP Special Interest Session on *Salmonella* growth, persistence and survival in low-moisture foods and their environment – strategies for control. IAFP Annual Meeting, July 8–1, Buena Vista, FL.
82. Zink, D. 2007. FDA concerns about food safety. Presented at the Regulatory Update session at the Grocery Manufacturers/Food Products Association 2007 Fall Conference. October 30 – November 1. Washington, D.C.
83. Zink, D. 2008. Environmental investigation and regulatory response: *Salmonella* Tennessee in peanut butter in the United States, 2007. IAFP Symposium S1 – 2008 Foodborne disease update: *Salmonella* in processed foods. IAFP Annual Meeting, August 3–6. Columbus, OH.

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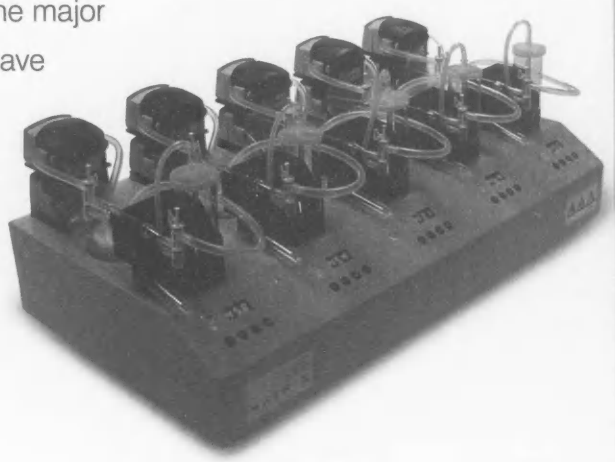

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NOTIFICATION OF PROPOSED AMENDMENTS TO THE INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION CONSTITUTION

Proposed changes to Article IV will be voted on by the IAFP Membership present at the IAFP Business Meeting, July 14, 2009 at 12:15 p.m. in Grapevine, Texas.

ARTICLE IV.
OFFICERS AND EXECUTIVE BOARD

A. The officers of IAFP shall be President, President-Elect, Vice President and Secretary, who shall hold these offices for one year or until their successors are elected or appointed, as provided in the Bylaws.

1. At the ~~termination~~ conclusion of each Annual Meeting, the President-Elect, Vice President, and Secretary shall automatically succeed to the offices of President, President-Elect and Vice President, respectively (rotation of Executive Board positions).
2. The Secretary will be elected by the members from candidates selected by the Nominating Committee, on a rotating basis, from education, government and industry members (categories of membership), as determined by majority ballot of votes cast. The elected Secretary assumes the Executive Board position upon conclusion of the first Annual Meeting taking place after the completion of their election.

B. The Executive Board shall consist of the Officers of IAFP, the Immediate Past President, and the Chairperson of the Affiliate Council.

C. The Executive Board must include, at all times, members officially connected with education, government, and industry. There must be at least one representative from each of the three categories at all times. Retirement (or a temporary or permanent separation from employment), without re-employment in a different category of membership, is viewed as remaining officially connected in the category of the member's last employment.

1. If the employment status of any member of the Executive Board changes after election to the Executive Board, ~~or~~ during ~~the~~ their term of ~~that office~~ service, or after pro tem appointment as provided in the Bylaws, so that the composition of members officially connected, as stated herein, is not maintained ~~in~~ by the Executive Board members, then such member shall ~~be deemed ineligible without prejudice and such office shall be declared vacant~~ become an ex-officio member of the Executive Board until such time that the proper composition of the Executive Board has been re-established.

1.1 A pro tem appointment shall be made from the proper category of membership to fill the open Executive Board position and to fulfill the Executive Board composition requirements of representation from education, government, and industry.

1.2 Once an election and rotation of Executive Board positions reestablishes representation from education, government, and industry, the ex-officio Executive Board member reassumes their proper position on the Executive Board and the pro tem appointment expires.

1.3 If the Executive Board member who becomes an ex-officio Executive Board member under Article IV, C1 above prefers not to continue as an ex-officio Executive Board member, the Executive Board may choose one of the options under Article IV, D to fill the vacancy.

1.4 All pro tem Executive Board appointments expire when the next rotation of Executive Board positions takes place.

~~2. The elective officer(s) will continue in their respective office(s) until their successors(s) are duly elected or appointed, as provided in the Bylaws.~~

D. In the event of the permanent absence of an officer due to illness, death or resignation, the duties of that position will be performed by the remaining Executive Board members until a pro tem appointment is made by the Executive Board or an election is held to fill the vacancy. If a pro tem appointment is made, it shall expire when the next rotation of Executive Board positions takes place.

1. In lieu of making a pro tem appointment for the vacated position, the Executive Board may choose to have any or all of the elected Executive Board members succeed to higher office and fill any vacant Executive Board position with a pro tem appointment until the next rotation of Executive Board positions takes place.
2. The Executive Board may choose to not make a pro tem appointment, depending on the circumstances.
3. The Executive Board may choose to hold a special election or provide for election of more than one office at the next scheduled election.

Rational: The changes to Article IV, Officers and Executive Board, are intended to give direction to the Association on what must take place if a Member of the Executive Board changes a category of Membership or becomes unable to serve in their appointed position during a term of service.

Report of IAFP Timely Topics Session on "Raw Milk Consumption: An Emerging Public Health Threat?"

February 17, 2009

by Robert L. Buchanan, Ph.D.

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University of Maryland
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The development of food safety programs and policy always has controversial aspects as the needs, desires, and concerns of specific segments of society have to be balanced against the general well being of the country. However, few food safety issues have had such a long history and intensity as the debate over the question: "Milk, to pasteurize or not to pasteurize?" The pros and cons of pasteurization have been debated since 1908 when Chicago required the pasteurization of all milk unless it came from tuberculin-tested cows. In 1924, the US Public Health Service developed the Standard Milk Ordinance to assist states with voluntary pasteurization programs, and ultimately the Food and Drug Administration introduced the Grade A Pasteurized Milk Ordinance (PMO) and barred the interstate sale of unpasteurized milk for direct consumption due to the high incidence being attributed to dairy products. Many of the individual states have adopted the PMO but others allow the intrastate sale of unpasteurized milk. The debate related to unpasteurized milk has once again resurfaced as several states are considering changes is their current requirements related to the direct sale of raw milk to consumers. As part of its leadership role in emerging issues in food protection, the International Association for Food Protection (IAFP), in collaboration with the Raw Milk Subcommittee of the Dairy Quality and Safety PDG, organized a "timely topics" session devoted to "Raw Milk Consumption: An Emerging Public Health Threat?" which was held in Arlington, VA on February 17, 2009.

After introductory remarks from IAFP President Stan Bailey, a highly engaged audience listened to experts in the fields of microbiology, epidemiology, nutrition, food processing, and law.

Allen Sayler of International Dairy Foods Association (IDFA), who along with Ronald Schmidt of the University of Florida, served as moderator of the symposium, kicked off the conference by providing a synopsis of the history of pasteurized regulations, both here and in other countries, that have been enacted in response to the past transmission of infectious diseases via milk and milk products. He then introduced some of the major points of controversy in relation to claims of unique benefits associated with raw milk or adverse effects that result from the pasteurization of milk. Some of the purported claims of adverse effects resulting from pasteurization identified were inactivation of natural antimicrobials present in raw milk, increased incidence of lactose intolerance, increases in milk allergies, increased incidence of arthritis, association with autism as a result of modification to casein, increased incidence of asthma, decreased bioavailability of calcium, and loss of lipid soluble and water soluble vitamins.

Isabel S. Maples, a National Dairy Council Ambassador, gave a wide-ranging presentation on the safety and nutritional benefits of milk, with a focus on comparing the relative risks and benefits of raw vs. pasteurized milk. She focused on two attributes, the retention of activity of various enzymes and immunoglobulins after pasteurization and milk's nutritional profile, particularly in relation to trace nutrients. She pointed out that one of the attributes of which many consumers are not aware is that many of the enzymes, such as the antimicrobial enzymes lysozyme and lactoperoxidase, retain most

of their activity after pasteurization. Additionally, the effect of pasteurization has minimal impact on most trace nutrients for which milk is an important source. Furthermore, certain vitamins are added to milk for purposes of offsetting losses (e.g., vitamin A additions to low-fat milk) or nutrient fortification (e.g., vitamin D). In the former case, consumers are generally unaware that the losses of lipid soluble vitamin A are not due to pasteurization but instead result from the reduction in fat content. Much of the discussion that followed centered around the adequacy of the nutritional and related studies that compared pasteurized vs. raw milk in relation to issues such as equivalent bioavailability. Interestingly, participants at the meeting indicated that few studies involving humans have been double blind studies, the "gold standard" for human clinical studies.

Dr. P. C. Vasavada reviewed the basic microbiology associated with dairy products, providing both information on the microbiological quality of milk and dairy products and the microorganisms that are pathogenic to humans that have been transmitted in milk. Historically, milk has been an important source of foodborne diseases, accounting for more that 25% of reported cases. This included several potentially life-threatening diseases such as tuberculosis, brucellosis, and salmonellosis. However, in recent years this has fallen to less than 1% as result of hygiene programs and pasteurization. Dr. Vasavada commented that a substantial number of the remaining cases involving enteric pathogens (e.g., *Campylobacter* spp., *Salmonella*, enterohemorrhagic *Escherichia coli*) involve unpasteurized milk. This is supported by several international surveys that indicate that frequency of human pathogens in milk varies from three microorganism ranging from 0.4 to 12.3%. He finished his presentation with a discussion of emerging pathogens such as *Enterobacter sakazakii*.

Ms. Caroline Smith-DeWaal, a well-known consumer advocate from the Center for Science in the Public Interest, provided a perspective on the issue of raw milk vs. pasteurized milk consumption from the standpoint of consumer perceptions and as a organization that maintains an extensive database on foodborne cases and outbreaks. Their database indicates that approximately 4% of the total foodborne disease outbreaks are associated with dairy products with milk accounting for approximately one third. Unpasteurized milk accounts for approximately 30% of the total dairy outbreaks and 70% of the milk outbreaks. Ms. Smith-DeWaal emphasized that the average US consumer is more cognizant of health issues related to foods and is expecting the dairy industry to be proactive in providing safe, wholesome foods.

Mr. Carl S. Custer, long time member of IAFP and retired microbiologist from the USDA Food Safety and Inspection Service, provided some background on regulatory approaches and concepts. He graciously took on this role at the last minute when it was determined that the invited representative from FDA could not attend due to the procedural restriction associated with the current review of raw milk policies. Mr. Custer drew upon his extensive knowledge of meat and poultry products to provide highly pertinent examples of regulatory approaches to controlling pathogenic microorganisms in raw animal products. He also spoke of the challenges that producers face if they are limited to relying only on controls during primary production.

Dr. Adam Langer of the US Centers for Disease Control and Prevention (CDC) provided the results of a policy analysis that was recently performed by the CDC. In this analysis, a total of 122 dairy product outbreaks that occurred between 1993 and 2006 were reviewed. They included 73 outbreaks (1,571 cases) involving unpasteurized products and 48 outbreaks (1,223 cases) involving pasteurized products. The two product classes had distinctly different etiologies with raw milk products predominately associated with *Campylobacter* spp. (55%), *Salmonella* (22%), and shiga toxin-producing *Escherichia coli* (14%) and pasteurized products associated with noroviruses (44%), *Salmonella* (20%), and *Campylobacter* (10%). This likely reflected differences in the source of contamination: on-farm contamination vs. post-pasteurization recontamination. Dr. Langer indicated that the CDC also looked at the outbreak data, comparing states that permitted the sale of unpasteurized milk vs. those that do not. As was expected, the incidence of outbreaks was almost 4 times higher in the states permitting its sale. The CDC concluded that unpasteurized dairy product outbreaks are more common and cause more severe illnesses than pasteurized products.

The final expert presentation was a fascinating talk by Bruce Clark of the law firm Marler Clark LLP, who introduced the audience to the concepts of product liability law as applied to unpasteurized dairy products. The legal logic is reasonably simple: (a) milk (raw or pasteurized) is a "product," (b) pathogen contaminated milk is "defective," and (c) the manufacturer (i.e., dairy) is "strictly liable" for injuries caused. Mr. Clark explained additional concepts such as comparative fault (the consumer knew the product was dangerous when they bought) and releases/waivers of liability (the consumer is willing to certify they are willing to take the risks). While these statements may protect the producer to some degree, the producer still has strict liability. Furthermore, a parent cannot sign a release or waiver for their children. He discussed the liability that trade associations take on if they endorse a product that causes injury.

A lively discussion followed, as the speakers engaged with the audience, which included members of the dairy industry (both those for and against the sale of unpasteurized milk), food safety professionals, academics, consumer advocates, and experts in food law and policies. The group focused on several points associated with the objective evaluation of health claims made for unpasteurized milk, interpretation of food laws and policies, and potential alternatives to current approaches. A key pair of questions asked of the audience members who are interested in the sale of unpasteurized milk were what are the characteristics that they want to retain and would they accept an alternative technology (e.g., treatment with high hydrostatic pressure) if it could retain those characteristics and eliminated pathogenic bacteria.

While it is unlikely that any minds were changed in this debate that has been ongoing for over a century, the IAFP Symposium on "Raw Milk Consumption: An Emerging Public Health Threat?" provided an invaluable service to the entire dairy industry by focusing on the science of food safety and by providing a platform wherein science could be potentially brought to bear on finding alternatives that can provide the high level of safety that consumers expect from dairy products.

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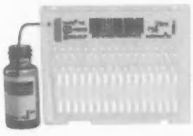

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We are proud to celebrate the 25th anniversary of our 3M Petrifilm Plates' introduction into the marketplace. Now an industry standard, these time-saving, sample-ready plates are uniquely designed to offer you increased productivity and reliability and a reduction in operational costs versus traditional methods of bacteria testing. The 3M Petrifilm Plates have changed the way food quality testing is done around the world.

In 2008, we were honored by the International Association for Food Protection with its most prestigious award, the Black Pearl, in recognition of 3M Microbiology's efforts in advancing food safety and quality through consumer programs, employee relations, educational activities, adherence to standards, and support of the goals and objectives of IAFP.

As the food industry is continuously challenged to find superior, yet more efficient and cost-effective tools for protecting the global food supply, 3M Microbiology is here to provide innovation solutions. We have dedicated ourselves to lead the way in research and development of many of the microbial testing methods used every day. In addition, we offer well-trained and informed worldwide field consultants who reach into more than 100 countries, as well as over 40 expert technical service representatives in key locations around the world.

For more information on 3M Microbiology, visit our Web site at www.3m.com/microbiology or call 800.328.6553.

Gold Sustaining Member Profile

Applied Biosystems

For more than 25 years, from the early days of the biotechnology revolution, Applied Biosystems, a division of Life Technologies Corporation, has been an innovation leader, providing sophisticated instrument-based systems that expand the horizons of life sciences research. The company's technologies make it possible to study the molecular building blocks of biology to an extent previously unimaginable and to validate and apply these discoveries in ways that improve our lives. Applied Biosystems innovations in automating DNA sequencing made possible the extraordinary decoding of all three billion units of the human DNA code.

With the industry's largest, most comprehensive, and most integrated portfolio of life sciences tools, Applied Biosystems serves more than 40,000 customers in more than 100 countries. The company's technologies advance science by extending the reach of scientists in academic, pharmaceutical, and clinical laboratories, and through applications such as forensics, quality control, and environmental testing.

Applied Biosystems is committed to protecting and improving human health by providing innovations to help ensure the quality and safety of foods. In 1996, Applied Biosystems introduced the world to real-time PCR with the release of the ABI PRISM® 7700 sequence detection system. Applied Biosystems was also the co-inventor of '5 nuclease assay, a PCR analysis technique using TaqMan products for measuring gene expression. The company has leveraged its assay design, sequencing and bioinformatics expertise to develop highly specific assays for the food pathogen testing market. The Applied Biosystems Food Pathogen Detection System uses real-time PCR and TaqMan® assays to identify pathogens at the molecular level, enabling quick and accurate detection of contaminants in materials ranging from environmental samples to food and finished products. The Applied Biosystems Food Pathogen Detection System is a complete testing solution, including sample prep, assays, instruments and software – all designed to work together. In addition, Applied Biosystems offers mass spectrometry-based solutions for identifying chemical contaminants such as melamine, pesticides, dyes and mold-related toxins in food.

Applied Biosystems offers the most comprehensive global technical service and support organization available. The company's field application specialists are experienced in quality and safety testing in environmental, food and finished product applications, and provide expert assistance to customers in their laboratories, over the phone, and online.

For more information on the Applied Biosystems Food Pathogen Detection System, please visit www.appliedbiosystems.com/foodsafety.

About Life Technologies

Life Technologies Corporation (NASDAQ:LIFE) is a global biotechnology tools company dedicated to improving the human condition. Our systems, consumables and services enable researchers to accelerate scientific exploration, driving to discoveries and developments that make life even better. Life Technologies customers do their work across the biological spectrum, working to advance personalized medicine, regenerative science, molecular diagnostics, agricultural and environmental research, and 21st century forensics. Life Technologies had sales of more than $3 billion in 2008, employs approximately 9,500 people, has a presence in more than 100 countries, and possesses a rapidly growing intellectual property estate of approximately 3,600 patents and exclusive licenses. Life Technologies was created by the combination of Invitrogen Corporation and Applied Biosystems Inc. For more information on how we are making a difference, please visit our website: www.lifetechnologies.com.

Gold Sustaining Member Profile

BD

Helping all people live healthy lives

BD Diagnostics, a leading global medical technology company that manufactures and sells medical devices, instrument systems and reagents, is dedicated to improving people's health throughout the world. BD is focused on improving drug therapy, enhancing the quality and speed of diagnosing infectious diseases, and advancing research and discovery of new drugs and vaccines. The company's capabilities are instrumental in combating many of the world's most pressing diseases. Founded in 1897 and headquartered in Franklin Lakes, New Jersey, BD employs approximately 27,000 people in approximately 50 countries throughout the world.

The company's original microbiology products division, Baltimore Biological Laboratories (founded in 1935 and acquired by BD in 1955), undertook the study of the preparation of peptones and development of culture media. The acronym "BBL" became the brand name for products offered by the company.

Difco Laboratories, founded in 1895, produced high quality enzymes, dehydrated tissues, and glandular products. In 1934, the focus was to develop new and improved bacteriological culture media, many of which were adopted as "standard" formulations in water, dairy, food, pharmaceutical and other microbiological laboratories.

In June 1997, the merger of Difco Laboratories with the Microbiology Systems division brought together the leading providers of microbiology products to industrial and clinical microbiology laboratories worldwide, with over 180 years of combined experience. Today, both businesses comprise BD Diagnostics – Diagnostic Systems, headquartered in Sparks, MD, near the city of Baltimore.

Continuing this tradition of excellence, BD has developed an innovative line of media that incorporates carefully selected synthetic chromogenic and/or fluorogenic substrates. This novel technology has been shown to provide improved accuracy and faster detection than other traditional primary culture media. Depending on the media type and organism, identification may be accomplished without the need for confirmatory testing, subculturing, or supplemental biochemical or latex testing, leading to more efficient use of technologist time and earlier reporting of final results. In addition, four chromogenic media, all BBL™ CHROMagar™ formulations, have been developed and AOAC™–RI approved for rapid detection and identification of *E. coli* O157:H7, *Listeria monocytogenes*, *Salmonella* and *Staphylococcus aureus* from foods.

The business that now constitutes BD Diagnostics – Diagnostic Systems was founded by entrepreneurs whose ideas, diligence and foresight have contributed to making BD one of the world's leaders in the healthcare field. Through its products and services, BD is committed to "helping all people live healthy lives."

For more information, please visit www.bd.com/ds.

Gold Sustaining Member Profile

BIOMÉRIEUX INDUSTRY

Advancing Diagnostics to Improve Public Health

bioMérieux is a leading international group specializing in the field of in vitro diagnostics. Through 38 subsidiaries and a large network of distributors, the company is present in more than 150 countries.

TEMPO® System

bioMérieux provides diagnostic solutions (reagents, instruments, software), which determine the source of disease and contamination to improve patient health and ensure consumer safety. Its products are used for diagnosing infectious diseases and providing high medical value results for cancer screening and monitoring cardiovascular emergencies. They are also used for microbiological analysis of food, drug or air samples to monitor and confirm the quality of the production process and finished product.

Microbiological analysis plays a crucial role in a changing global food market. Microbiological food safety is evolving due to ongoing changes in demographics, globalization, food products and processing, and food consumption patterns. These changes are also reflected in the transformation of the role of the microbiologist. Twenty years ago, the role of food microbiologists was limited and underestimated. Today, food microbiologists are at the forefront of food safety, anticipating the challenges generated in today's global market.

A Family History Rooted in Microbiology

bioMérieux's commitment to public health is rooted in its unique history. Marcel Mérieux worked with Louis Pasteur before founding Institut Mérieux in 1897 and starting off the century-long fight that his family has waged against infectious diseases. Under the leadership of Alain Mérieux, grandson of Marcel, Institut Mérieux became the world leader in human and veterinary vaccines (now evolved into two companies, Sanofi Pasteur and Mérial, no longer belonging to the family). In 1963, Alain Mérieux founded the diagnostics company known today as bioMérieux.

Its launch from the field of clinical diagnostics soon led to the development of a new division, bioMérieux Industry, a pioneer in providing solutions to improve the safety and quality of food, biopharmaceutical and cosmetic products. Alexandre Mérieux, the son of Alain Mérieux, leads this division, which has become number one worldwide in industrial microbiology.

Innovations from bioMérieux

bioMérieux's innovations encompass a full range of manual and fully automated microbiology testing solutions, including prepared culture media, the API® and VITEK® 2 Compact identification systems, BacT/ALERT® 3D Microbial Detection System, and *air*IDEAL® environmental air sampling system. The extensive range of rapid screening tests provided on the VIDAS® automated pathogen detection system has recently been enhanced with a new assay kit for detecting *E. coli* O157:H7, VIDAS UP. This new kit has the most advanced technology available for food pathogen screening: phage recombinant proteins used for the targeted capture of bacteria and to isolate them in a sample.

Increasing microbiology lab automation to enhance workflow is a strategic focus at bioMérieux. Additional automated systems include two key food safety solutions, TEMPO® and DiversiLab®. Based on a unique concept developed by bioMérieux, TEMPO is the first automated quality indicator testing system for the food industry. The system offers enumeration of quality indicators, which are vital in determining overall product hygiene. DiversiLab provides food companies with a rapid, easily implemented and automated bacterial strain typing method, an essential tool in tracking the source of microbial contamination. Rounding out the product portfolio is a distribution agreement with Elisa Systems, adding a full range of allergen tests.

Food professionals are faced with unique challenges in a changing global market. bioMérieux is committed to educating its customers about advances in the field. The company has published the Food Safety Handbook: Microbiological Challenges, an overview of modern approaches to microbiological food safety. More than twenty internationally renowned experts contributed to chapters covering the key issues in food safety today.

IAFP Gold Sustaining Member

Over the years, bioMérieux has built relationships with customers and leaders in the food safety community, including the IAFP Foundation. As an IAFP Gold Sustaining Member, bioMérieux proudly promotes the Foundation's endeavors to provide a global forum for technical exchange between all sectors of the food safety industry. bioMérieux strives not only to supply food safety and quality solutions for the food industry, but also to be a partner and educator with the food community in ensuring public health.

bioMérieux's food safety and quality solutions can be found at www.biomerieux-usa.com and www.biomerieux-industry.com or by calling 800.634.7656.

Gold Sustaining Member Profile

BIO-RAD

Bio-Rad Laboratories has played a leading role in the advancement of scientific discovery for over 50 years by providing a broad range of innovative products and services to the life science research and clinical diagnostic markets. Founded in 1952 and incorporated in 1957, Bio-Rad has a global team of more than 6,300 employees and serves more than 85,000 research and industry customers worldwide through its global network of operations. Throughout its existence, Bio-Rad has built strong customer relationships that advance scientific research and development efforts and support the introduction of new technology used in the growing fields of genomics, proteomics, drug discovery, food safety, medical diagnostics, and more.

Bio-Rad's Life Science Group develops, manufactures, and markets a wide range of laboratory instruments, apparatus, and consumables used for research in functional genomics, proteomics, and food safety. The group ranks among the top five life science companies worldwide, and maintains a solid reputation for quality, innovation, and commitment to its customers. Bio-Rad's life science products are based on technologies used to identify, separate, purify, and analyze biological materials such as proteins and nucleic acids. Some of these technologies include electrophoresis, imaging, multiplex immunoassay, chromatography, microbiology, bioinformatics, protein function analysis, transfection, amplification, and real-time PCR. Bio-Rad products support researchers in laboratories throughout the world.

The Food Science Division produces tests for food safety, veterinary diagnostics, water and TSE (Transmissible Spongiform Encephalopathy) testing. Bio-Rad has a complete line of RAPID chromogenic media for isolation and detection of *Salmonella*, *E. coli* O157:H7, *Listeria monocytogenes*, *Staphylococcus aureus*, and indicator organisms *Listeria* spp. and coliforms/*E. coli*. Bio-Rad has launched a complete menu of iQ-Check™ real-time PCR test kits for detection of food pathogens with reduced enrichment times. With the iQ-Check kits, real-time PCR has been adapted to fit the needs of food safety professionals.

For more information on Bio-Rad Laboratories, please visit our Web site at www.bio-rad.com.

Gold Sustaining Member Profile

Cargill

Cargill is an international producer and marketer of food, agricultural, financial and industrial products and services. Founded in 1865, the privately-held company employs 160,000 people in 67 countries.

Cargill helps customers succeed through collaboration and innovation. The company is committed to sharing its global knowledge and experience to help meet economic, environmental and social challenges.

Thousands of customers turn to Cargill for innovative solutions across five major market segments:

- Agriculture – Cargill originates, processes and distributes grain, oilseeds and other commodities to makers of food and animal nutrition products. Cargill also provides crop and livestock producers with farm services and products.
- Food – Cargill collaborates with food manufacturers, foodservice companies and other food retailers to help them better serve their customers. Cargill provides high-quality food and beverage ingredients, as well as meat and poultry products.
- Health – Through applied science, Cargill develops health-promoting ingredients and ingredient systems for makers of dietary and pharmaceutical products.
- Risk Management – Cargill provides its agricultural, food, financial and energy customers with risk management and financial solutions in world markets.
- Industrial – Cargill services industrial users of salt, starch and steel products. The company also develops and markets sustainable products made from agricultural feedstocks.

In the area of food and animal nutrition safety, Cargill seeks to ensure the safety and integrity of its products and the global food systems in which the company and its customers are engaged. Cargill uses public-private partnerships to drive global harmonization of food safety standards. Cargill's food safety programs are based on those developed by the Codex Alimentarius Commission. Cargill is a founding member of SSAFE (Safe Supply of Affordable Food Everywhere). SSAFE—a public-private partnership among global food system companies, international non-governmental organizations (NGOs), intergovernmental organizations, and academia—aspires to be a global catalyst to protect the world's food supply chain.

The company also is committed to using public-private partnerships to develop future food-safety system leaders and was instrumental in launching GIFSL (Global Initiative on Food Systems Leadership). GIFSL is focused on building leadership capacity through experiential learning opportunities that facilitate better communication and coordination to strengthen our collective response to food systems dilemmas.

For more information on Cargill, please visit our Web site at www.cargill.com.

Gold Sustaining Member Profile

LIVE POSITIVELY Coca-Cola

Established in 1886, The Coca-Cola Company operates in more than 200 countries and markets nearly 500 brands and 3,000 beverage products. These products include regular, diet and light sparkling beverages; and still beverages that include waters, juices and juice drinks, teas and coffees, and energy and sports drinks.

Today, we are the industry leader in juices and juice drinks, and our ready-to-drink coffees and teas and sports drinks are globally ranked No. 1 and No. 2, respectively. We have four of the world's top five non-alcoholic sparkling beverage brands: Coca-Cola, Diet Coke, Sprite and Fanta. We offer more than 750 low- and no-calorie products, and we continue to build our innovation pipeline to meet consumers' needs for enjoyment, nutrition, refreshment and hydration.

The global nature of our business requires that the Coca-Cola system has the highest standards and processes for ensuring consistent product safety and quality. Safety remains first and foremost for the company. Delivering the safety and quality our consumers expect requires consistent and flawless implementation, execution and evaluation of our programs and processes, and a never-ending focus on the continuous improvement of our systems. To that end, The Coca-Cola Management System (TCCMS) is our integrated safety and quality management program, designed to ensure that operations system-wide are held to the same high standards for production and distribution.

TCCMS is backed by a network of food safety and quality professionals, supported in a top-down approach by all leadership throughout the Coca-Cola system. It guides our product safety and quality by integrating and aligning business and quality objectives with consistent metrics to monitor performance; integrating preventive actions as a management tool, including more rigorous demands when planning new product and service introductions; incorporating Hazard Analysis Critical Control Points (HACCP) programs throughout our system; and defining problem-solving methodologies and tools to drive continuous product safety and quality advances and enhancements.

Consistency and reliability are critical to product safety and quality and to meeting global regulatory requirements and company standards. The global nature of our business requires that the Coca-Cola system has the highest standards and processes for ensuring two key deliverables—product safety and consistent quality—from our concentrate production to our bottling and product delivery. Whether consumers purchase our products in Atlanta or Adelaide, Mumbai or Mexico City, our commitment ensures that our beverages are produced to the same level of safety and quality everywhere and every time.

Our company exists to refresh the world, inspire moments of optimism, create value and make a positive difference everywhere we engage. Live Positively is our commitment to making a positive difference in the world by redesigning the way we work and live so that sustainability is part of everything we do. Sustainability is woven throughout our business model through a number of important efforts: from productivity and efficiency enhancements to improvements in water and energy use; climate protection; sustainable packaging; active, healthy living initiatives, projects and programs; workplace rights; and community development programs.

For more information about The Coca-Cola Company, please visit www.thecoca-colacompany.com.

Gold Sustaining Member Profile

ConAgra Foods®

Since our first bag of flour was sold in 1867, ConAgra Foods has grown from a small Nebraska company into one of America's largest food companies. Today ConAgra Foods is one of North America's leading packaged food companies, with a strong presence in consumer grocery as well as restaurant and foodservice establishments. ConAgra nourishes the lives of its consumers, customers, and employees by providing trusted, brand-name food and quality ingredients, while fostering a workplace that grows talented people and values inclusion. We work every day to find a better way—to make meal time convenient, to help schools provide nutritious meals for students, to improve the communities in which we operate, and more.

ConAgra Foods had net sales of $11 billion in 2008, with 25,000 employees spanning the globe. The company is organized into two businesses:

- Consumer Foods, which manufactures and markets many leading branded products to retail and foodservice customers in the United States and internationally. Among our popular consumer brands are Healthy Choice, Chef Boyardee, Banquet, Hunt's, Hebrew National, PAM, Egg Beaters, Orville Redenbacher's and Slim Jim.
- Commercial Foods, which manufactures and sells a variety of specialty products to foodservice and commercial customers worldwide. Major brands include Lamb Weston, a leading producer of quality frozen potato products and top supplier to foodservice chains and distributors worldwide; ConAgra Mills, a top provider of premium, multi-use flour with the broadest portfolio of whole grain ingredients in the industry, including such innovations as Ultragrain whole wheat flour and Sustagrain barley; and Gilroy Foods and Flavors, both a leading industrial seasoning and flavor supplier and a leading supplier of vegetables, garlic, onions, and capsicum ingredients, including vegetable innovations such as Controlled-Moisture Fire-Roasted Grilled Vegetables and GardenFrost Purees.

ConAgra Foods is proud to be a Gold Sustaining Member of IAFP and we are dedicated to the safety, quality, and wholesomeness of our products. We are committed to the highest possible standards of food safety throughout our operations and are taking demonstrable measures to that end. This includes the consolidation of responsibility for existing and future companywide oversight of food safety initiatives and systems into a single leadership position, and the formation of a Food Safety Advisory Committee of leading independent experts uniquely positioned in the industry to help the company's efforts in this area.

ConAgra's vision is simple: one company growing by nourishing lives and finding a better way today… one bite at a time!

For more information on ConAgra Foods, please visit our Web site at www.conagrafoods.com.

Gold Sustaining Member Profile

DUPONT®

Leading the Way in Food Safety Science

Fast, accurate results are critical for delivering safer food products for consumers and more profitable growth for food companies. That's why, at DuPont Qualicon, our food safety science is focused on continuously developing state-of-the-art technologies that are faster and more accurate. In fact, for more than a decade, we have been revolutionizing food safety.

DuPont Qualicon was the first company to apply PCR technology to food testing with rapid, DNA-based assays for *Salmonella*, *E. coli* O157:H7 and *Listeria monocytogenes*. Our use of automated PCR processing with tableted rather than liquid reagents created a dramatic increase in speed and consistency—helping to usher in a new era of easy-to-use testing methodology.

Meeting a Global Need

For years, leading food companies and government testing labs around the world have relied on the genetics-based BAX® System to quickly and accurately detect pathogens such as *Salmonella*, *E. coli* O157:H7, *Listeria* spp., *Listeria monocytogenes*, *Enterobacter sakazakii*, *Campylobacter*, *Staphylococcus aureus* and more. In fact, government testing agencies in the US, Canada, Brazil, Japan and other parts of the world have adopted or validated the BAX® System as an approved testing method to help protect their food supply and their citizens.

The BAX® System has been certified by independent authorities such as AOAC and the French Association of Normalization (AFNOR). It's been adopted by the USDA Food Safety and Inspection Service and approved by government labs in Brazil, China, Canada, Japan and Russia. What's more, the BAX® System has been included in the newly launched Emergency Response Validation (ERV) program of the AOAC Research Institute, a program designed to respond immediately to emerging food contamination crises.

Delivering Innovations Year after Year

While we're proud to have been a part of food safety history, we're always looking ahead to provide the next breakthrough in food safety science—with technological advances and new assays that make food testing faster, more accurate and more convenient.

Our most recent innovation is the BAX® System Real-Time PCR Assay for *Vibrio*. This automated rapid method utilizes probe-based chemistry to detect three species of *Vibrio* – *V. cholerae*, *V. parahaemolyticus* and *V. vulnificus* – in the same sample, with results in less than 24 hours.

We recently acquired a license to use DxS Scorpions® technology. This highly sensitive and adaptable platform will enable us to develop rapid multiplex assays for detecting microorganisms that are often difficult to find. With cutting-edge technology like this, we are developing increasingly faster, more sensitive tests for pathogens and spoilage organisms.

From sophisticated analytical platforms to soluble packets of enrichment media, DuPont Qualicon is a company you can trust to deliver the technology innovations you need to reduce risk, react to issues quickly and ultimately deliver the safest food possible to consumers.

For additional information, contact DuPont Qualicon, ESL Bldg 400, P.O. Box 80400, Wilmington, DE 19803, Phone: 800.863.6842 or 302. 695. 5300, Qualicon.com.

Gold Sustaining Member Profile

ECOLAB®

Based in St. Paul, Minnesota, Ecolab is the leading provider of cleaning, food safety and health protection products and services. Around the world, it operates directly in 70 countries, employing more than 26,000 associates, and reaching customers in roughly 100 other countries through distributors, licensees and export operations.

Founded in 1923, Ecolab serves customers in a variety of markets, including foodservice, hospitality, healthcare, and food and beverage industries, helping them to achieve cleaner, safer and healthier environments. Ecolab uses an integrated systems approach to food safety and brand protection issues. Innovative solutions such as automated product dispensing systems, specialized solid detergents, and EPA-registered sanitizers combine with Ecolab's promise of service excellence to provide customers with uncompromised cleanliness and operational efficiency in any market.

At the start of the food chain, Ecolab associates provide customers with premium cleaning and sanitation products, programs, and expertise in food production environments. For example, the Ecolab Livestock Disease Intervention™ program is aimed at helping control cross contamination within animal production facilities, between such facilities, and between production facilities and processing plants. Ecolab also provides complete udder health, hoof management, and fly control programs for dairy production facilities.

Reducing pathogens and other microbial counts on food surfaces in the processing stage, meanwhile, improves the quality and shelf life of food products such as meat, poultry, seafood, fruits and vegetables. These patented food surface treatments are effective solutions for minimizing microbial contamination during processing.

Contamination at any point in a food processing operation can shut down plant operations, costing customers time and money. Therefore, Ecolab also provides custom-designed programs to meet the individual needs of food and beverage processing plants, as well as foodservice and food retail businesses. The emphasis is on sanitation, structural concerns within a facility, and preventative exclusion services for pests in every aspect of the food production process.

Once the food supply reaches foodservice vendors, Ecolab offers numerous high-quality, patented product solutions to help prevent many of the leading causes of foodborne illnesses. These include products to improve employee hygiene practices and sanitize the kitchen equipment used to prepare or serve food, as well as high-performance detergents and cleansers to sanitize every surface within a facility. In fact, Ecolab personnel hygiene programs provide comprehensive, worker-focused hygiene systems including hand cleaners and sanitizers, doorway sanitizing systems for food processors, state-of-the-art, no-touch dispensers, and employee training.

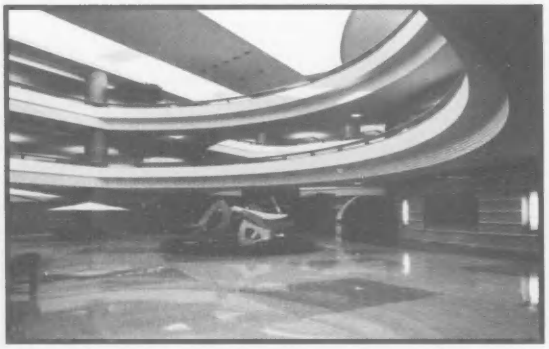
Finally, Ecolab provides a comprehensive intervention program that focuses on compliance. Ecolab's quality assurance food safety management program helps customers establish a routine program of self-inspection, provide comprehensive employee training, and conduct periodic independent audits to help identify areas in need of improvement. It also brings Ecolab's commitment to its customers full circle.

For more information, visit www.ecolab.com or call 651.293.2233.

Gold Sustaining Member Profile

JohnsonDiversey

JohnsonDiversey is a global leader in commercial cleaning and hygiene solutions. Across the globe, JohnsonDiversey develops, manufactures, and provides cleaning and hygiene products and services, including safety and hygiene application training, consulting and auditing.



Addressing Every Food Protection Need

Our ongoing commitment to food protection is supported by a continuously expanding portfolio of JohnsonDiversey products and services designed to address virtually every food safety need. To simplify the complicated business of ensuring that food is safe, JohnsonDiversey developed the SafeKey™ portfolio. Under SafeKey™, we've organized the many elements of food protection, from sophisticated risk management consulting to essential cleaning chemicals, to provide seamless food protection from processing to consumption.

SafeKey™ makes food protection straightforward, with integrated solutions that are easy to implement and manage. Together with JohnsonDiversey Consulting, we deliver intellectual property and methodologies to thousands of customers around the world who know that partnering with a global food protection expert ensures a distinct competitive advantage.

Our consultants use the proprietary Hygieneomics™ Matrix to assess performance and quantitatively benchmark opportunities for improvements. Then, customized action plans map out an integrated risk management program.

JohnsonDiversey works with customers to develop a Food Safety Management System (FSMS) for the business and a Vendor Assurance Program, to ensure that food safety is managed, and traceable, all along the supply chain. The FSMS program includes HACCP (Hazard Analysis Critical Control Point) validation.

With strategy and management oversight established, the operational cornerstone of the process, HotSpots™, is put to work. JohnsonDiversey's HotSpots™ program assembles all the elements of an effective food protection program into one customizable solution. It maps high-risk areas throughout individual facilities, and then provides data, guidelines, training, and online tools to drive "best practices" for efficiently matching internal and external resources for improved food safety management.

Our comprehensive approach to food and beverage protection includes plant-wide cleaning and sanitation solutions, a broad range of food surface antimicrobial treatments, and water quality and management expertise. Our CIP cleaning and disinfection agents, application expertise, and control systems ensure that the highest standards of hygiene are obtained for all production equipment, safeguarding even the most sensitive foods and beverages. The unique AquaCheck program measures, analyzes, and solves water usage problems to manage operating costs, improve operational efficiencies, save water and energy, and reduce waste.

JohnsonDiversey History

JohnsonDiversey has its roots in S.C. Johnson and Son, Inc., which was founded in 1886 in Racine, WI. Beginning as the Services Division of S.C. Johnson in the 1940s, the company gained independence from its parent in 1999 as Johnson Wax Professional.

JohnsonDiversey was formed in 2002 when Johnson Wax Professional acquired DiverseyLever from global food conglomerate Unilever PLC, making the new company a global leader in the institutional and industrial cleaning and hygiene business.

We offer our professional products directly or through third-party distributors and channel partners to end users in the following sectors: food service, lodging, food and beverage, building service contractors, retail, health care, industrial, government, and education.

Headquartered in Racine, WI, JohnsonDiversey maintains operations in 56 nations and provides products and services in more than 160 countries. To learn more, visit www.johnsondiversey.com.

Gold Sustaining Member Profile

Kellogg's®

For more than 100 years, Kellogg Company has been "Bringing Our Best to You." In 1906, our founder, W.K. Kellogg, discovered toasted flakes that were later developed into Kellogg's Corn Flakes®. W.K. combined his commitment to high-quality, nutritious, and great-tasting foods with his passion for his community and built a socially responsible business well ahead of his time. He said, "We are a company of dedicated people making quality products for a healthier world." This remains a guiding principle of Kellogg.

Today, the company has grown "beyond breakfast" into a diverse food company. With 2008 sales of nearly $13 billion, Kellogg is the world's leading producer of cereal and a leading producer of convenience foods, including cookies, crackers, toaster pastries, cereal bars, fruit-flavored snacks, frozen waffles and veggie foods. Our products are manufactured in 19 countries and marketed in more than 180 countries.

Kellogg brands bring both long-loved and innovative products including Kellogg's®, Keebler®, Pop-Tarts®, Eggo®, All-Bran® Mini-Wheats®, Nutri-Grain®, Rice Krispies®, Special K®, Chips Deluxe®, Famous Amos®, Sandies®, Austin®, Cheez-It®, Carr's®, Bear Naked®, Kashi®, Morningstar Farms®, Gardenburger® and Stretch Island®, Just Right®, Vector®, Guardian®, Optivita®, Choco Trésor®, Frosties® Sucrilhos® Vive®, Muslix® and Zucaritas®.

Kellogg's more than 32,000 employees share a dedication to our focused strategy and operating principles that emphasize consistent performance. Combined with our K Values™ that shape the Kellogg culture and guide the way we run our business, this focus on being the best in the categories in which we compete allows us to consistently deliver sustainable, dependable business results.

Consistent with our founder's principles, Kellogg has long been an industry leader in nutrition. We were the first company to fortify cereals. In 2005, Kellogg became the first company to voluntarily introduce nutrition labeling information on the front of cereal packaging. Kellogg's Guideline Daily Amounts, or GDAs, offer simple, Nutrition-at-a-Glance information that helps people determine where our foods fit in a daily diet. And, in 2007, in what many viewed as an industry-leading approach, Kellogg announced new nutrition standards—Kellogg Global Nutrient Criteria—to determine which products will be marketed to children. As a result, many of our children's cereals were reformulated to reduce sugar, salts and fat, and to add other grains.

In addition to our nutrition efforts, the quality and safety of our foods is also a top priority. At Kellogg, we don't view food safety as a competitive issue. We actively engage with other food manufacturers and industry groups to ensure that we are in line with best practices to produce the safest products for consumers.

More than a century after our founding, Kellogg remains a company consumers rely on to provide consistent, high-quality, great-tasting foods. Now more than ever, it's important to do so while minimizing environmental impacts and positively addressing global challenges. Our Global Corporate Responsibility Report provides a transparent and comprehensive accounting of Kellogg's progress, challenges, and future direction in four key areas: marketplace, workplace, environment and community. The report is available at www.kelloggcompany.com/CR.

For additional information on Kellogg Company, visit www.kelloggcompany.com.

Gold Sustaining Member Profile

kraft foods

Make today delicious

Kraft Foods makes today delicious in 150 countries around the globe, and our 100,000 employees work tirelessly to make delicious foods consumers can feel good about.

Kraft Foods' brands deliver millions of smiles every day, from American brand icons like Kraft cheeses, dinners and dressings, Maxwell House coffees and Oscar Mayer meats, to global powerhouse brands like Oreo and LU biscuits, Philadelphia cream cheeses, Jacobs and Carte Noire coffees, Tang powdered beverages and Milka, Côte d'Or, Lacta and Toblerone chocolates.

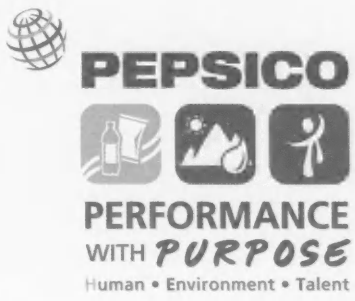
Innovation is a primary ingredient of our success as we reinvent our iconic brands and create new product platforms. Every day, more than 2,000 employees in Research, Development & Quality help invent delicious foods that meet consumers' needs and lifestyles.

One of our core values is to inspire trust, and our highest priority is the safety and quality of our products. Kraft Foods is a leader in food safety, including how we work with our suppliers to ensure we meet regulatory requirements and the highest standards. Our team also uses consumer data to continuously improve our products' quality and taste to be truly delicious.

Kraft Foods is the world's second largest food company with annual revenues of $42 billion. The company is a member of the Dow Jones Industrial Average, Standard & Poor's 500, the Dow Jones Sustainability Index and Ethibel Sustainability Index.

For more information, visit http://www.kraftfoodscompany.com.

Gold Sustaining Member Profile



PepsiCo is a world leader in convenient foods and beverages, with 2007 revenues of more than $39 billion and more than 185,000 employees worldwide. Sold in approximately 200 countries, its products include Frito-Lay snacks, Pepsi-Cola beverages, Gatorade sports drinks, Tropicana juices, and Quaker foods. The PepsiCo portfolio includes 17 brands that generate $1 billion or more each in annual retail sales. PepsiCo's commitment to sustainable growth, defined as "Performance with Purpose," is focused on generating healthy financial returns while giving back to the communities the company serves. This includes meeting consumer needs for a spectrum of convenient foods and beverages, reducing the company's impact on the environment through water, energy and packaging initiatives, and supporting its employees through a diverse and inclusive culture that recruits and retains world-class talent. PepsiCo is listed on the Dow Jones North America Sustainability Index and the Dow Jones World Sustainability Index.

The safety and integrity of our products is our single highest priority. It's our duty as a responsible company. People buy our brands because they know they can count on consistent quality—every time. We follow very rigorous standards of safety and quality. Our policies ensure strict adherence to all applicable regulations and legislation. Our policies cover food safety, sanitation, recalls, and allergens, as well as requirements that our products be coded, labeled, identifiable and traceable.

At every level of PepsiCo, we take great care to ensure that the highest standards are met in our manufacturing processes. We strive for excellence, because our consumers expect and deserve nothing less. The PepsiCo Product Integrity Council provides strategic and technical guidance on product integrity. Our compliance systems include Web site training, monitoring, preventative measures, and readiness for corrective action. We have regular management review of our procedures and activities regarding our products. Our standards are equally rigorous in New York, London, Beijing, and wherever else we operate. We stand behind each and every product we sell.

PepsiCo is committed to providing safe, wholesome products and protecting equity in our brands, trademarks, and goodwill. Our divisions have implemented policies related to food safety, labeling product integrity and quality. PepsiCo products meet a broad variety of needs and preference—from fun-for-you treats to healthy eats. The company has stated, as part of its Performance with Purpose vision, that it is committed to "doing better by doing better": delivering solid financial performance while focusing its efforts in the areas of Human Sustainability (its products and the communities it serves), Environmental Sustainability, and Talent Sustainability (attracting and retaining the best qualified and most committed workforce).

For more information on PepsiCo, please visit our Web site at www.pepsico.com.

Gold Sustaining Member Profile

SGS

Food Sector Services

SGS is the world's leading inspection, verification, testing and certification company. SGS is recognized as the global benchmark for quality and integrity. With over 55,000 employees, SGS operates a network of about 1,000 offices and laboratories around the world. Partnering with SGS allows customers to mitigate risks in safety and quality of their final product and regulatory compliance.

The protection of brand image and development of brand loyalty is of primary importance to food growers, producers, processors and retailers. Without effective supply chain management relating to food safety and quality systems, a company is at risk of producing defective and contaminated product which can lead to food scares, poisoning outbreaks, damaging product recalls, huge legal costs, and loss of both public image and market share.

Customers can maximize their returns by ensuring that risks and uncertainties are addressed by SGS's talented professionals who understand their needs for safety and quality across:

- Primary Production
- Transportation and Shipping
- Packing and Processing
- Distribution and Storage
- Retail

Based on consultative meetings with your team, SGS adapts the following core services to meet your needs in North America and around the world:

- Inspection Services – SGS inspects and verifies the quantity, weight, and quality of traded goods. Inspection typically takes place at the manufacturer's/processor's premises or at the time of loading or at the destination during discharge/off-loading.
- Testing Services – SGS tests product safety, quality and performance against various health, safety and regulatory standards. SGS operates state-of-the-art laboratories on or close to customer's premises. We continue to invest in world class testing capabilities. Our network of laboratories and capabilities are now structured to optimize cross lab synergies, to create specialized competence centers, to share best practices and to develop new testing methods for client and network benefit.
- Certification and Audit Services – SGS certifies that products, systems or services meet the requirements of standards set by governments (e.g., US FDA Seafood HACCP), standardization bodies (e.g., ISO 22000, and Global Food Safety Initiative; BRC, SQF, IFS, Dutch HACCP and Global Gap) or by SGS customers including GMP and HACCP-based standards. SGS also develops and certifies its own standards including Animal Welfare, C-TPAT and Corporate Social Responsibility.
- Consulting & Technical Support Services – SGS is a leading provider of Private Label Programs for US and international retailers. We develop testing protocols for all major food categories. We offer Seed Services, Laboratory Research, Fertility Management, and Specialty Testing. SGS provides comprehensive training workshops on various topics including food hygiene, GMP and HACCP food safety and quality management systems, and food safety standards.

North American Resources

SGS has an established network of microbiological and chemical, food and agri-product testing labs, GMP/HACCP and GFSI auditors, inspectors, training centers and key account managers. Our professionals are actively involved in local IAFP chapters, and are leading spokespersons for the food safety industry including FDA Seafood Certification, Fresh Produce, and Private Label Programs.

For more information, visit www.foodsafety.sgs.com or call 973.575.5252.

Gold Sustaining Member Profile

SILLIKER®
Food Safety & Quality Solutions

When John H. Silliker, Ph.D., founded Silliker in 1967, the field of food testing was in its relative infancy. With a small staff of four professionals, Dr. Silliker, a revered microbiologist, sought to take food testing to a new and higher level. He had a practical philosophy: Give the clients more than just analytical results; give them practical solutions to their problems. This enduring philosophy has guided and sustained the Silliker organization for 40 years.

Today as part of the Mérieux-Alliance group, Silliker is the leading internationally-accredited food testing and consulting network, with 50 locations in 13 countries. CEO and President Philippe Sans leads the company in its quest to provide the most comprehensive solutions to help guarantee product quality and safety, protect individual brands, and reduce the risk of financial loss for suppliers, manufacturers, retailers, and food service companies. Our services include:

- Laboratory Services – Utilizing state-of-the-art technologies and the latest validated methods, Silliker microbiologists and chemists can handle routine and complex analytical requests with fast, accurate and responsive service. At the core of our expertise, we offer a unique range of microbiology services to help companies solve issues throughout the food chain. Our services include analyses for spoilage/process indicator organisms and pathogens. Serving various sectors of the supplement, food, and feed industries, we offer a broad spectrum of chemistry services ranging from nutrient analyses to contaminant testing. All Silliker laboratories meet or exceed ISO 17025, an international standard that assures testing laboratories maintain a well-defined quality system and the necessary technical competencies to generate reliable test results. Our laboratories have specific internal quality requirements and performance programs in place to further assure the competency of our testing services.
- Auditing – With years of experience in almost every food industry environment and segment of the food chain, Silliker auditors can help retailers, distributors, and foodservice companies identify potential risks in their safety programs and adhere to industry and regulatory standards.
- Consulting – Highly knowledgeable and skilled Silliker consultants provide companies with professional, expert services to improve quality assurance programs, reduce the risk of product recalls, and find practical, workable solutions to science-based problems.
- Education and Training – Silliker public short courses, training videos, online learning programs, customized training programs, and learning management solutions provide upper management and line workers with multi-level tools to put recognized food safety principles into immediate action.
- Research – From shelf life and challenge studies to microbial identifications, the Silliker Food Science Center provides a host of expert studies to help companies assure product safety and quality.

For its abundant contributions to food science, Silliker has been the recipient of numerous industry honors including the International Association for Food Protection's Black Pearl Award.

To learn more about the Silliker international network, please log on to www.silliker.com.

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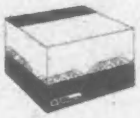

Sides

Salmonella	AOAC Approved
Listeria spp.	AOAC Approved
E. coli O157:H7	Available
Campylobacter	Available
L. monocytogenes	Available
C. botulinum	Available
Avian Influenza	Available

Dessert

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Madison, Wisconsin

Microbiology International
Kevin Klink
Frederick, Maryland

OpGen
Robert Gibbs
Gaithersburg, Maryland

WHAT'S HAPPENING IN FOOD SAFETY

Update on Pistachio Product Recalls

The FDA and the California Dept. of Public Health continue to investigate *Salmonella* contamination in pistachios and pistachio products. Setton Pistachio of Terra Bella Inc., Terra Bella, CA, is voluntarily expanding its recall of roasted pistachios to include all lots of roasted in-shell pistachios and roasted shelled pistachios that were produced from nuts harvested in 2008. The firm is also recalling those raw shelled pistachios from the 2008 crop that are not subsequently roasted prior to retail sale. The pistachios may be contaminated with *Salmonella*.

Initially, the firm's recall was limited to certain lots of roasted pistachios. Information from the joint FDA and California Department of Public Health inspection indicates the presence of *Salmonella* in critical areas of the facility and the potential for cross contamination between raw and roasted products. After this information was shared with Setton, the firm decided to expand its recall.

The FDA has now determined that three environmental samples and one finished product sample obtained during the inspection of Setton Pistachio Inc. were positive for *Salmonella*. The same *Salmonella* type (*Salmonella* Montevideo) with the same genetic fingerprint was found in all four samples. FDA has provided PulseNet, the CDC database of bacterial DNA fingerprints, with the DNA fingerprints of the *Salmonella* strains found in association with the company's products. Some of the DNA fingerprints of the *Salmonella* strains from the pistachio products match the DNA fingerprints of *Salmonella* strains from recently ill persons already in the PulseNet database. This particular strain of *Salmonella* also has been isolated from a stool sample in a child who developed gastroenteritis and who is reported to have consumed pistachios that were sourced from Setton Pistachio. In addition, this specific *Salmonella* fingerprint matches a number of other clinical isolates in the PulseNet data base. However, it is important to recognize that when a patient's isolate has a relatively common DNA fingerprint pattern (such as this one) that matches that of a food isolate, it does not necessarily follow that the patient's illness was related to that food. CDC is investigating whether the other cases infected with this strain of *Salmonella* have had exposure to pistachios from Setton Pistachio.

Because the pistachios were used as ingredients in a variety of foods, this expanded recall will affect many products and is expected to result in other recalls. The FDA has created a searchable database of recalled products at http://www.fda.gov/pistachios/ and will continue to update the public as its investigation progresses. Consumers should not eat pistachios or food products containing them (such as pistachio bakery goods and pistachio ice cream) until they can determine that the products do not contain pistachios recalled by Setton.

The FDA is advising wholesalers, retailers, and operators of restaurants and food service establishments not to sell or serve any pistachios or pistachio-containing products until the source of the pistachios can be determined. Firms should check with their suppliers to determine whether the source of the pistachios is Setton. If the source is Setton and the products are subject to this recall, then the pistachios and pistachio products should not be sold.

The FDA is helping the pistachio industry address the public health risks associated with *Salmonella* and to understand appropriate control procedures to prevent contamination. As part of this effort, on April 3, 2009, the FDA issued a letter to pistachio processors in the United States reminding them of their legal responsibility to ensure that the products they are providing are safe for consumption. The FDA intends to examine current pistachio industry practices and issue guidance to the industry that provides additional information on measures to be taken to prevent *Salmonella* contamination.

CAL-PURE co-op of California pistachio growers and the Western Pistachio Association have established a Web site that lists firms that have informed the Web site sponsors that their products do not contain pistachios from Setton. Information on this Web site has not been verified by the FDA, and the Agency is not responsible for its contents: www.pistachiorecall.org.

Salmonella can cause serious and sometimes fatal infections in young children, frail or elderly people, and others with weakened immune systems.

CDC Reports Progress in Foodborne Illness Prevention Has Reached a Plateau

The incidence of the most common foodborne illnesses has changed very little over the past three years, according to a 10-state report released by the Centers for Disease Control and Prevention.

The findings are from 2008 data reported by the Foodborne Diseases Active Surveillance Network (FoodNet), a collaborative project of CDC, US Department of Agriculture's Food Safety and Inspection Service (FSIS), US Food and Drug Administration, and 10 state sites.

FoodNet monitors foodborne disease and conducts related epidemiologic studies to help health officials better understand the epidemiology of these infections in the United States. Each year, the current data is compared to the previous three years and the period from 1996 to 1998, the first three years of surveillance. The FoodNet population is similar to the US population and therefore provides reliable information on the incidence and trends of foodborne illness in the United States.

Campylobacter, *Cryptosporidium*, *Listeria*, Shiga toxin-producing *Escherichia coli* (STEC) O157, *Salmonella*, *Shigella*, *Vibrio*, and *Yersinia* did not change significantly when compared to the previous three years (2005–2007), the latest data showed. Although there have been significant declines in the incidence of some foodborne infections since surveillance began in 1996, these declines all occurred before 2004. The incidence of *Salmonella* infections has remained between 14 and 16 cases per 100,000 persons since the first years of surveillance.

"This year's report confirms a very important concern, especially with two high-profile *Salmonella* outbreaks in the last year," said Robert Tauxe, M.D., M.P.H. deputy director of CDC's Division of Foodborne, Bacterial and Mycotic Diseases. "We recognize that we have reached a plateau in the prevention of foodborne disease and there must be new efforts to develop and evaluate food safety practices from the farm to the table. The foodborne division at CDC is planning to increase the capacity of several health departments so that outbreaks can be better detected and investigated."

The USDA's *Salmonella* Initiative Program, which began in 2006, has already significantly reduced the presence of *Salmonella* in raw meat and poultry products, according to David Goldman, M.D., M.P.H., assistant administrator of USDA's Food Safety Inspection Service. "We have worked hard to reduce contamination in FSIS-regulated products and have seen marked success in *Salmonella* and *Listeria monocytogenes*. We are concerned about the lack of progress in reducing the incidence of foodborne illness and believe this report points to the need for better information about sources of infection."

The FDA is using new tools to help predict potential threats to foods and the best options for prevention to meet the many challenges of an increasingly complex food-supply chain, according to David Acheson, M.D., associate commissioner for foods. "The FDA is embarking on an aggressive and proactive approach in protecting and enforcing the safety of the US food supply. The Agency is committed to make the necessary changes to keep unsafe products out of the marketplace before they reach consumers."

Consumers can reduce their risk for foodborne illness by following safe food-handling and preparation recommendations and by avoiding consumption of unpasteurized milk, raw or undercooked oysters, or other raw or undercooked foods of animal origin such as eggs, ground beef, and poultry. Risk also can be decreased by choosing pasteurized eggs, high pressure-treated oysters, and irradiated produce. Everyone should wash hands before and after contact with raw meat, raw foods derived from animal products, and animals and their environments. More detailed information on food safety practices is available at www.foodsafety.gov and www.fightbac.org.

The full report, "Preliminary FoodNet Data on the Incidence of Infection with Pathogens Transmitted Commonly through Food — 10 States, United States, 2008" appears in this week's *Morbidity and Mortality Weekly Report* (April 10, 2008) and is available online at www.cdc.gov/mmwr.

3-A SSI Issues Guidance on Commercial Display of the 3-A Symbol

3-A Sanitary Standards, Inc. (3-A SSI) has released special guidance for marketers of equipment built to 3-A Sanitary Standards on the proper display of the 3-A Symbol. The guidance is intended to provide practical advice for equipment marketers, such as representatives and distributors and others, on the promotion of 3-A Symbol licensed equipment.

According to 3-A SSI Executive Director, Tim Rugh, "The '3-A' brand holds a clear marketing advantage to reach customers of dairy and food processing equipment. We want to make sure the use of the mark is consistent with the trademark requirements and the interests of all stakeholders who share a common interest in sanitary equipment design."

With its wide recognition and acceptance, the 3-A Symbol is often featured by marketers to help make customers aware that such licensed equipment conforms to a 3-A Sanitary Standard. The 3-A SSI guidance provides specific suggestions on how the 3-A Symbol can be used to help promote the sales of 3-A Symbol licensed equipment.

A copy of the guidance is available on the 3-A SSI Web site with information about the 3-A Symbol at http://www.3-a.org/symbol/about.html or go directly to http://www.3-a.org/symbol/distributor_guidelines.doc.

National Restaurant Association Names Kendall College Educational Partner of Conserve Environmental Initiative

The National Restaurant Association has announced that Kendall College has become an official educational partner of the Association's Conserve: Solutions for Sustainability initiative. Conserve's mission is to help the nation's nearly one million restaurant and foodservice locations reduce their environmental impact while maintaining economic vitality. Kendall College joins the Turner Foundation, ENERGY STAR, and the Food Service Technology Center as Conserve partners.

"We are pleased to welcome Kendall College as an educational partner of our Conserve sustainability initiative," said National Restaurant Association President and CEO Dawn Sweeney. "Kendall's educational expertise in sustainability and outreach to the foodservice industry add a great dimension to our effort. The restaurant industry is forecast to add nearly two million jobs in the next decade. Today's students are tomorrow's industry leaders and culinary stars, so it is crucial to our industry's future success that awareness, knowledge and commitment to environmental sustainability are established at every level."

Kendall launched its sustainability education program in 2008 with the production of a sustainability video that explains the basics of environmental sustainability and offers some simple actions operators can take to become more sustainable. Like Conserve's tips, many of the video's steps also result in net operational savings. Kendall's program is a natural extension of its own long-term commitment and progress toward environmental sustainability.

In 2007, Kendall College was the recipient of the Green Award presented by Foodservice Consultants Society International (FCSI). Created in 1996 to recognize and applaud exemplary efforts in ecology and environmentally sensitive hospitality operations, it was only the fifth such award presented by FCSI — which does not commit to an annual presentation unless a worthy recipient is evident — and the first ever to a culinary-training program.

AIV Microbiology's Paul Hall Receives 2009 NCFST Award for Food Safety

The National Center for Food Safety and Technology (NCFST), Illinois Institute of Technology (IIT), presented its prestigious 2009 NCFST Food Safety Award to Paul A. Hall, Ph.D., president and COO of AIV Microbiology & Food Safety Consultants LLC, at the consortium's semi-annual meeting in March.

The annual NCFST Food Safety Award recognizes the achievements of an individual in the field of food science and technology who has made outstanding contributions to food safety across government, academia and industry. Nominations are evaluated by a selection panel consisting of representatives from the US Food and Drug Administration (FDA), IIT, and the food industry.

The NCFST award recognizes Dr. Hall's more than 30 years' experience as a globally recognized food safety leader. During his career, he has held a variety of top management positions with companies including Kraft Foods, Matrix MicroScience, Anheuser Busch Companies and Ralston Purina. Following positions as a microbiology manager in corporate research and development for Anheuser Busch Companies, Inc. and in central research for Ralston Purina Co., Dr. Hall joined Kraft Foods Technology Center in 1989 as section manager, chilled foods stability and methods development in the microbiology and food safety department. In 1994, he assumed the position of director of microbiology and food safety for Kraft Foods North America, and in 2003, was named Kraft's senior director of microbiology and Food Safety. Dr. Hall also served as V. P. global business development for Matrix MicroScience Inc. and established food safety improvements at ConAgra Foods in 2007 as the company's vice president of global food safety.

Dr. Hall launched his own consulting firm in 2008, AIV Microbiology & Food Safety Consultants LLC, which provides food safety, quality, regulatory compliance and crisis management consulting services to the global food industry and to clients including NCFST, Wal-Mart, General Mills, HerbaLife, Silliker Inc., Cadbury-Schweppes, and others.

"It has always been an honor and a pleasure for me to be associated with so many talented scientists and colleagues here at NCFST over the past 20 years," Dr. Hall said. "Under Martin Cole's leadership, this center has grown and expanded in many exciting ways that are truly advancing the field of food safety science. I am very honored to accept this award." Dr. Hall joins the NCFST Food Safety Award Hall of Fame, which includes Jon DeVries,

Ph.D., General Mills (2005), Michael Cirigliano, Ph.D., Unilever (2006), Richard Whiting, Ph.D., U.S. FDA CFSAN (2007), and Katherine M.J. Swanson, Ph.D., Ecolab.

Mettler-Toledo Hi-Speed Appoints Mark McCann as West Coast Regional Sales Manager

Mettler-Toledo Hi-Speed is pleased to announce that Mark McCann has joined the firm as West Coast regional sales manager. Mr. McCann will concentrate on checkweigher and integrated product inspection solutions for the company's west coast market segments.

Mr. McCann comes to Mettler-Toledo Hi-Speed from Exact Equipment – a Mettler-Toledo company. He brings more than 17 years of sales experience serving as the western regional sales manager at Exact. Prior to that, he was the sales manager for Supermarket Development Corporation in Detroit, MI.

"With today's increasing challenges in the US markets, we are confident that Mark's proven experience within the Mettler-Toledo organization and his knowledge of the packaging industry will allow him to guide our customers in finding the most cost- effective solution for their applications," states John Fletcher, national sales manager of Mettler-Toledo Hi-Speed. "Mark is well qualified to take a leadership role within the company; we expect to benefit greatly from his years of experience."

INDUSTRY PRODUCTS

Biohit Inc.

New Filter Tips from Biohit

Biohit has introduced a new line of Filter Tips which are an ideal tool for any scientist concerned about sample integrity, safety, and minimizing contamination risks. They can be used in applications including molecular biology, microbiology and cell culture, as well as radioactive work.

These Filter Tips have been designed to meet high quality and purity demands and provide an effective barrier between the pipette and the sample.

The higher filter positioning in the new models prevents the liquid sample from touching the filter-enabling safer pipetting in reverse and multi-dispensing modes.

The Filter Tips cover the volume range from 0.1–1200 µl including new sizes for 10, 20, 100/120, 200, 300, 1000 and 1200 µl volume capacities. This wide selection offers optimal tip compatibility with Biohit Pipettes. They are packed in color-coded single tray boxes.

Biohit Filter Tips reduce the risk of contamination to the pipette; liquid samples and the operator. The tips are made of virgin polypropylene and the filters are polyethylene.

Single tray packages, wrapped in air-tight plastic are electron beam sterilized with the tip size ID printed on the sterilization indicator.

Biohit Filter Tips are certified as DNase, RNase and endotoxin free. They are CE/IVD certified and are manufactured according to ISO 9001, ISO 14001 & ISO 13485.

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R & F Laboratories/ Products Develops a New *Salmonella* (Nontyphoidal) Chromogenic Plating Medium

R & F Laboratories/Products announces a newly developed *Salmonella* (Nontyphoidal) Chromogenic Plating Medium. This new *Salmonella* medium utilizes the same patented (US Patent 7,150,977) mechanism for identifying *Salmonella* strains as our current *Salmonella* (includes *S.* Typhi/Paratyphi) Chromogenic Plating Medium but is more selective and better suited for identifying *Salmonella* serotypes from foods and the environment.

The *Salmonella* (Nontyphoidal) Chromogenic Plating Medium with increased antibiotics and additional selective ingredients will eliminate additional bacteria such as *Proteus*, *Pseudomonas*, *Morganella* and *Pantoea* that could interfere with *Salmonella* isolation from foods. About 20% of the *Citrobacter* and *Klebsiella* strains have been eliminated or the colony sizes reduced to partial growth. Any growth of *Citrobacter* and *Escherichia coli* strains (which may ferment the carbohydrate 2-deoxy-D-ribose) can easily be distinguished from *Salmonella* serotypes by their colorless, green, greenish blue, blue-green or blue colored colonies due to their β-galactosidase activity on the chromogenic sub-strate 5-Bromo-4-chloro-3-indoxyl-β-D-galactopyranoside. The *Salmonella* serotypes are identified only by their reddish-pink colored colonies fermenting 2-deoxy-D-ribose without β-galactosidase activity in the presence of the pH indicator neutral red.

By eliminating or reducing many interfering bacteria found in foods such as meats and produce, the *Salmonella* (Nontyphoidal) Chromogenic Plating Medium allows for better growth and easier colonial identification of the *Salmonella* serotypes.

Our company also offers a wide range of chromogenic plating media to isolate various types of pathogens found in foods and the environment.

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www.rf-labs.com

Charm Sciences Receives USDA GIPSA Approval for Its ROSA® Fumonisin Quantitative Test Kit for Feed and Grain

Charm Sciences, Inc. is pleased to announce that its ROSA Fumonisin Quantitative test kit is the first lateral flow quantitative test to be approved for official testing of fumonisin in the US national grain inspection system (Certificate No. FGIS 2009-102).

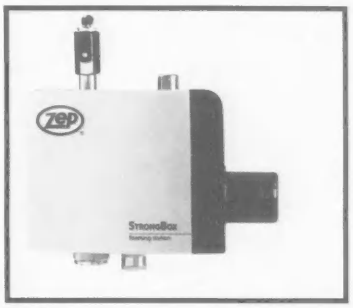
The ROSA Fumonisin kit delivers fast, economical, accurate fumonisin detection in a convenient single strip. Quantitative readings and a detection range from 0 to 6 ppm provide the flexibility to meet both domestic and export requirements.

The ROSA Fumonisin Quantitative kit is the 10th Charm mycotoxin test to receive approval from United States Department of Agriculture's Grain Inspection Packers and Stockyards Association (GIPSA). Speed, simplicity and sensitivity make Charm Rapid One Step Assay (ROSA) technology the de facto standard for mycotoxin detection. All ROSA mycotoxin tests can be run on the same equipment and follow a similar assay format, providing an efficient and economical way to detect and quantify mycotoxins in feed and grain.

"The Charm ROSA Fumonisin Quantitative Test helps ensure the safety of the food chain by enabling growers, processors and regulators to validate that grain and feed conform to specified or recommended limits for fumonisin," said Mark Tess, Mycotoxin product manager at Charm Sciences.

Fumonisins (FB1, FB2, and FB3) are produced by naturally occurring Fusarium molds, including *F. verticillioides* and *F. proliferatum*. These toxins have been implicated as possible causes of human esophageal cancer, equine leukoencephalomalacia – a serious disease in horses, toxic feed syndrome in poultry, and pulmonary edema in swine.

Charm Sciences, Inc.
978.687.9200
Lawrence, MA
www.charm.com



Zep Inc.

Zep Launches StrongBox: Rugged Foaming Station for Food Processing Facilities

Food processors looking for a stronger, more reliable foaming station for cleaning walls, floors and equipment can now turn to Zep StrongBox, a new foaming station built to survive the most difficult food processing environments.

Zep StrongBox connects to either house pressure or a low-pressure pump system and provides a consistent sanitizer spray and high foam. Made of stainless steel, it contains no internal plastic parts, making it more durable than competitive foaming stations.

"Because StrongBox provides premium cleaning performance, coupled with ruggedness and reliability, it can help food processors reduce their maintenance costs," says Blaine Morton, director of marketing and business development, food, Zep Inc.

The StrongBox line consists of three products:

Zep StrongBox 1 – an airless foamer with a fixed chemical suction hose, designed for water at a pressure of 45 to 145 psi. It is supplied with one set of chemical dosing nozzles in different colors.

Zep StrongBox 2 – an air system with one fixed chemical suction hose, it is connected to external compressed air and water at a pressure of 45 to 580 psi. It is also supplied with one set of chemical dosing nozzles in different colors.

Zep StrongBox 3 – a kit with one fixed chemical suction hose, it is connected to external compressed air and water at a pressure of 45 to 580 psi. Three color-coded suction tubes, each with quick-coupling and non-return valves in both nipple and coupling prevent chemical spills. This product comes with a hose wall-mount bracket.

Zep StrongBox offers more rugged features than other foaming stations: Tamper-resistant meter tip placement, color-coded chemical pickup, ergonomic recessed valve, easy-to-clean injector, one hose with three functions, easy adaptation to different pressure ranges, three non-return valves built into the air line, non-return on the water line, and high-quality, long-lasting hose.

Zep Inc.
877.428.9937
Atlanta, GA
www.zep.com

3M™ Tecra™ *Salmonella* Visual Immunoassay (VIA) Test, a Recognized AOAC® Official Method of Analysis – Including Detection of Peanut Butter

3M announced that its 3M™ Tecra™ *Salmonella* VIA Test method has been validated with the scope of "In Foods" by the AOAC®

International *Official Methods of Analysis* for over 15 years – which included the detection of *Salmonella* in peanut butter.

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

3M continues to respond to the recall of thousands of peanut-derived products by reassuring their customers and the food industry that the 3M Tecra *Salmonella* VIA Test has been a recognized method for over 15 years, meeting the rigorous standards required to receive an AOAC Official Method of Analysis approval. "With the recent events involving peanut contamination, the industry is being challenged to reexamine their testing protocols. The 3M Tecra *Salmonella* VIA Test has long been a recognized and trusted method for detecting *Salmonella*. Our customers are committed to using 3M Tecra VIA as part of their comprehensive approach to deliver safe, quality food products to consumers. We are proud to continually partner with the food industry worldwide and are committed to respond with innovative solutions," said Robert E. Koeritzer, past president AOAC International and currently the senior technical manager for 3M.

3M Tecra *Salmonella* VIA Test is designed to provide rapid, reliable and repeatable results regardless of the number of samples to be processed. The easy-to-use method is simple to incorporate into current workflows and detects *Salmonella* in raw materials, finished product or environmental surfaces.

3M Microbiology
800.328.6553
St. Paul, MN
www.3m.com/microbiology

Romer Labs® Introduces New AgraQuant® Food Allergen ELISA Test Kits

Romer Labs® proudly launches new AgraQuant® Allergen ELISA Test Kits that detect food allergens sensitively in a wide range of processed foods and raw materials. The user-friendly test kits include all ready-to-use reagents.

A food allergy is typically an immune system response to a protein present in food that the body mistakenly believes is harmful. Common food allergens are gluten containing cereals, crustaceans, eggs, fish, peanuts, soybeans, lupines, nuts, milk, mustard, sesame, celery, sulphur dioxide, sulphites and molluscs. Food allergies affect 1–3% of the whole population and 5–8% of children. Even minor exposure to a food allergen in the nano-gram range can cause symptoms from mild skin rashes to a fatal anaphylactic shock.

Cross contamination during the production process often occurs so that residues of food allergens in different products may be present. Testing with the sensitive AgraQuant® Allergen ELISA Test Kits ensure safe food and contribute to consumer protection. Romer Labs® is always one step ahead in "Making the World's Food Safer".

Romer Labs©
636.583.8600
Union, MO
www.romerlabs.com

Spiral Biotech Introduced New Autoplate Spiral Plating System at ASM General Meeting

Spiral Biotech, an Advanced Instruments Company, introduced its new Autoplate® Spiral Plating System – which delivers faster cycle times, a touch screen display, and self-cleaning features that boost processing speed and efficiency in microbiology laboratories – at The American Society for Microbiology's (ASM) General Meeting in May, 2009.

"The introduction of the new Autoplate represents a major advancement in spiral plating technology," said Anthony Pappas, national sales manager, Advanced Instruments.

"The new Autoplate features 50 percent faster cycle times – 30 seconds as opposed to one minute – a new Windows® CE-based touch screen display, and an expanded range of analysis that includes two new spiral plating modes. The new system also introduces a revolutionary self-cleaning feature that is very fast, very thorough, and ensures no sample-to-sample contamination.

"Altogether, the new Autoplate drives spiral plating technology a generational leap forward," Mr. Pappas said.

The new Autoplate deposits microbial suspensions without the need for most serial dilutions, thus increasing efficiency in the microbiology laboratory. Labor and material costs associated with sample preparation and manual dilution are reduced by 75%. Moreover, by eliminating the variability inherent in manual procedures, Autoplate delivers both a higher degree of accuracy and repeatability.

Spiral Biotech's Autoplate technology is ideal for any laboratory that uses microbial concentration samples greater than 1,000 CFU/g or CFU/ml, or any application where counts are high and standardization and reproducibility are key.

Spiral Biotech, Inc.
an Advanced Instruments Co.
800.554.1620
Norwood, MA
www.aicompanies.com

AWARD WINNERS

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Aaron R. Uesugi
Stelios Viazis

DEVELOPING SCIENTISTS

Sponsored by the IAFP Foundation

To be determined

SAMUEL J. CRUMBINE AWARD

Sponsored by the Conference for Food Protection, in cooperation with American Academy of Sanitarians, American Public Health Association, Association of Food & Drug Officials, Foodservice and Packaging Institute, Inc., 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.

Columbus Public Health Department
Columbus, OH

AFFILIATE AWARDS

C.B. SHOGREN MEMORIAL AWARD

Ontario Food Protection Association

BEST AFFILIATE OVERALL MEETING AWARD

New York State Association for Food Protection

BEST AFFILIATE EDUCATIONAL AWARD

Texas Association for Food Protection

BEST AFFILIATE COMMUNICATION MATERIALS AWARD

British Columbia Food Protection Association

AFFILIATE MEMBERSHIP ACHIEVEMENT AWARD

Pennsylvania Association of Milk, Food and Environmental Sanitarians

COMMITTEE MEETINGS

TIMES	COMMITTEE MEETING	ROOM
Saturday, July 11		
2:00 p.m. – 5:00 p.m.	International Food Protection Issues	Fort Worth 7
3:00 p.m. – 4:00 p.m.	Past Presidents'	Grapevine 4
3:00 p.m. – 4:30 p.m.	Membership	Grapevine 5
Sunday, July 12		
7:00 a.m. – 10:00 a.m.	Affiliate Council	Grapevine A
8:00 a.m. – 5:00 p.m.	Committee on Control of Foodborne Illness	Fort Worth 6
9:00 a.m. – 11:00 a.m.	Food Chemical Hazards and Food Allergy	Austin 4
9:00 a.m. – 11:00 a.m.	Food Safety Education	Austin 5
9:00 a.m. – 11:00 a.m.	Fruit and Vegetable Safety and Quality	Grapevine 1–2
9:00 a.m. – 11:00 p.m.	Microbial Modelling and Risk Analysis	Grapevine 3–4
9:00 a.m. – 11:00 a.m.	Viral and Parasitic Foodborne Disease	Austin 6
9:00 a.m. – 11:00 a.m.	Water Safety and Quality	Austin 1
10:00 a.m. – 12:00 p.m.	3-A Committee on Sanitary Procedures	Austin 3
10:00 a.m. – 12:00 p.m.	*JFP* Management	Grapevine B
10:00 a.m. – 12:00 p.m.	Retail Food Safety and Quality	Grapevine 5–6
11:00 a.m. – 12:00 p.m.	Awards	Austin 6
11:00 a.m. – 12:00 p.m	Constitution and Bylaws	Austin 4
12:00 p.m. – 1:30 p.m.	Student	Grapevine A
1:00 p.m. – 3:00 p.m.	Applied Laboratory Methods	Grapevine 1–2
1:00 p.m. – 3:00 p.m.	Audiovisual Library	Austin 3
1:00 p.m. – 3:00 p.m.	Food Hygiene and Sanitation	Austin 5
1:00 p.m. – 3:00 p.m.	Seafood Safety and Quality	Austin 6
2:00 p.m. – 4:00 p.m.	Beverage	Austin 4
2:00 p.m. – 4:00 p.m.	Dairy Quality and Safety	Grapevine 3–4
2:00 p.m. – 4:00 p.m.	Food Law	Austin 1
2:00 p.m. – 4:00 p.m.	*FPT* Management	Grapevine B
2:00 p.m. – 4:00 p.m.	Meat and Poultry Safety and Quality	Grapevine 5–6
3:00 p.m. – 4:30 p.m.	Foundation	Austin 5
3:30 p.m. – 4:30 p.m.	Nominating	Austin 3

IAFP Members are welcome to attend Committee Meetings.
Both Members and Non-members are welcome to attend and participate in PDG Meetings.

Committee Meetings represented in blue; PDF Meetings represented in green.

IVAN PARKIN LECTURE

Navigating Food Safety through Times of Economic Chaos: A Call to Action

SUNDAY, JULY 12
6:00 P.M. - 7:30 P.M.

Dr. Paul A. Hall

AIV Microbiology and Food Safety Consultants, LLC
Hawthorn Woods, Illinois

Dr. Paul A. Hall is the President and Chief Operating Officer for AIV Microbiology and Food Safety Consultants, LLC, a company dedicated to providing an array of food safety solutions for the global food and beverage industry. Dr. Hall is also on the Board of Directors of Purfresh, Inc., the leading provider of sustainable clean technology solutions for food and water including advanced ozone-based applications for cold storage and disinfection.

During his professional career, Dr. Hall has held a number of positions in the food industry, including Vice President of Global Food Safety for ConAgra Foods, and the position of Vice President of Global Business Development for Matrix MicroScience, Inc., a leading technology company that focuses on the concentration, capture, and detection of foodborne pathogens and spoilage organisms.

Dr. Hall also had a seventeen-year career with Kraft Foods where his last position was Chief Microbiology and Food Safety Officer for Kraft, Global. Dr. Hall has also held positions as a Microbiology Manager in Corporate Research and Development for Anheuser Busch Companies, Inc. and in Central Research for Ralston Purina Company, both in St. Louis, MO. He is Past President of the International Association for Food Protection and has been actively involved with various professional organizations and institutes, including the International Life Sciences Institute, the University of Georgia Center for Food Safety, the American Society for Microbiology, the Institute of Food Technologists, the Grocery Manufacturers' Association, and the International Dairy Foods Association, among others. He serves on the editorial boards of the *Journal of Rapid Methods and Automation in Microbiology* and *Food Safety Magazine*.

Dr. Hall holds a bachelor's degree in Microbiology from the University of Missouri-St. Louis, a master's degree in Technology Management from Washington University, and a Ph.D. in Quality Management from LaSalle University. He has lectured extensively around the world on microbiological food safety, HACCP, rapid testingand detection methods, and microbiological risk management.

Dr. Hall was the recipient of IAFP's prestigious 2006 Harold Barnum Industry Award for excellence in leadership and contributions to the area of microbiological food safety for the industry and in 2007 he was inducted as a Fellow of IAFP.

JOHN H. SILLIKER LECTURE

The 2008 Irish Dioxin Crisis: A Public Health, Food Safety, Economic, Legal, or a Risk Communication Challenge?

WEDNESDAY, JULY 15
4:00 P.M. - 4:45 P.M.

Dr. Patrick Wall

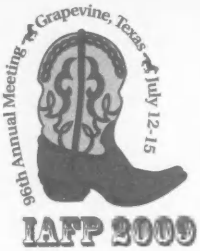
University College Dublin
School of Public Health and Population Sciences
Belfield, Ireland

Dr. Patrick Wall is Associate Professor of Public Health in University College Dublin's School of Public Health and Population Sciences which hosts the National Nutrition Surveillance Centre. His research interests include food safety, foodborne diseases, lifestyle-related diseases and health damaging consumer behaviour. He is a co-director of the UCD Centre for Behaviour and Health.

Dr. Wall was the first Chief Executive of the Irish Food Safety Authority (FSAI) and contributed to the setting up of this science-based consumer protection agency created partly in response to the BSE crisis. He has just completed a term as the Chairperson of the European Food Safety Authority, a pan EU Agency with a remit in risk assessment and communication. Dr. Wall was one of seven non-Chinese nationals on the committee advising on food safety arrangements for the 2008 Beijing Olympics. He was a member of the crisis management team convened to deal with the recent Irish dioxin contamination incident. He is a member of the Ireland's Healthy Eating Guidelines Steering Committee and is the Chairperson of the Irish Government's CJD Advisory Committee.

Dr. Wall is the Chairperson of the UK Food Standards Agency's (FSA) Advisory Body for the Delivery of Official Controls which is currently overseeing the transformation of the UK Meat Hygiene Service.

In addition to qualification in veterinary and medicine from University College Dublin and the Royal College of Surgeons, Dr. Wall has an MSc in Infectious Diseases from the University of London and an MBA. He is a Diplomat of the European College of Veterinary Public Health and a Fellow of the UK Faculty of Public Health Medicine.



IAFP 2009 SPECIAL CONTRIBUTORS

BD

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QAI Quality Auditing Institute Ltd

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Clean is just the beginning

SDI
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PRELIMINARY PROGRAM

SUNDAY, JULY 12

Opening Session – 6:00 p.m. – 7:30 p.m.

Ivan Parkin Lecture – *Navigating Food Safety through Times of Economic Chaos: A Call to Action*, **Dr. Paul A. Hall**, AIV Microbiology and Food Safety Consultants, LLC, Hawthorn Woods, Illinois

MONDAY, JULY 13

All Day – 10:00 a.m. – 6:00 p.m.

Poster Session

P1 Meat and Poultry, Pathogens, Seafood, and Education

Morning – 8:30 a.m. – 12:00 p.m.

Symposia

S1 ICMSF Symposium on International Developments in Food Safety
S2 Sterilant Gas Decontamination of Food and Environments and Emerging Technologies
S3 Harnessing Irradiation for the Marketplace Today
S4 Epidemiological Trends of Noroviruses

Roundtables

RT1 Public Health Decision Making – A Character Building Exercise
RT2 Selling Food Safety to Employees: Creating a Fully Functioning Food Safety Culture in Retail Grocery and Foodservice Operations

Technical Session

T1 Dairy, General Microbiology, and Sanitation

Afternoon – 1:30 p.m. – 5:00 p.m.

Symposia

S5 Pathogen and Spoilage Persistence in the Processing Environment and Food Products: Where, Why and How We Know
S6 Zapped! Optimizing the Consumer Experience of Microwave Cooking through Labeling, Infrared Thermography, and Validation
S7 *Listeria monocytogenes* Controls from Local to Global – Are They Working?
S8 The Effect of Climate Change on Food Availability and Safety
S9 Tracking and Tracing Technologies – Do You Know Where Your Steak and Tomatoes Come From?
S10 International Food Protection Issues: Overview and Global Commodity Trade

Technical Sessions

T2 Antimicrobial, Seafood, and Non-microbial Food Safety
T3 Applied Laboratory Methods

TUESDAY, JULY 14

All Day – 10:00 a.m. – 6:00 p.m.

Poster Session

P2 Risk Assessment, Applied Laboratory Methods, Novel Laboratory Methods, Toxicology, Water, Sanitation, and Microbial Spoilage

Morning – 8:30 a.m. – 12:00 p.m.

Symposia

S11 Foodborne Disease Outbreak Update: *Campylobacter* in Fresh Peas, *Salmonella* Schwarzengrund in Pet Food, *Salmonella* Saintpaul in Tomatoes/Peppers
S12 Attribution of Foodborne Illness/Disease
S13 Best Practices for Cleaning and Validation
S14 Enhancing Oyster Safety through *Vibrio* Control Plans
S15 Less Recognized and Underappreciated Foodborne Pathogens – No Crystal Ball for the Next Big Bug

Technical Sessions

T4 Education and Novel Laboratory Methods
T5 Produce

Afternoon – 12:15 p.m. – 1:00 p.m.

IAFP Business Meeting

Afternoon – 1:30 p.m. – 5:00 p.m.

Symposia

S16 Facing a Persistent Challenge: *Salmonella* Control in Low-Moisture Foods
S17 Food Safety in Global Food Trade
S18 Looking for Thresholds: A Multi-Disciplinary "Key Events" Approach
S19 Round Up Your Pathogen Plan: Enrichment, Sample Preparation and the Legal and Social Perspectives
S20 Environmental Reservoirs of Major and Emerging Foodborne Pathogens
S21 Integrating Epidemiology and Microbiology to Solve Complex Food Safety Problems

Technical Session

T6 Meat and Poultry

WEDNESDAY, JULY 15

All Day – 9:00 a.m. – 5:00 p.m.

Poster Session

P3 General Microbiology, Antimicrobials, Produce, Dairy and Epidemiology

Morning – 8:30 a.m. – 12:00 p.m.

Symposia

S22 Third Party Certification Systems: Can It Make Our Food Safer?
S23 A Systems Approach to Minimize *Escherichia coli* O157:H7 Food Safety Hazards Associated with Fresh and Fresh Cut Leafy Greens
S24 Emerging Chemical Hazards in Food

Roundtable

RT3 Measuring and Interpreting Food Handling Behavior and Its Impact on Policy Emerging Chemical Hazards in Food

Technical Sessions

T7 Risk Assessment, Spoilage, and Beverages and Water
T8 Pathogens

Afternoon – 1:30 p.m. – 3:30 p.m.

Symposia

S25 Food Safety Challenges for Unrefrigerated Display of Ready-to-Eat Foods
S26 Shigatoxin *E. coli*: The Bad, the Worse, and the Pathogenic
S27 Focusing Our Efforts: Vulnerability Assessment and Mitigations Research in Food Processing and Handling Default
S28 CSI: Beverage Plant: On the Trail of Hot- and Cold-Fill Spoilers
S29 Food Safety Programs Across an Integrated Poultry Industry

Debate

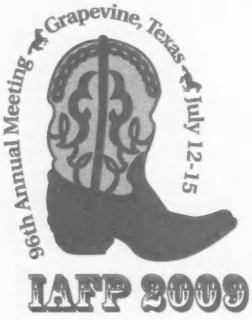
Pros and Cons of Zero-Tolerance Policy for Pathogens in Food

4:00 p.m. – 4:45 p.m.

John H. Silliker Lecture – *The 2008 Irish Dioxin Crisis: A Public Health, Food Safety, Economic, Legal, or a Risk Communication Challenge?* – **Dr. Patrick Wall,** University College Dublin, School of Public Health and Population Sciences, Belfield, Ireland

Program subject to change

A full program is available on our Web site at www.foodprotection.org



IAFP 2009 GENERAL INFORMATION

REGISTER ONLINE

Register online at **www.foodprotection.org**

REGISTRATION INCLUDES

Register to attend the world's leading food safety conference.

Full Registration includes:

- Program Book
- Abstract Book on Thumb Drive
- Welcome Reception
- Ivan Parkin Lecture
- Cheese and Wine Reception
- Technical Sessions
- Poster Presentations
- Symposia
- Roundtables
- Exhibit Hall Admittance
- Exhibit Hall Lunch (Mon. & Tues.)
- Exhibit Hall Reception (Mon. & Tues.)
- John H. Silliker Lecture
- Awards Banquet

PRESENTATION HOURS

Sunday, July 12
Opening Session 6:00 p.m. – 7:30 p.m.

Monday, July 13
Symposia & Technical Sessions 8:30 a.m. – 5:00 p.m.

Tuesday, July 14
Symposia & Technical Sessions 8:30 a.m. – 5:00 p.m.

Wednesday, July 15
Symposia & Technical Sessions 8:30 a.m. – 3:30 p.m.
Closing Session 4:00 p.m. – 4:45 p.m.

GOLF TOURNAMENT

Saturday, July 11
Golf Tournament at Tour 18 6:30 a.m. – 2:00 p.m.

Join your friends and colleagues for an exciting round of golf before IAFP 2009.

DAYTIME EVENTS

Saturday, July 11
JFK and Dallas City Tour 9:00 a.m. – 3:00 p.m.

Sunday, July 12
Grapevine Historical Tour (Lunch included) 10:00 a.m. – 3:00 p.m.

Monday, July 13
Fort Worth Stockyards Tour (Lunch included) 12:00 p.m. – 5:00 p.m.

Tuesday, July 14
Fort Worth Arts Tour (Lunch included) 10:00 a.m. – 3:00 p.m.

EVENING EVENTS

Sunday, July 12
Opening Session 6:00 p.m. – 7:30 p.m.
Cheese and Wine Reception 7:30 p.m. – 9:30 p.m.
Sponsored by Kraft Foods

Monday, July 13
Exhibit Hall Reception 5:00 p.m. – 6:00 p.m.
Sponsored by DuPont Qualicon

Monday Night Social
Texas Fun on the Ranch 6:30 p.m. – 10:00 p.m.

Tuesday, July 14
Exhibit Hall Reception 5:00 p.m. – 6:00 p.m.

IAFP Foundation Fundraiser
Dinner at Cowboys Golf Club 6:30 p.m. – 9:30 p.m.

Wednesday, July 15
Awards Banquet Reception 6:00 p.m. – 7:00 p.m.
Awards Banquet 7:00 p.m. – 9:30 p.m.

SPECIAL EVENTS

Saturday, July 11
NIFSI Project Directors Meeting 11:00 a.m. – 5:00 p.m.

Tuesday, July 14
Texas A&M Breakfast 7:00 a.m. – 8:30 a.m.

Tuesday, July 14
NFPA Alumni and Friends Reception 6:00 p.m. – 8:00 p.m.

EXHIBIT HOURS

Sunday, July 12 7:30 p.m. – 9:30 p.m.
Monday, July 13 10:00 a.m. – 6:00 p.m.
Tuesday, July 14 10:00 a.m. – 6:00 p.m.

HOTEL INFORMATION

Hotel reservations can be made online at **www.foodprotection.org**.

The IAFP Annual Meeting Sessions, Exhibits and Events will take place or depart from the Gaylord Texan Resort.

Gaylord Texan Resort $169.00 per night

CANCELLATION POLICY

Registration fees, less a $50 administration fee and any applicable bank charges, will be refunded for written cancellations received by June 26, 2009. No refunds will be made after June 26, 2009; however, the registration may be transferred to a colleague with written notification. Refunds will be processed after July 20, 2009.

Event and extra tickets purchased are nonrefundable.

International Association for Food Protection®
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Des Moines, IA 50322-2864, USA
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Fax: +1 515.276.8655
E-mail: info@foodprotection.org
Web site: www.foodprotection.org

IAFP 2009 ACTIVITIES

SATURDAY, JULY 11

COMMITTEE MEETINGS
2:00 p.m. – 5:00 p.m.

WELCOME RECEPTION
5:00 p.m. – 6:30 p.m.
Sponsored by Quality Auditing Institute

SUNDAY, JULY 12

COMMITTEE MEETINGS
7:00 a.m. – 5:00 p.m.

STUDENT LUNCHEON (ticket required)
12:00 p.m. – 1:30 p.m.
Sponsored by Unilever

EDITORIAL BOARD RECEPTION (by invitation)
4:30 p.m. – 5:30 p.m.

OPENING SESSION AND IVAN PARKIN LECTURE
6:00 p.m. – 7:30 p.m.

CHEESE AND WINE RECEPTION
7:30 p.m. – 9:30 p.m.
Sponsored by Kraft Foods

MONDAY, JULY 13

COMMITTEE AND PDG CHAIRPERSON BREAKFAST (by invitation)
7:00 a.m. – 9:00 a.m.

EXHIBIT HALL LUNCH
12:00 p.m. – 1:00 p.m.
Sponsored by JohnsonDiversey

EXHIBIT HALL RECEPTION
5:00 p.m. – 6:00 p.m.
Sponsored by DuPont Qualicon

MONDAY NIGHT SOCIAL (ticket required)
6:30 p.m. – 10:00 p.m.
Texas Fun on the Ranch

TUESDAY, JULY 14

EXHIBIT HALL LUNCH
12:00 p.m. – 1:00 p.m.
Sponsored by DNV

BUSINESS MEETING
12:15 p.m. – 1:00 p.m.

EXHIBIT HALL RECEPTION
5:00 p.m. – 6:00 p.m.
Partially sponsored by Quality Assurance and Food Safety Magazine

PRESIDENT'S RECEPTION (by invitation)
6:00 p.m. – 7:00 p.m.
Sponsored by Fisher Scientific

FOUNDATION FUNDRAISER (ticket required)
6:30 p.m. – 9:30 p.m.
Dinner at Cowboys Golf Club

WEDNESDAY, JULY 15

JOHN H. SILLIKER LECTURE
4:00 p.m. – 4:45 p.m.

AWARDS RECEPTION AND BANQUET
6:00 p.m. – 9:30 p.m.

IAFP JOB FAIR
Sunday, July 12 through Wednesday, July 15

Employers, take advantage of the opportunity to recruit the top food scientists in the world! Post your job announcements and interview candidates.

IAFP 2009 EVENT INFORMATION

GOLF TOURNAMENT

Saturday, July 11

Golf Tournament at Tour 18 — 6:30 a.m. – 2:00 p.m.

Have you ever dreamed of playing Amen Corner at Augusta National? How about a round of golf at Murifield Village, Firestone Country Club, or Southern Hills? Oakmont? Sawgrass? Crooked Stick? Doral? Each of these famed golf courses and more are represented in this unique golfing experience at "Tour 18" Golf Course, the site of IAFP's 2009 Golf Tournament. "Tour 18" has duplicated legendary holes from the most celebrated golf courses for your enjoyment.

Imagine yourself playing on carefully simulated holes from some of the greatest golf holes in America. This collaboration of incredible replicas offers one fantastic challenge after another, creating a uniquely memorable experience.

This will be an opportunity you won't want to miss! Sign up now to join your friends and colleagues in this best-ball, pre-meeting tournament to start IAFP 2009 off with some fun!!! Price includes transportation, greens fees with a cart, range balls, breakfast, lunch and prizes.

DAYTIME EVENTS

Saturday, July 11

JFK and Dallas City Tour — 9:00 a.m. – 3:00 p.m.

Do you remember where you were on November 22, 1963? On this day, John F. Kennedy, the 35th President of the United States of America was assassinated in downtown Dallas. Visit the Sixth Floor Museum to learn more about this historic day. Continue to explore the heart of Dallas including the Historic West End District, Pioneer Plaza, the renowned Dallas Farmer's Market and more.

Sunday, July 12

Grapevine Historical Tour — 10:00 a.m. – 3:00 p.m.
(Lunch included)

After a scrumptious brunch at Willhoittes on Main Street you will visit Nash Farm and witness the life and times of the early farmers and settlers who established Grapevine. Your journey will continue to the Grapevine Vintage Railroad, the Grapevine Heritage Museum and the Vetro Glass Studio, where you can watch the glass blowing artisans. A memorable wine tasting experience at Cross Timbers will complete your day.

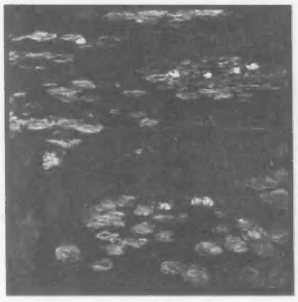
Monday, July 13

Fort Worth Stockyards Tour — 12:00 p.m. – 5:00 p.m.
(Lunch included)

Begin your day with lunch at Risky's Barbeque before you are transported back in time to the Wild West, visiting the Fort Worth Historic Stockyards, the largest horse and mule market in the world during WWII. Explore the Texas Cowboy Hall of Fame and then see an actual boot making demonstration at the Ponder Boot Company. End your day with the Fort Worth Herd Cattle Drive, the only true cattle drive left in the US.

Tuesday, July 14

Fort Worth Arts Tour 10:00 a.m. – 3:00 p.m.
(Lunch included)



The Kimbell Art Museum's holdings range in period from antiquity to the 20th century and includes masterpieces by Duccio, El Greco, Rembrandt, Monet and Picasso to name a few. Next you will have lunch at the famed Joe T. Garcia's Mexican Cuisine, one of the most popular restaurants in the area. Then it's on to the Sid Richardson Museum to see the finest and most focused collections of Western art in America.

EVENING EVENTS

Sunday, July 12

Opening Session 6:00 p.m. – 7:30 p.m.

Cheese and Wine Reception 7:30 p.m. – 9:30 p.m.
Sponsored by Kraft Foods

Monday, July 13

Exhibit Hall Reception 5:00 p.m. – 6:00 p.m.
Sponsored by DuPont Qualicon

Monday Night Social

Texas Fun on the Ranch 6:30 p.m. – 10:00 p.m.

Howdy, partner! Pull on your boots and get ready to kick up your heels at Circle R Ranch. Hop aboard a horse-drawn hay wagon for a leisurely ride, try your hand in a quick-draw "shoot-out," learn to rope and work up a Texas-sized appetite for an all-you-can-eat barbecue. Enjoy the country-western band and join the fun as you are taught a Texas line dance. Don't miss this Wild West experience!

Tuesday, July 14

Exhibit Hall Reception 5:00 p.m. – 6:00 p.m.

IAFP Foundation Fundraiser 6:30 p.m. – 9:30 p.m.
Dinner at Cowboys Golf Club

Support the IAFP Foundation and enjoy an evening of food and fun at the Cowboys Golf Club, a tribute to the five-time world champion NFL football team. The clubhouse features a hall of honor with a magnificent display of the coveted Super Bowl trophies and memorabilia of Cowboys legends both past and present. Participate in the putting contest to show off your skills or relax on the patio to enjoy the fresh air. Then, enjoy a delicious dinner and live music. What a perfect way to end your day and support the IAFP Foundation!

Wednesday, July 15

Awards Banquet Reception 6:00 p.m. – 7:00 p.m.

Awards Banquet 7:00 p.m. – 9:30 p.m.

SPECIAL EVENTS

Registration required

Saturday, July 11

NIFSI Project Directors Meeting 11:00 a.m. – 5:00 p.m.

The National Integrated Food Safety Initiative (NIFSI) is hosting its bi-annual Project Directors Meeting in conjunction with the International Association for Food Protection's Annual Meeting. This meeting will help to: (1) Facilitate regional and national coordination of efforts to avoid duplication and create synergy in productivity; (2) Foster alignment of program activities with national and international priorities in food safety research, education, and extension; and (3) Showcase the impacts of different NIFSI grants in food safety. This meeting will also provide a mechanism for gathering stakeholder input on emerging issues and priority areas impacting the safety of America's food supply.

Registration fee includes lunch and breaks.

Tuesday, July 14

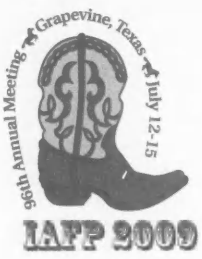
Texas A&M Breakfast 7:00 a.m. – 8:30 a.m.

Current and Former Students of Texas A&M University, get your "Gig 'em" going by joining fellow Aggies for breakfast before heading off to the symposia. Catch up on all the news and meet new members of the Aggie Network.

Tuesday, July 14

NFPA Alumni and Friends Reception 6:00 p.m. – 8:00 p.m.

National Canners Association has evolved to today's major food association GMA, and IAFP's Annual Meeting draws many of its alumni and friends. The Gaylord's shuttle bus will take us on the short ride to a local watering hole for this casual, strictly social event featuring drinks, snacks, billiards, and friends from GMA today and yesterday. All are welcome.



Contribute to the Twelfth Foundation Silent Auction Today!

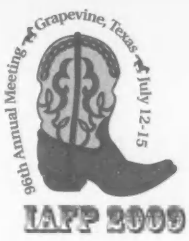
Proceeds from the Silent Auction Benefit the Foundation

Support the Foundation by donating an item today. A sample of items donated last year included:

- 3M Gift Box
- "Taste of Chicago" Gift Certificates
- Experience Atlanta Gift Basket
- Rosemary's Garden Bath & Body Products
- 2009 Annual Meeting Registration
- Jimmy Buffet Autographed Album
- Cultured Freshwater Pearl Necklace w/Sapphire and Silver Clasp
- *JFP* On-A-Stick (Back Issues)
- *Y'all Come Eat*–Signed by Paula Deen
- Author Signed Scientific Text Books
- 10 lb. Nestle Crunch Bar

To donate an item go to our Web site at www.foodprotection.org and complete the Silent Auction Donation Form or contact Donna Gronstal at dgronstal@foodprotection.org +1 515.276.3344; +1 800.369.6337

IAFP FOUNDATION



IAFP 2009 REGISTRATION FORM

3 Ways to Register

ONLINE	FAX	MAIL
www.foodprotection.org	+1 515.276.8655	6200 Aurora Ave., Suite 200W Des Moines, IA 50322-2864, USA

Member Number: _____

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

Employer _____ Title _____

Mailing Address (Please specify: ❒ Home ❒ Work) _____

City _____ State/Province _____ Country _____ Postal/Zip Code _____

Telephone _____ Fax _____ E-mail _____

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

❒ IAFP occasionally provides Attendees' addresses (excluding phone and E-mail) to vendors and exhibitors supplying products and services for the food safety industry. If you prefer NOT to be included in these lists, please check the box.

PAYMENT MUST BE RECEIVED BY JUNE 9, 2009 TO AVOID LATE REGISTRATION FEES

REGISTRATION FEES	MEMBERS	NONMEMBERS	TOTAL
Registration	$ 430 ($ 480 late)	$ 650 ($ 700 late)	_____
Association Student Member	$ 80 ($ 90 late)	Not Available	_____
Retired Association Member	$ 80 ($ 90 late)	Not Available	_____
One Day Registration* ❒ Mon. ❒ Tues. ❒ Wed.	$ 230 ($ 255 late)	$ 360 ($ 385 late)	_____
Spouse/Companion* (Name): _____	$ 60 ($ 60 late)	$ 60 ($ 60 late)	_____
Children 15 & Over* (Names): _____	$ 25 ($ 25 late)	$ 25 ($ 25 late)	_____
Children 14 & Under* (Names): _____	FREE	FREE	_____
*Awards Banquet not included			
Additional Awards Banquet Ticket – Wednesday, 7/15	$ 55 ($ 65 late)	$ 55 ($ 65 late)	_____
Student Luncheon – Sunday, 7/12	$ 10 ($ 15 late)		_____
DAYTIME EVENTS		**# OF TICKETS**	
Golf Tournament at Tour 18 – Saturday, 7/11	$ 145 ($ 155 late)	_____	_____
JFK and Dallas City Tour – Saturday, 7/11	$ 58 ($ 63 late)	_____	_____
Grapevine Historical Tour – Sunday, 7/12 (Lunch included)	$ 83 ($ 88 late)	_____	_____
Fort Worth Stockyards Tour – Monday, 7/13 (Lunch included)	$ 84 ($ 89 late)	_____	_____
Fort Worth Arts Tour – Tuesday, 7/14 (Lunch included)	$ 85 ($ 90 late)	_____	_____
EVENING EVENTS			
Monday Night Social – Texas Fun on the Ranch – Monday, 7/13	$ 45 ($ 55 late)	_____	_____
IAFP Foundation Fundraiser – Dinner at Cowboys Golf Club – Tuesday, 7/14	$ 140 ($ 150 late)	_____	_____
SPECIAL EVENTS			
NIFSI Project Directors Meeting – Saturday, 7/11	$ 80 ($ 90 late)	_____	_____
Texas A&M Breakfast – Tuesday, 7/14	$ 10 ($ 20 late)	_____	_____
NFPA Alumni and Friends Reception – Tuesday, 7/14	$ 35 ($ 45 late)	_____	_____
ABSTRACTS			
Annual Meeting Abstracts (citable publication to be mailed Sept. 1)	$ 30	$ 30	_____

Payment Options: ❒ **VISA** ❒ **Master Card** ❒ **American Express** ❒ **Discover**

❒ **Check Enclosed**

TOTAL AMOUNT ENCLOSED $ _____
US FUNDS on US BANK

Refunds subject to cancellation policy

CREDIT CARD # _____

CARD ID #* _____ EXP. DATE _____

SIGNATURE _____

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

EXHIBITORS DO NOT USE THIS FORM

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

❒ Check box if you are a technical, poster, or symposium speaker.

International Association for Food Protection

IAFP 2009 WORKSHOPS

WORKSHOP 1	WORKSHOP 2	WORKSHOP 3
Your Toolkit for Cleaning by Design...What Can Go Right	**Microbiological Sampling and Testing in Food Safety Management**	**Beyond Food Safety Management – How to Create a Food Safety Culture**
Friday and Saturday	**Saturday**	**Saturday**
July 10–11	**July 11**	**July 11**
8:00 a.m. – 5:00 p.m.	**8:00 a.m. – 5:00 p.m.**	**8:00 a.m. – 5:00 p.m.**

REGISTRATION – (Payment must be received by June 26, 2009 to avoid late registration rates).
Cancellations received by June 26 will be refunded, less a $50.00 administrative fee. No refunds will be made after this date.

	Early Rate	Late Rate
Member	$675.00	$750.00
Non-Member	$775.00	$850.00

	Early Rate	Late Rate
Member	$380.00	$455.00
Non-Member	$480.00	$555.00

	Early Rate	Late Rate
Member	$345.00	$420.00
Non-Member	$445.00	$520.00

Student rates available, contact Julie at jcattanach@foodprotection.org for more information.

Workshop 1 – Your Toolkit for Cleaning by Design...What Can Go Right — Friday and Saturday, July 10–11

The concept of sanitary design has long been recognized by the food industry as an integral part of developing, implementing and maintaining a successful food safety program. Hygienic design considerations play a vital role in food safety management, as processors face potential economic challenges resulting from loss of product through spoilage, food safety concerns and loss of market confidence. Investigations involving product contamination by spoilage organisms or pathogenic bacteria however, have shown that faulty equipment design and use of incompatible construction materials can lead to ineffective cleaning and sanitation, and create conditions that will allow microbial growth to occur, resulting in product contamination. Although cleanability of the equipment is a major criterion in the pre-qualification stage prior to purchase of new equipment; consideration for addressing hygienic design during installation and its integration with auxiliary systems in food production areas could be overlooked.

Furthermore, although the application of sanitary design principles is widely embraced by the food industry in new equipment acquisitions and in the construction of food plant and retail establishments, upgrading an existing plant/equipment design to meet hygienic requirements can be prohibitively expensive. Understanding the concept of sanitary design when modifying existing plant equipment can prevent or minimize the risk of microbial contamination resulting from the development of harborage areas or niches.

Whether building a new facility, remodeling an existing food plant and retail establishment, purchasing new equipment, or simply repairing existing structures or equipment, participants will receive practical information from experts in meat, liquid, dry and retail food processes in designing cleaning and sanitation programs that can be implemented to advance food safety and quality. Attendees will gain practical and theoretical understanding of hygienic design and be able to identify non-hygienic features, improve equipment designs and make better informed decisions about equipment purchases and/or modifications.

Topics:

- Hygienic design standards in the US
- Hygienic design standards in European countries (EHEDG) and equipment validation to meet US requirements
- Challenges and improvement opportunities in the cleaning and sanitation of existing and retrofitted equipment in various industries: case studies
- Validation of cleaning and sanitation processes: What works and how effective it is
- Considerations for equipment qualification and redesign

Instructors:

John N. Butts, Land O'Frost, Lansing, IL, USA
Don Graham, Graham Sanitary Design Consulting, Ltd., Jackson, MI, USA
Debra Henyon, Elopak, Inc., New Hudson, MI, USA
John T. Holah, Campden & Chorleywood Food Research Association, Gloucestershire, UK
Jeffrey L. Kornacki, Kornacki Microbiology Solutions, Inc., McFarland, WI, USA
Todd Rossow, Publix Super Markets, Inc., Lakeland, FL, USA
Tracie G. Sheehan, Sara Lee Corporation, Downers Grove, IL, USA
Purnendu C. Vasavada, University of Wisconsin-River Falls, River Falls, WI, USA
John Weisgerber, Weisgerber Consulting LLC, Downers Grove, IL, USA

Organizers:

Rocelle Clavero, Sara Lee Corporation, Downers Grove, IL, USA
Yale Lary, Sysco Corporation, Houston, TX, USA

INTENDED AUDIENCE

Engineers working in equipment design, processors specifying or purchasing new equipment, technical sales people, new project managers and plant quality assurance/food safety managers. Manufacturers, fabricators and engineers of food plant and retail equipment. Food safety professionals involved in the design, implementation and validation of food safety systems.

Workshop 2 – Microbiological Sampling and Testing in Food Safety Management – Saturday, July 11

It is well recognized that no amount of sampling and testing can ensure the absence of pathogens in foods. However, there are many useful applications of microbiological testing related to monitoring and verification; e.g., testing critical ingredients, in-process monitoring, final product verification, port-of-entry testing where there is no historical data, etc.

In the 1970s, ICMSF introduced statistically based sampling plans, derived from a risk-based approach. These sampling plans have been adopted by organizations such as Codex Alimentarius and national authorities for certain applications. However, there are many examples where these plans have been applied inappropriately or incorrectly.

This "hands-on" workshop will (re-)introduce participants to the principles and limitations of microbiological sampling and testing for food safety assurance. Participants will learn how the performance of a sampling can be determined and how suitable sampling plans for particular pathogens and foods and intended consumers are established. Some calculations of the statistical aspects of sampling will be illustrated, like detection probabilities, effects of log-normal distributions of organisms, operating characteristic curves, and within-lot and between-lot testing. The use of sampling and testing in food safety management will be discussed and illustrated from both the governmental and industry perspectives.

Participants are asked to bring laptops to the workshop and will work individually, or in pairs, on case studies to demonstrate the issues and principles discussed.

Topics:

- Importance of testing in food safety management
- Basics of establishing suitable sampling plans and determining their performance
- Within-lot and between-lot sampling and statistics
- Illustrative examples of microbial testing and sampling plans

ORGANIZED AND SUPPORTED BY ICMSF

Instructors:

Leon G.M. Gorris, Unilever, Safety & Environmental Assurance Centre, Sharnbrook, U.K.
Marcel H. Zwietering, Laboratory for Food Microbiology, Wageningen University, Wageningen, The Netherlands
Tom Ross, Food Safety Centre, University of Tasmania, Hobart, Australia
Russell S. Flowers, Silliker Group Corp., Homewood, IL, USA

Organizer:

Leon G.M. Gorris, Unilever, Safety & Environmental Assurance Centre, Sharnbrook, U.K.

INTENDED AUDIENCE

Members involved in, or with a keen interest in understanding, microbiological sampling and testing for food safety management from the industry as well as the governmental perspective.

Workshop 3 – Beyond Food Safety Management – How to Create a Food Safety Culture – Saturday, July 11

Food safety awareness is at an all time high. New and emerging threats to the food supply are being recognized. Accordingly, retail and foodservice establishments, and food producers at all levels of the food production chain, have a growing responsibility to ensure that proper food safety and sanitation practices are followed, thereby, safeguarding the health of their guests and customers.

Achieving food safety success in this changing environment requires going beyond traditional training, testing, and inspectional approaches to managing risks. It requires a better understanding of organizational culture and the human dimensions of food safety. To improve the food safety performance of a retail or foodservice establishment, an organization with thousands of employees, or a local community, you must change people's behavior.

The importance of organizational culture, human behavior, and systems thinking is well documented in the occupational safety and health fields. However, significant contributions to the scientific literature on these topics are noticeably absent in the field of food safety.

This workshop will be the first of its kind designed to teach participants how to create a food safety culture – not just a food safety program. Designed as a series of lectures and participatory, hands-on sessions, workshop participants will be divided into teams to work through different case studies such as:

- food safety for large foodservice chains
- you are hired as consultant by the CEO of a large international company to strengthen their food safety performance, what advice will you give?
- a community's inspection scores are getting worse, as public health director, what can you do to improve restaurant inspection scores in the community?

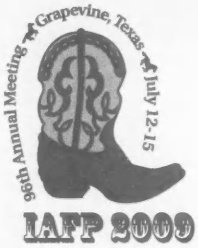
By the end of the workshop, participants will have gained a real working knowledge of different behavioral change theories, key elements of an effective food safety culture, and a thorough understanding of the differences between a traditional food safety management system versus a behavior-based food safety approach. In addition, participants will have received practical, real-world advice and be better equipped for their next promotion or challenge. As a take away resource, participants will also receive an autographed copy of Frank Yiannas' new book, *Food Safety Culture, Creating a Behavior-based Food Safety Management System.*

Organized and Instructed by Frank Yiannas: In addition to working for well-known global brands, Frank is the Past President of the International Association for Food Protection, recipient of the 2007 NSF Lifetime Achievement Award for Leadership in Food Safety, and author of the book, *Food Safety Culture, Creating a Behavior-based Food Safety Management System.*

INTENDED AUDIENCE

Food safety managers, consultants, public health directors, restaurateurs, etc.

TO REGISTER, GO ONLINE TO WWW.FOODPROTECTION.ORG



IAFP 2009 EXHIBITORS

Companies Scheduled to Exhibit as of May 4, 2009

Indicates IAFP Sustaining Member

3-A Sanitary Standards, Inc.
703.790.0295 www.3-a.org

3M Microbiology
651.733.1213 www.3m.com/microbiology

ABC Research Corporation
352.372.0436 www.abcr.com

Advanced Instruments, Inc.
781.320.9000 www.aicompanies.com

Aemtek, Inc.
510.979.1979 www.aemtek.com

AES – Chemunex, Inc.
609.497.0166 www.aeschemunex.com

American Proficiency Institute
800.333.0958 www.api-pt.com

Analytical Food Laboratories, Inc.
800.242.6494 www.afltexas.com

Applied Biosystems
650.638.5800 www.appliedbiosystems.com

ASI Food Safety Consultants
314.422.8365 www.asifood.com

ASM Press
734.327.4876 http://estore.asm.org

Association of Food and Drug Officials
717.757.2888 www.afdo.org

ATCC
703.365.2700 www.atcc.org

BD Diagnostics
410.316.4024 www.bd.com/ds

Bio-Rad Laboratories
510.741.5191 www.foodscience.bio-rad.com

BioControl
425.603.1123 www.biocontrolsys.com

BioLumix
734.973.5870 www.mybiolumix.com

bioMérieux, Inc.
314.731.8681 www.biomerieux-usa.com

British Food Journal
00.44.1274.777700 www.emeraldinsight.com/bfj.htm

Charm Sciences
978.687.9200 www.charm.com

Chemstar Corporation
800.327.0777 www.chemstarcorp.com

CRC Press – Taylor & Francis Group LLC
561.994.0555 www.crcpress.com

Decagon Devices, Inc.
509.332.2756 www.decagon.com

Deibel Laboratories
847.329.9900 www.deibellabs.com

DonLevy Laboratories
219.226.0001 www.donlevylab.com

DuPont Qualicon
302.695.5300 www.qualicon.com

Elisa Systems
+61 7.38578600 www.elisasystems.net

Exponent
888.656.3976 www.exponent.com

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

Food Safety Magazine
818.842.4777 www.foodsafetymagazine.com

Food Safety Net Services
210.308.0675 www.food-safetynet.com

Food Safety Summit
847.405.4000 www.foodsafetysummit.com

Hanna Instruments, USA
401.765.7500 www.hannainst.com

Hardy Diagnostics
800.266.2222 www.hardydiagnostics.com

HiMedia Laboratories Pvt. Limited
91.22.40951919 www.himedialabs.com

Hygiena
805.388.8007 www.hygiena.net

Idaho Technology
801.736.6354 www.idahotech.com

IEH Laboratories & Consulting Group
206.522.5180 www.iehinc.com

Instant Recall by BellTower Technologies
214.220.8071 www.instantrecall.com

International Food Hygiene
44.13.7724.1724 www.positiveaction.co.uk

International Food Information Council Foundation
202.296.6540 www.ific.org

LGC Standards
011.44.208.943.8470 www.lgcstandards.com

LITMUS RAPID-B, LLC
870.761.3446 www.litmusrapid-b.com

MATRIX MicroScience, Inc.
303.277.9613 www.matrixmsci.com

Medical Wire / ABSP
866.286.3546 www.mwe-usa.com

Michelson Laboratories, Inc
562.928.0553 www.michelsonlab.com

Michigan State University Online Master of Science in Food Safety
517.884.2080 www.online.foodsafety.msu.edu

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

MicroBioLogics, Inc.
320.253.1640 www.microbiologics.com

Microbiology International
301.662.6835 www.800ezmicro.com
www.thenfl.com

Nasco Whirl-Pak
920.563.2446

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

Nelson-Jameson, Inc.
715.387.1151 www.nelsonjameson.com

Neogen Corporation
517.372.9200 www.neogen.com

Neutec Group, Inc
516.870.0877 www.neutecgroup.com

Nice-Pak Commercial
845.365.1700 www.nicepak.com

Northwest Analytical, Inc.
503.224.7727 www.nwasoft.com

NSF International
734.769.8010 www.nsf.org

OpGen
240.813.1260 www.opgen.com

Orkin Commercial Services
800.ORKIN.NOW www.orkincommercial.com

Q Laboratories, Inc.
513.471.1300 www.qlaboratories.com

Quality Assurance & Food Safety Magazine
800.456.0707 www.qualityassurancemag.com

R&F Laboratories
630.969.5300 www.rf-labs.com

Remel Inc. (Part of Thermo Fisher Scientific)
800.255.6730 www.remel.com

Rochester Midland Corporation, Food Safety Division
800.762.4448 www.rochestermidland.com

rtech™ laboratories
800.328.9687 www.rtechlabs.com

SA SCIENTIFIC LTD
210.699.8800 www.sascientific.com

SGS
973.575.5252 www.us.sgs.com/cts

Silliker, Inc.
708.957.7878 www.silliker.com

Society for Applied Microbiology
44.1234.76.0751 www.sfam.org.uk

Springer
212.460.1500 www.springer.com

Stericycle
877.860.1200 www.stericycle.com

Steton
435.627.5097 www.steton.com

Strategic Diagnostics Inc.
302.456.6789 www.sdix.com

Takara Bio
608.441.8314 www.takarabiousa.com

Tepnel Research Products & Services
203.328.9500 www.tepnel.com

University of Wisconsin-Madison, Food Research Institute
608.263.7777 www.wisc.edu/fri

USDA Food Safety and Inspection Service
202.690.6370 www.fsis.usda.gov

Vacci-Test Corporation
720.842.1920 www.vaccitest.com

Vista Enterprises Incorporated
925.755.0511 www.vistaenterprisesinc.com

VWR
610.429.5577 www.vwr.com

Weber Scientific
609.584.7677 www.weberscientific.com

Wiley-Blackwell
515.292.0140 www.wiley.com

SPECIAL EXHIBIT HALL EVENTS

CHEESE AND WINE RECEPTION

Sunday, July 12 7:30 p.m. – 9:30 p.m.
Sponsored by Kraft Foods

EXHIBIT HALL BREAKS

Monday, July 13 10:00 a.m. Pastries and Coffee
Sponsored by Deibel Laboratories
3:00 p.m. Coffee Break
Sponsored by NSF International

Tuesday, July 14 10:00 a.m. Pastries and Coffee
Sponsored by Springer
3:00 p.m. Coffee Break
Sponsored by BD Diagnostics

EXHIBIT HALL LUNCH

Monday, July 13 12:00 p.m. – 1:00 p.m.
Sponsored by JohnsonDiversey

Tuesday, July 14 12:00 p.m. – 1:00 p.m.
Sponsored by DNV

EXHIBIT HALL RECEPTIONS

Monday, July 13 5:00 p.m. – 6:00 p.m.
Sponsored by DuPont Qualicon

Tuesday, July 14 5:00 p.m. – 6:00 p.m.
Partially sponsored by Quality Assurance and Food Safety Magazine

EXHIBIT HOURS

Sunday, July 12
7:30 p.m. – 9:30 p.m.

Monday, July 13
10:00 a.m. – 6:00 p.m.

Tuesday, July 14
10:00 a.m. – 6:00 p.m.

Hours subject to change. See final program for actual hours

COMING EVENTS

JULY

- **1–3, National Association of Local Boards of Health 17th Annual Conference,** Philadelphia, PA. For more information, call 419.353.7714 or go to www.nalboh.org/NALBOH_Conference.htm.
- **6–9, Sfam Summer Conference,** Manchester Metropolitan University, United Kingdom. For more information, go to www.sfam.org.uk/summer_conference.php.
- **9–10, HACCP Workshop,** Bloomington, MN. For more information, contact AIB International at 800.633.5137 or go to www.aibonline.org.
- **10–11, IAFP Workshops,** Gaylord Texan Resort, Grapevine, TX. For more information, go to www.foodprotection.org.
- **12–15, IAFP 2009 Annual Meeting,** Gaylord Texan Resort, Grapevine, TX. For more information, go to www.foodprotection.org.
- **13–16, Australian Association for Food Protection Annual Meeting,** Brisbane, Australia. For more information, contact Ian Jenson at 61.2.9463.9264; E-mail: ijenson@mla.com.au.
- **22–25, HACCP Workshop for Packaging Suppliers,** Vancouver, WA. For more information, call AIB International at 800.633.5137 or go to www.aibonline.org.
- **23–24, Meat and Poultry Marination Short Course,** University of Georgia, Athens, GA. For more information, go to www.foodscience.caes.uga.edu/.
- **24–28, NACO 2009 Annual Conference and Expo,** Gaylord Opryland Resort and Convention Center, Nashville/Davidson County, TN. For more information, call 202.942.4292 or go to www.naco.org.
- **27–28, Engineering for Food Safety,** Manhattan, KS. For more information, contact AIB International at 800.633.5137 or go to www.aibonline.org.
- **29–31, The 2009 NACCHO Annual Conference,** Rosen Shingle Creek Resort, Orlando, FL. For more information, go to www.naccho.org/events/nacchoannual2009/.

AUGUST

- **4–6, Food Marketing Institute Auditing SQF Systems Training,** Marriott Chicago Midway, Chicago, IL. For more information, go to www.fmi.org/forms/MeetingCalendar/.
- **9–13, Dietary Managers Association 49th Annual Meeting,** Hyatt Regency Atlanta On Peachtree Street, Atlanta, GA. For more information, call 800.323.1908 or go to www.dmaonline.org.
- **11–13, Statistical Process Control (SPC) for the Food Industry,** University of Georgia, Athens, GA. For more information, go to www.foodscience.caes.uga.edu/.

SEPTEMBER

- **8–12, 6th International Conference on Predictive Modeling in Foods,** Renaissance Washington, D.C. Hotel, Washington, D.C. For more information, contact Debbie Donze at ddonze@helmsbriscoe.com or go to www.6icpmf.org.
- **13–16, 123rd AOAC Annual Meeting,** Philadelphia, PA. For more information, go to www.aoac.org.
- **13–16, American Association of Cereal Chemists International Annual Meeting,** Baltimore Convention Center, Baltimore, MD. For more information, call 651.454.7250 go to www.aaccnet.org.
- **15–16, Developing and Implementing HACCP for the Meat and Poultry Industry,** University of Georgia, Athens, GA. For more information, go to www.foodscience.caes.uga.edu/.
- **15–16, Food Labeling: Complying with Regulatory Requirements for the Labeling of Packaged Foods Workshop,** GMA Headquarters, Washington, D.C. For more information, go to www.gmaonline.org/events/index.cfm.
- **15–16, Upper Midwest Dairy Industry Association,** Centennial Meeting, Holiday Inn, St. Cloud, MN. For more information, contact Gene Watnaas at 218.769.4334 or saantaw@prtel.com.
- **20–24, IDF World Dairy Summit–United Dairy World 2009,** Maritim Hotel Berlin, Berlin, Germany. For more information, go to www.wds2009.com.
- **21–24, Dairy Technology Workshop,** Randolph Associates, Inc., Birmingham, AL. For more information, call 205.595.6455; E-mail: kristy.clark@raiconsult.com.
- **22–24, New York State Association for Food Protection 86th Annual Conference,** Doubletree Hotel, East Syracuse, NY. For more information, contact Janene Lucia at 607.255.2892; E-mail: jgg@cornell.edu.
- **22–24, Wisconsin Association for Food Protection Joint Education Conference,** Wilderness Resort, Lake Chelan, WA. For more information, contact Stephanie Olmstead at 206.660.4594 or go to www.waffp.org.
- **23–24, China International Food Safety and Quality Conference and Expo,** Landmark Hotel and Towers, Beijing, China. For more information, go to www.chinafoodsafety.com/index.htm.
- **23–25, Washington Association for Food Protection Annual Conference,** Campbell's Resort, Lake Chelan, WA. For more information, contact Stephanie Olmsted at 206.660.4594 or go to www.waffp.org.

OCTOBER

- **5–7, Process Expo 2009,** Las Vegas Convention Center, Las Vegas, NV. For more information, go to www.fpsa.org/processExpo/.

COMING EVENTS

- **6–7, Iowa Association for Food Protection Annual Conference,** Quality Inn & Suites, Ames, IA. For more information, contact Lynn Melchert at lynn.melchert@swissvalley.com.
- **7–8, Associated Illinois Milk, Food and Environmental Sanitarians Fall Conference,** Stoney Creek Inn, East Peoria, IL. For more information, contact Steve DiVincenzo at Steve.DiVincenzo@illinois.gov.
- **7–9, IAFP European Symposium on Food Safety,** Berlin, Germany. For more information, call 515.276.3344 or go to www.foodprotection.org/events/european-symposia/.
- **13–16, 2009 ASTHO Annual Meeting,** Vienna (Tysons Corner), VA. For more information, go to www.astho.org.
- **18–21, Food Microbiology Symposium – Current Concepts in Foodborne Pathogens and Rapid and Automated Methods in Food Microbiology,** University of Wisconsin–River Falls, River Falls, WI. For more information, go to www.uwrf.edu/afs-all/institutes/foodmicro/.
- **26–29, North Dakota Environmental Health Association Annual Conference,** Doublewood Inn, Fargo, ND. For more information, go to www.ndeha.org.
- **28–31, Worldwide Food Expo,** McCormick Place, Chicago, IL. For more information, go to www.worldwidefood.com.

NOVEMBER

- **2–4, Sweets Middle East,** Dubai International Convention and Exhibition Centre, Dubai, U.A.E. For more information, phone 971.4.308.6748; E-mail: sweetsmiddleeast@dwtc.com.
- **7–11, 137th APHA Annual Meeting and Exposition,** Philadelphia, PA. For more information, go to www.apha.org/meetings.
- **9–11, 3rd Halal Expo,** Dubai, U.A.E. For more information, go to www.worldhalalexpos.com.
- **10–12, Sanitation Workshop,** Randolph Associates, Inc., Birmingham, AL. For more information, call 205.595.6455; E-mail: kristy.clark@raiconsult.com.
- **11–13, IAFP Asia Pacific Symposium on Food Safety,** Seoul KyoYuk MunHwa HoeKwan Hotel, Seoul, South Korea. For more information, go to www.iafpkorea.co.kr/main.asp.

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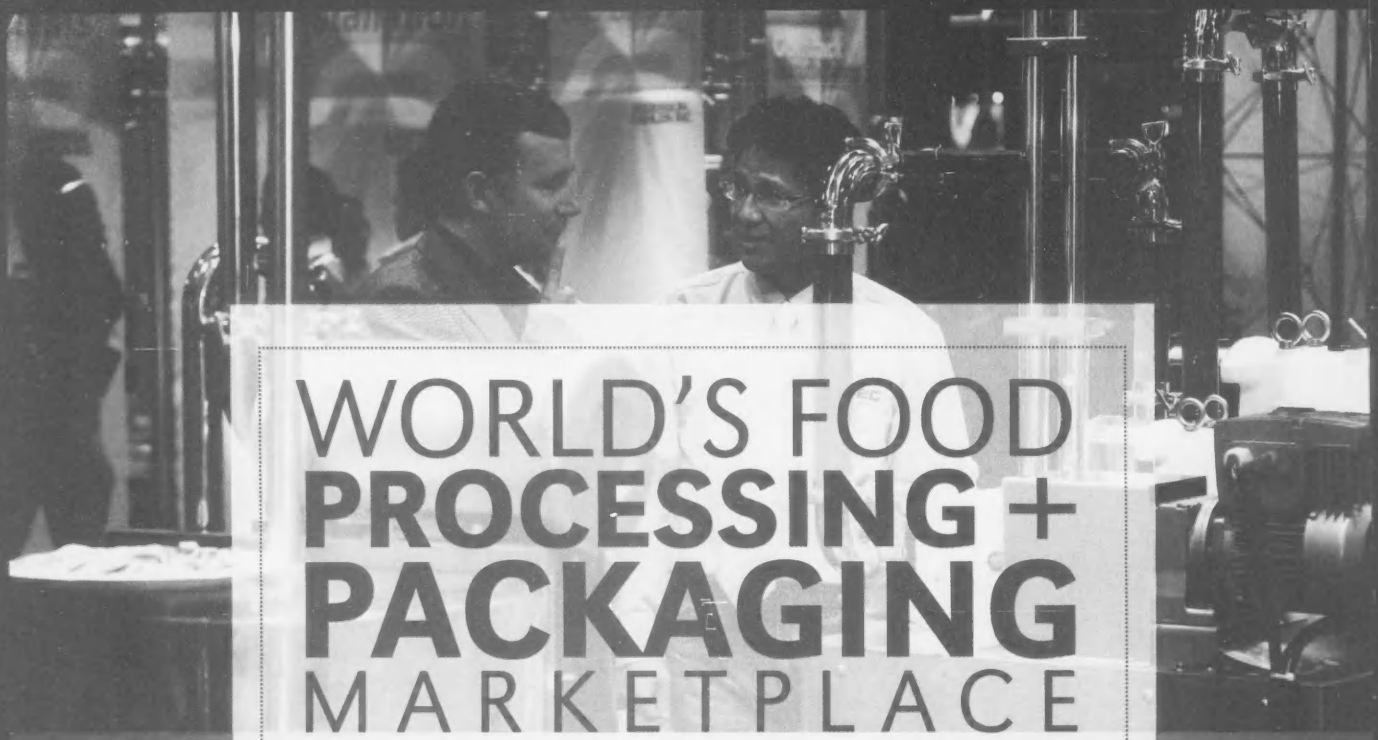

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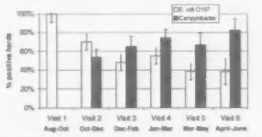
Research Notes

Review

ERRATA

In the article "*Enterobacter sakazakii* in Dried Infant Formulas and Milk Kitchens of Maternity Wards in São Paulo, Brazil" by Babiuk et al., *Journal of Food Protection* 72(1):37–42, the correct MPN value is <0.3, not <0.03 as published in the Abstract and the Results and Discussion.

A corrected Figure 2 for the article "Temporal Patterns and Risk Factors for *Escherichia coli* O157 and *Campylobacter* spp. in Young Cattle" by Ellis-Iversen et al., *Journal of Food Protection* 72(3):490–496, appears here.



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