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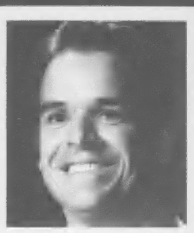

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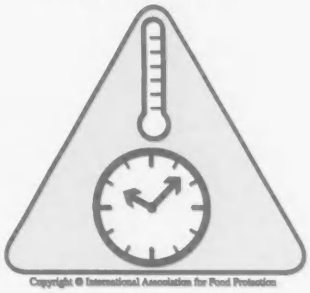


Cooking

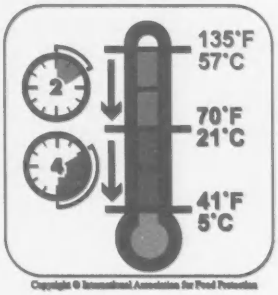
Do Not Work If Ill

Cross Contamination

Wash, Rinse, and Sanitize

No Bare Hand Contact

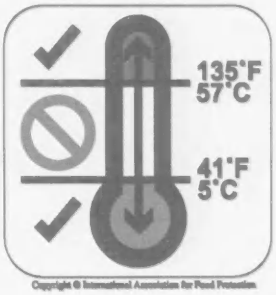
Cooling



Refrigeration/Cold Holding

Hot Holding

Temperature Danger Zone



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International Association for Food Protection

FOOD PROTECTION TRENDS

VOLUME 29, NO. 1

ARTICLES

ASSOCIATION NEWS

DEPARTMENTS

EXTRAS

A NOTE FROM THE *FPT* SCIENTIFIC EDITOR...

As my first year as *FPT* Scientific Editor draws to an end, I would like first to reflect upon three significant changes to the journal. First, the cover was completely redesigned in 2008 to give an appropriately more scientific "look" to the journal. Each cover now bears a listing of the technical papers published in the issue along with a set of three photographs that represent some aspect of food safety. At present, our supply of appropriate photographs is limited, but we are working to increase these such that the same three photos do not appear on every issue. If you have appropriate, high quality photos that you would permit us to use on the cover, please send them to Donna Bahun or me.

Second, I hope everyone has taken the opportunity to browse the new format for *FPT* online. The new format is truly an amazing piece of work. It is an interactive PDF document that looks like the actual hardcopy of the journal. Viewers can turn pages, jump to a target page, and even click on live links to Web sites and/or E-mail addresses that are available within the text. This new format will be available as one of your membership options, and I encourage everyone to consider adding the new *FPT* online format to your membership optional benefits (see: http://www.foodprotection.org/membership/types.asp).

Third, we have moved completely away from hardcopy "snail mail" submissions to the journal. While submissions are not truly "online," as is the case with the *Journal of Food Protection*, articles are submitted directly to Donna Bahun as E-mail attachments. Likewise, papers are sent electronically to reviewers, who then return their reviews to me by E-mail. This has significantly improved our timing on getting articles reviewed and responding to authors. The low volume of papers published in *FPT*, as compared with *JFP*, simply does not justify the cost associated with truly online submission and reviews. However, we very much prefer the electronic submissions and hope that submitters and reviewers have appreciated it as well.

Through the end of November, 2008, 22 manuscripts were submitted for consideration to publish in *FPT*. Of these submissions, 11 papers were published or accepted for publication, one was under revision for final consideration, five were rejected, and five remained under review by members of the Editorial Board. Concern has been expressed over the decrease in the number of papers submitted to *FPT*. The *FPT* Management Committee has created a subcommittee charged with the task of improving this situation. During the 2008 Annual Meeting, members of this subcommittee browsed the poster sessions and encouraged presenters to consider submitting a manuscript to *FPT* for publication. In addition, I went through all the abstracts from the 2008 poster presentations and selected many that seemed appropriate for publication in *FPT*. Each of the presenters of these posters was invited by letter to submit their work for consideration to publish in *FPT*, and we have received substantial positive responses from these presenters.

The focus of these recent direct solicitations was primarily on work related to consumer food safety attitudes, consumer or retail food safety practices, food safety surveys, etc. However, technical research papers that involve "bench work" microbiology are indeed welcome, as are review articles related to food safety. In addition, *FPT* welcomes articles for publication that are non-peer reviewed. These include reports from workshops, Professional Development Groups, and opinion articles. Please review the Instructions for Authors on page 31 or at: (http://www.foodprotection.org/publications/FPT%20Inst.%20 for%20Authors.pdf) for more information on the types of articles published in *FPT*.

Finally, I want to thank Donna Bahun, *FPT* Production Editor, for all her hard work and dedication to *FPT*. Since our submissions are not truly online, Donna handles all the behind-the-scenes work of archiving articles and sending papers out to reviewers. She processes papers quickly, responds to authors' queries, and does her job with professionalism. Her dedicated efforts make my job as Scientific Editor much easier!

I hope everyone is pleased with the new design of the journal. If you have comments or suggestions for improving *FPT*, or if you have any concerns, please let me know. I look forward to seeing many more submissions to *FPT* in 2009. Best wishes to all.

David A. Golden, *FPT* Scientific Editor

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Funds from the Foundation help to sponsor travel for deserving scientists from developing countries to our Annual Meeting, sponsor international workshops, distribute *JFP* and *FPT* journals to developing countries through FAO in Rome, and supports the future of food scientists through scholarships for students or funding for students to attend IAFP Annual Meetings.

It is the goal of the Association to grow the IAFP Foundation to a self-sustaining level of greater than $1.0 million by 2010. With your generous support we can achieve that goal and provide additional programs in pursuit of our goal of *Advancing Food Safety Worldwide*®.

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AUGUST 1–4

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International Association for Food Protection

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"PERSPECTIVES" FROM YOUR PRESIDENT

By STAN BAILEY
PRESIDENT

"From a food safety perspective, I often ask myself how did we ever survive our grandmothers' food-handling practices?"

Happy New Year! I hope that 2009 will be a healthy and prosperous year for everyone reading this column. For many people, the start of this New Year could not come quickly enough. In many ways, 2008 was a trying year for our societies as a whole for companies supporting IAFP, and for many of the individual members of IAFP. The slow down in the global economy has put a strain on most economies of the world. In many instances, the need to reduce government, academic, or private industry spending is putting extreme pressure on our food safety system. All of this at a time when we seemingly are faced with more food safety challenges than at any time in our history. Hopefully, as budget holders make the tough decisions that they must make, they will remember that there are no shortcuts to providing safe foods.

As I reflect back on 2008 and before, from a food safety perspective, I often ask myself "how did we ever survive our grandmothers' food-handling practices?" I grew up on a farm in hot and humid South Georgia. We always had a cow that provided the unpasteurized milk that we drank everyday and which was used to make the butter that we ate. We grew our own chickens, pigs and cows that provided most of the meat that we ate. We grew our own vegetables that more often than not were fertilized with "organic matter" from our animals.

My grandmother was an outstanding cook, and I have many fond memories of the great meals we ate at her house. However, when I think about my food safety training, probably the thing that scared me the most about eating at Grandma's house was how she handled the food after meals were through. In South Georgia, the meal that most of us now know as lunch (middle of the day) was called dinner. Every day Grandma would cook at least two meats and three or four vegetables along with a big bowl of biscuits for dinner. After we had eaten, we would clear the table of our dirty dinner plates and then Grandma would fold the tablecloth up over the food and leave it until we ate supper (night meal that we now refer to as dinner). The "leftovers" were never refrigerated.

How did we survive? I believe that we were just lucky. To the best of my knowledge, none of ever got *Campylobacter, Listeria,* or pathogenic *E. coli* from the unpasteurized milk we drank or the raw vegetables fertilized with organic materials from our animals that we ate. The thing that saved us from getting sick from all of the unrefrigerated leftovers was that Grandma always cooked everything "well" done and there was little opportunity for cross contamination.

I am aware that there is a small, but vocal, group of consumers in the United States and around the world who are advocating returning to consumption of raw milk and locally, organically grown, minimally processed foods. As someone who grew up on a small family farm, I am fully supportive of efforts to support sustainable agriculture in general, and the small farmer in particular. There is nothing better than fresh produce or vegetables that are eaten on the day they are picked, and clearly, buying locally will help reduce the carbon footprint of the food we eat. However, even though many people including myself can say that they have consumed unpasteurized milk with no adverse consequences, I do believe that there is overwhelming epidemiological evidence suggesting that it is irresponsible to allow the sale and consumption of raw, unpasteurized milk.

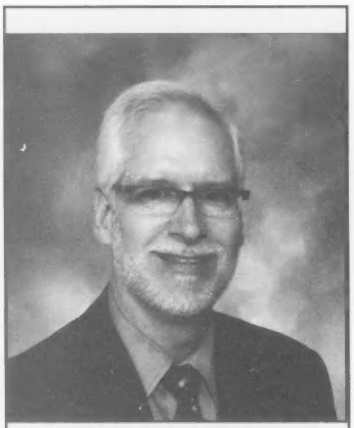
Even as local, small farmers are supported, it is also important to recognize the role that "commercial" farmers and agriculture has played and is playing in feeding the US and world populations. The following facts about US agriculture are

taken from North Carolina States College of Agriculture and Life Sciences Web site. Twenty-two million American workers produce, process, sell and trade the nation's food and fiber. But only 4.6 million of those people live on the farms – slightly less than 2 percent of the total US population. Consumers spend $547 billion for food originating on US farms and ranches. Of each dollar spent on food, the farmer's share is approximately 23 cents. The rest are for costs beyond the farm gate: wages and materials for production, processing, marketing, transportation and distribution. On average, every hour, 24 hours a day, 365 days a year, around $6 million in US agricultural products–grains, oilseeds, cotton, meats, vegetables, snack foods, etc., will be consigned for shipment for export to foreign markets. It all means more jobs and higher wages across the nation. US agricultural exports generate more than $100 billion annually in business activity throughout the US economy and provide jobs for nearly 1 million workers. Agricultural land provides habitat for 75 percent of the nation's wildlife. Deer, moose, waterfowl and other species have shown significant population increases during the past several years. A recent survey of America's young farmers and ranchers revealed that 97.2 percent planned to farm and ranch for life. And 90 percent said they would like their children to follow in their footsteps. This provides strong incentive for today's farmers and ranchers to protect and preserve the natural resources on their property. Not only is the land and its resources a farmer's lifeblood today, it represents the future for his family and their business.

Even though I left the farm many years ago, I can understand why such a high percentage of young farmers want to spend their life on their farm. Once you have a little dirt on your boots and under your fingernails, it stays with you forever. As we move into 2009 and beyond, we must continue to work to be sure that all of our farmers, big and small, are provided with the knowledge and tools to grow and produce foods that are safe.

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

"COMMENTARY" FROM THE EXECUTIVE DIRECTOR



By DAVID W. THARP, CAE
EXECUTIVE DIRECTOR

"Remember the deadlines mentioned for abstracts and Award nominations"

Deadlines, Secretary Election, the Dubai International Food Safety Conference and the IAFP Member Guide – these are things that are on the immediate horizon for IAFP! First off, let's cover some deadlines.

It is almost inconceivable, but time has passed so quickly that it is now six months until IAFP 2009, the 96th Annual Meeting, takes place in Grapevine, Texas. For those who might not be familiar with Grapevine, it is a city just north and west of the Dallas/Fort Worth International Airport. The resort we will use is the Gaylord Texan Resort and Conference Center, a beautiful domed facility that will keep the Texas heat away (at least while we are indoors!). Just a short transfer from the airport of ten to fifteen minutes and you will arrive at the site of IAFP 2009. Housing is now open and reservations can be made through the IAFP Web site.

With mention of IAFP 2009, that brings a few things to the front and center. First on the list is the deadline for technical abstract submission. All abstracts are due by January 21, 2009 at which time they will be turned over to the Program Committee Members for review and determination of acceptance. Abstracts are accepted in a number of subject areas and you are not limited by the number of abstracts you can submit, so review the information available at the IAFP Web site for details. Notification of acceptance will be provided by March 9.

Another Annual Meeting related deadline is that of the Awards Nominations. This year, Awards Nominations are due to the IAFP office not later than February 3, 2009. There are thirteen specific Awards recognizing excellence in food science and food safety. The list of Awards and nominating criteria are available through the IAFP Web site. There are many IAFP Members who are worthy of receiving these awards, so consider nominating a colleague today! It is a rewarding experience to call attention to the accomplishments of someone you respect. We will be watching for your nomination of a deserving colleague.

Something of interest to the long-term operations of IAFP is the Secretary Election which begins at the end of January. Be sure to watch your E-mail for notification of the electronic election ballot. The election is open from January 30 until March 17, so don't delay when your notification arrives! Our candidates this year are Mark Moorman from Kellogg Company in Battle Creek, Michigan and Katie Swanson from Ecolab in St. Paul, Minnesota. Both are excellent candidates and would serve the Association very well if elected. If you have an opportunity, pass your thanks to both Katie and Mark for their willingness to stand for election. By standing for election, they both committed that they are willing to dedicate five years of time and effort to directing IAFP's future course.

There are two additional things that I want to bring to your attention. One is the upcoming, Dubai International Food Safety Conference (DIFSC) that will be held on February 24–26. This is the second year for IAFP to be involved and the fourth conference organized by the Dubai Municipality. There will be many topics of interest to food safety professionals in the region and a good number of the speakers are IAFP Members! This is one way in which IAFP continues to "Advance Food Safety Worldwide" by sharing information among food safety professionals. We encourage you to review the DIFSC program information available through the link on IAFP's home page.

The last item to discuss is the IAFP Member Guide for 2009. This year, to provide instant access to the information presented in IAFP's Member Guide, we have made the Member Guide available Online in

a full, publication-style book. You can easily find information about and contacts for each of our Committees and Professional Development Groups. Affiliate information is also included making it easy to see if there is an IAFP Affiliate in your local area. The Constitution and Bylaws along with IAFP Award descriptions and past Awardees are shown in the Member Guide. We hope you enjoy the convenience of the "Online Member Guide" and that you access it when you need information about IAFP!

So, a little bit about a number of things this month. Remember the deadlines mentioned for abstracts and Award nominations. Also, vote when you receive notification that the ballot is open for our Secretary election. We will contact you when the Member Guide is available for your use.

Best wishes for a healthy and Happy New Year!

ARTICLES

Food Protection Trends, Vol. 29, No. 1, Pages 16–20

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International Association for Food Protection

A Content Analysis of Food Safety Measures on Television's Food Network

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SUMMARY

The popularity of television cooking shows has grown exponentially in the past few years. At the same time, fewer Americans learn how to cook during childhood or in high school; therefore, many turn to television cooking shows for cooking lessons. This study aimed to determine how well television cooking shows, particularly those on the Food Network, demonstrate common consumer food safety measures. In May 2007, a total of 49 episodes from *30 Minute Meals, The Essence of Emeril, Everyday Italian, Paula's Home Cooking,* and *Semi Homemade Cooking with Sandra Lee* were recorded, viewed, and coded for food safety measures by a panel of three trained experts. A content analysis revealed a total of 460 poor food handling incidents, compared to 118 positive food safety measures. Most commonly, the shows did not demonstrate washing fruits, vegetables, and herbs properly; a lack of hand washing was also frequently observed. The hosts occasionally demonstrated proper refrigeration, hand sanitation, and cross contamination prevention; additionally, the hosts sometimes discussed proper food handling.

Although it is extremely difficult to demonstrate every food safety measure in a 30 minute television show, demonstration of basic food safety measures could potentially educate the consumer about proper food handling.

INTRODUCTION

The World Health Organization (WHO) *(11)* reports that the United States has an estimated 76 million cases of foodborne diseases, resulting in 325,000 hospitalizations and 5,000 deaths, each year. Although foodborne illness outbreaks are commonly made public by the media, food safety experts believe that sporadic cases and small outbreaks in the home are far more common *(3)*. Consumers probably think that most foodborne illnesses are caused from foods prepared outside the home, but many food safety-related illnesses are preventable through use of common food safety practices in the home *(7)*.

WHO states that educating consumers and training food handlers about methods of safely preparing and storing food is one of the most critical means of preventing foodborne illnesses *(11)*. The food handling mistakes consumers commonly make at home are serving undercooked or raw food, cooking or heating food inadequately, obtaining food from unsafe sources, cooling food inadequately, and having a colonized person handle implicated food or practice poor hygiene *(3)*. The Partnership for Food Safety Education's (PFSE) "FightBAC!" campaign focuses on four messages: clean (wash hands and surfaces often), separate (do not cross contaminate), cook (cook to proper temperature), and chill (refrigerate promptly) *(8)*.

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In the past five years, many people have learned various food preparation techniques by watching food-related television shows, particularly on cable television. More people than ever have access to satellite or cable television *(1, 10)* and the Food Network is one of the most popular stations on cable *(2)*. The Food Network is distributed to more than 85 million households in the United States and is considered the giant in food programming, ranked number one out of 50 cable channels *(2)*.

"Food Network has one of the most engaged audiences in television. …As the giant in food programming, they are ranked number one out of 50 cable channels." More than 85 million households in the United States receive the Food Network *(2)*. The Food Network claims an average viewership of 766,000. Revenue for the network continues to grow, with tripled revenues since 2000; reported earnings in 2005 were $363 million, which is high for a cable channel *(5)*. The network has a viewership of more than three-quarters of a million Americans, a large following for a cable channel *(5)*.

Most previous research on food safety and television has been conducted in Europe and Canada *(3, 6, 9)*. In a survey conducted in the United Kingdom, 97% of the respondents said they watch television cooking shows, and 44% thought their home food preparation behaviors were influenced by food safety habits shown on television food shows. When the respondents rated the behaviors of television chefs, 88% considered the chefs' food safety practices good-to-average *(9)*.

An early-1990s study in Wales that analyzed the food safety practices dealt within television cooking programs found that some practices, such as good personal habits, were included in 76% of the programs; however, other practices, such as the need for thorough cooking, proper cooling, and thorough reheating, were poorly dealt with or ignored. Practices to eliminate cross contamination, such as washing hands or cleaning dishes and utensils after these have touched raw food, were not mentioned or shown *(4)*.

A similar study in Canada in 2002 and 2003 found that for each positive food handling behavior observed, 13 negative behaviors were observed. The most common unsafe practices were "inadequate hand washing, cross contamination between raw and ready-to-eat food, failure to wash fresh fruits and vegetables, and inadequate washing of cooking utensils and cutting boards" *(6)*.

Griffith et al. *(4)* say that television can be a good vehicle to educate viewers on food safety practices, since the correct methods can be demonstrated effectively. In addition, television reaches a wide audience; of all media formats, it has the largest audience and the greatest degree of interpersonal communication. Television can effectively communicate this information and possibly change attitudes toward food safety; however, to be effective, cooking programs need to contain specific information and illustrations on food safety measures in order to change attitudes and practices *(4)*.

Statement of the problem

Cable and digital broadcast (satellite) television are gaining popularity each year. According to Umstead *(10)*, more viewers are turning to cable or satellite television and away from broadcast, and ad-supported cable networks recorded a 61% share of the audience in the summer of 2006, beating the seven broadcast networks' 32.7% share. At the same time, fewer schools are offering food preparation courses, and many people say they prefer to learn about food preparation through television *(4)*. Yet British and Canadian research has found that food preparation television programs similar to those on the Food Network do not always adhere to safe food handling practices.

A study to evaluate safe food handling practices on the Food Network programs has not yet been conducted in the United States. Since many people are learning new food cooking techniques through these shows, it is important to determine if the shows teach correct methods of safe food handling, such as hand and surface washing, preventing cross contamination, proper cooking temperatures, and correct food chilling and re-heating.

The purpose of this study was to determine how well television cooking shows on the Food Network in the United States adhere to the proper food safety procedures specified by the Partnership for Food Safety Education *(8)*.

Two research questions guided this study:

1. How frequently are positive or negative food handling practices demonstrated or mentioned on television cooking shows?
2. What, if any, information do television cooking shows provide about safely handling food?

It is hoped that this study can provide information to the general public about the lack of food safety procedures demonstrated on the Food Network so they can be aware that what is seen on television is not necessarily the safest way to cook. In addition, the researchers hope that this study will encourage the Food Network and other television cooking shows to change their presentation methods to include more food safety information.

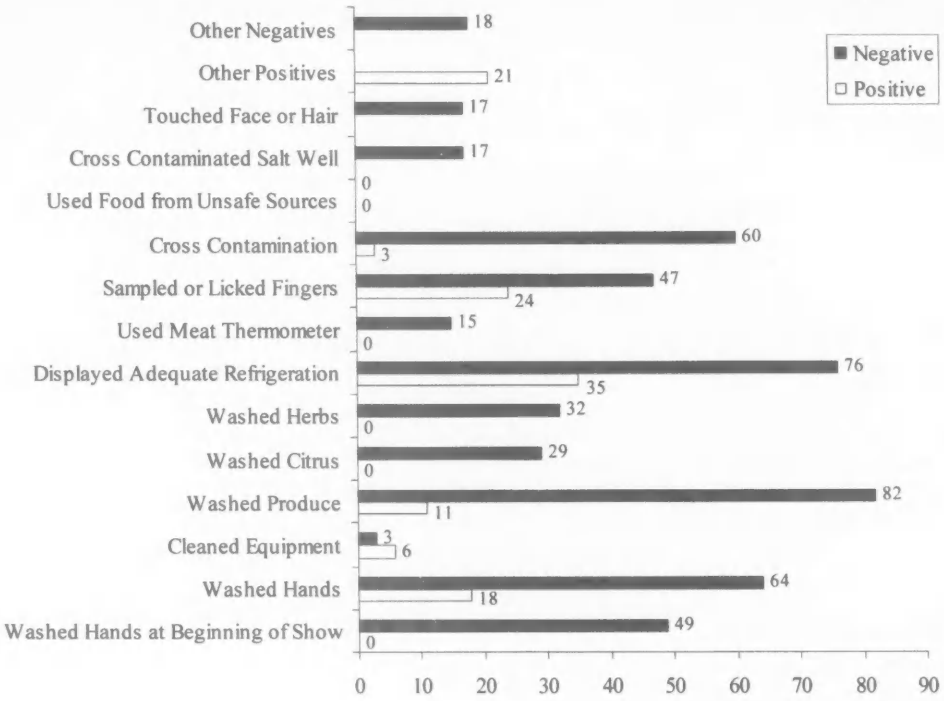
MATERIALS AND METHODS

This study replicates work conducted by Mathiasen, Chapman, LaCroix, and Powell in 2002 and 2003 on cooking shows on Food Network Canada *(6)*. A study of this nature has not yet been conducted in the United States. The Mathiassen et al. *(6)* study analyzed 47 shows that aired over a two-week period and used 17 different coded categories: six positive and 11 negative. The positive behaviors included proper hand washing, cleaning equipment, washing fruits and vegetables, adequate refrigeration, use of thermometer, or other positives. The negative categories included using food from unsafe sources, failure to use thermometer, use of food from floor, failure to refrigerate perishables, failure to wash fruits or vegetables, inadequate washing of equipment, improper food sampling or licking of fingers, cross contamination of ready-to-eat or raw foods, touching the face, lack of hand washing, and other negatives.

Instrumentation

In this study of shows on the Food Network in the United States, a total of 49 shows were analyzed. Researchers recorded five popular shows on the Food Network over the course of two weeks: *30 Minute Meals with Rachael Ray*, *The Essence of Emeril*, *Everyday Italian*, *Paula's Home Cooking*, and *Semi-Homemade Cooking with Sandra Lee*.

FIGURE 1. Frequency of observed coded categories



Researchers used a deductive approach by placing food handling practices into a set of pre-determined categories based upon the five critical food handling behaviors set forth by PFSE *(8)*: personal hygiene, cook food adequately, avoid cross contamination, keep foods at safe temperatures, and avoid unsafe food. Researchers used the same 17 sub-categories as Mathiasen et al. *(6)*. A "checklist" was created for researchers to use to mark positive or negative behaviors while watching the shows. Before analyzing the data, the instrument was reviewed by a food sciences department at a southern university to verify accuracy and completeness.

Panel training

A trained panel of three individuals with expertise in food safety microbiology and communications was assembled to determine the food safety practices and to complete the instrumentation. All three researchers have been involved in food safety research to varying degrees in the past. The panel was trained by a food microbiologist to recognize proper techniques and improper food handling behaviors. They were trained by watching shows that were not part of the sample and by reviewing food handling behaviors to watch for.

To determine inter-rater agreement, the panel members independently watched three shows that were not part of the sample. When, the panelists came together, they found 95% consistency. The panel members watched the sample programs independently, after which the panelists came together to discuss the few discrepancies and achieve consensus.

Data collection

From May 16 to May 30, 2007, the lead researcher recorded 49 different programs that aired on the Food Network; each episode was 30 minutes in length. The goal was to record 10 episodes of five different programs for a total of 50 shows; however, because of a malfunction of the digital video recorder, not all the desired episodes were recorded. Researchers coded 10 episodes of *30 Minute Meals*, 11 episodes of *The Essence of Emeril*, nine episodes of both *Everyday Italian* and *Paula's Home Cooking*, and 10 episodes of *Semi Homemade Cooking with Sandra Lee*.

Data analysis

Following the recommendations of Mathiasen et al. *(6)*, the three trained experts who coded the data were made aware of the fact that many necessary meal preparation steps and food safety measures had been completed before the show. The shows were coded independently by the panel members. When panelists observed a positive or negative food safety practice, they marked the appropriate box of the checklist and made any needed notes. When discrepancies in coding decisions were found, the panel members reviewed the show and worked as a group to achieve consensus. Once coding was complete on all shows, frequencies of each category were coded and trends were noted. As the researchers analyzed each episode, they were looking for any food safety themes that should have been addressed that were not included in

TABLE 1. Frequency of observed coded categories by television show

Television show	Positive observations	Negative observations
30 Minute Meals with Rachael Ray	32	86
The Essence of Emeril	19	115
Everyday Italian	15	106
Paula's Home Cooking	20	89
Semi Homemade Cooking with Sandra Lee	33	113

the Mathiasen et al. *(6)* study. After analyzing the data coding checklists and researchers' comments, each researcher had noted when the hosts did wash their hands before preparing food, did not wash citrus or fresh herbs, or cross contaminated the salt wells. These behaviors were noted so often that the researchers made note of and analyzed additional categories: washed hands before preparing food, washed citrus, washed fresh herbs, and cross contaminated salt well.

RESULTS

None of the shows' hosts consistently washed their hands at the beginning of the show (49 negative observations), although, on occasion, hand washing would be mentioned or conducted during the show; citrus fruits were commonly not washed (29 negative observations), and the same was true for fresh herbs (33 negatives). Each host cross contaminated his or her salt well with a raw meat or poultry product at least once (17 negatives). All told, 118 positive practices and 460 negative practices were observed. The most frequently observed negative practice was the failure to wash produce, and the most frequent positive practice was adequate refrigeration. No one used food from unsafe sources; however, no one used a meat thermometer. Figure 1 is a complete listing of all the categories and totals.

Overall, among the individual shows, *30 Minute Meals with Rachael Ray* had the fewest negative observations (86), followed by *Paula's Home Cooking's* (89 negatives). *The Essence of Emeril* had the most negative observations (115), followed closely by *Semi Homemade Cooking with Sandra Lee* (113); however, *Semi Homemade* also exhibited the largest number of positive observations (33). Table 1 contains a list of all shows and numbers of positive and negative observations.

On the subject of hosts and certain behaviors, Sandra Lee demonstrated the most positive hand washing behavior (9) but also had the most negative hand washing behaviors (19). On the other hand, Sandra Lee most often utilized her refrigerator (14), followed closely by Rachael Ray (12). Giada DeLaurentis (*Everyday Italian*) displayed inadequate refrigeration the most (26), followed by Emeril Lagasse (23). Overwhelmingly, Paula Deen improperly sampled food or licked her fingers the most, with 20 observations in nine shows, yet she also exhibited the correct method to sample food, from an individual serving dish, more than any other host (8). Sandra Lee cross contaminated food most often, a total of 19 times in 10 shows.

This research found that for each positive food safety measure, there were four negative observations. When added together, the most frequently observed negative practice was failure to wash produce and/or herbs (143). The researchers observed failure to wash herbs (32) and citrus (29) so many times that two extra categories were added. Medeiros et al. *(7)* say that washing fresh fruits and vegetables is the only way to remove pathogens. Many consumers may not realize that produce and herbs carry various pathogens; therefore, they need frequent reminders to always wash fruits, vegetables, and herbs.

Altogether, 118 negative hand washing practices were observed, 49 of which occurred because the host did not wash his or her hands prior to cooking. This compares to only 18 positive hand washing observations. PFSE *(8)* states that humans easily pass harmful bacteria from unclean hands to raw food, cooking utensils, or countertops, and if that food is eaten, there is potential for foodborne illness. Repetitively discussing or demonstrating careful handwashing before cooking and before and after handling raw meat or poultry is needed on the Food Network. The researchers never observed a host use a meat thermometer, even though the only way to ensure foods are at the proper temperature is by use of a meat thermometer.

DISCUSSION

The researchers are frequently asked who is the safest or least-safe host on the Food Network. There is really no fair way to name one person best or worst. For example, one show had the most positive observations (33), yet it also had the second-highest negatives (113); therefore, the researchers do not proclaim that one particular show was better or worse than the others. Readers can refer to Table 1 to view a complete number of positive and negative behaviors by show.

Although a few hosts repeatedly made food safety mistakes, as described in a previous section, in some instances it is not fair to single out any one individual as the worst in one particular food safety category. For instance, one show had the most positive as well as the most negative marks for washing produce, probably because on this particular show the host cooked numerous dishes that required fresh fruits, vegetables, or herbs.

With regard to Research Question 2, several of the shows' hosts discussed food safety. In one show, Rachael Ray told viewers that she always washes her produce immediately after she purchases it. This is excellent information; however, we heard her say this only one time in 10 episodes. Emeril Lagasse discussed proper handwashing, Paula Deen discussed the importance of keeping seafood ice cold, and Sandra Lee often demonstrated proper perishable food refrigeration. So the observed shows do provide some food safety information, although again, when we compare the total positives (118) to total negatives (460), the amount of food safety information that is currently

given on the Food Network could be improved.

Researchers made notes of other positive or negative behaviors. Emeril Lagasse displayed the most of both; however, most of Lagasse's negative marks came from a show entitled "Tartare," which is traditionally raw food. In this show, the host served raw beef, egg, oysters, salmon, and tuna, yet the only safety message he presented was about purchasing the beef from a reputable source. Food pathogens can cause serious illness, and foods from animal and fish sources are frequently contaminated, and yet thorough cooking is the only way to control the pathogens *(7)*. Lagasse should have warned the viewers about the risks associated with consuming raw meat, fish, and eggs.

The researchers realize that because of time constraints, not all food safety steps can be displayed or discussed on television; our point is that television food shows need to show these safe habits more often than they currently do. As Griffith et al. point out *(4)*, fewer high schools teach students how to cook, and many people would rather learn via television, which means that if large numbers of Americans are learning how to cook by watching the Food Network, they are probably not learning all the necessary steps to prevent foodborne illness. It is not practical for the host to stop and wash hands or dishes several times in one 30-minute show; however, food safety information can be presented through graphics or "pop-ups" that explain the necessary precautions to prevent foodborne illness. Existing shows could be modified with graphics, reminding the viewers to wash their hands, refrigerate perishables, use a meat thermometer, or follow other food safety measures.

For future shows, the hosts could add food safety discussions to their banter or make comments such as, "I already washed my vegetables," "I'm going to wash my hands during the break," "You should always use a thermometer when preparing meat," or "Never use the same cutting board for meats and vegetables without thoroughly washing it in between." Additionally, the Food Network's Web site could include a section for food safety to further educate the consumer.

In the months since the research was conducted, other shows have premiered on the Food Network and have gained in popularity. In addition, several other cooking shows on television on other networks could be studied and compared to the Food Network. Follow-up research in a year or two could also be conducted to see if any improvements in food safety practices have been made on the shows that were the subjects of this research.

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Behavioral, Normative, and Control Beliefs Impacts on the Intention to Offer Food Safety Training to Employees

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SUMMARY

Training is an important aspect of food safety programs in commercial restaurants and is integral in ensuring that safe food is served. The purposes of this research were to explore restaurant managers' beliefs, attitudes, subjective norms, and perceptions of control with regard to providing employees the opportunity to attend food safety training and to determine how these characteristics differ between independent and chain restaurant managers as well as between managers with and without food safety certification.

A telephone survey yielded a total of 237 responses. Results indicated that intention to offer food safety training was high. Restaurant managers had a positive attitude about food safety, placed importance on the beliefs of those around them, and felt in control about offering food safety training.

Compared with managers without food safety certification, certified managers had more positive attitudes about offering food safety training and placed greater emphasis on subjective norms, but perceived less control. Certified managers had a higher intention to train employees than non-certified managers. When behavioral, normative, and control beliefs were compared between chain and independent restaurant managers, only behavioral and normative beliefs differed. Sanitarians can use the results of this study in training and inspections to help overcome potential barriers to managers' allowing employees to attend training.

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INTRODUCTION

Foodborne illnesses continue to be a major public health concern in the United States. The federal government has identified the reduction of foodborne illnesses by 2010 as a major health goal *(16)*. However, each year approximately 76 million people fall ill to a foodborne illness; 325,000 individuals are hospitalized and 5,000 die after contracting a foodborne illness *(25)*. Buzby, Frenzen, and Rasco *(7)* report that of all hospitalizations in the United States, foodborne disease accounts for one out of every 100 illnesses and one out of every 500 deaths. A large number of foodborne illnesses are traced to restaurant operations *(15, 17, 28)*.

Of all foodborne illnesses reported to FoodNet in 2005, 59% were associated with restaurants *(8)*. In 1997, Collins *(13)* found that the most common risk factors leading to foodborne diseases and illnesses were improper holding times, cross contamination, and poor personal hygiene, all of which can be controlled by employees and managers within the foodservice operation.

In 2000 and 2004, the Food and Drug Administration (FDA) conducted studies to assess the most prevalent practices that were out of compliance with the Food Code *(21, 22)*. The initial study

in 2000 *(21)* found that 26% of quick-service restaurants and 40% of full service restaurants were out of compliance with one or more identified standards. Both types of operations were primarily out of compliance for holding time/temperature, personal hygiene, and contaminated equipment/protection from contamination. The 2004 follow-up study by the FDA *(22)* found that both quick and full-service restaurants had improved, but not to the level of institutional foodservice operations. The FDA has set a goal of a compliance rate of 81% for quick service and 80% for full service restaurants by the year 2010.

To assist in achieving this goal, the Food and Drug Administration has recommended that all operations have at least one person on staff during normal business hours who can demonstrate knowledge of food safety or who has successfully completed food safety certification training. Food safety training programs have been found to increase sanitation inspection scores *(14, 24)*, the microbiological quality of food *(12)*, and self-reported food safety practices *(26)*. However, other research has found the opposite to be true, indicating that even when foodservice employees are trained in proper food handling and have the knowledge to perform proper food safety practices, the knowledge does not always transfer to actual behavior *(9, 10, 24, 30, 32)*.

A study completed by Roberts, et al. *(30)* conducted a pre- and post-test survey and observation of foodservice employees to determine if food safety training improves overall food safety knowledge and behaviors. The results indicated that knowledge and behavior increased significantly for handwashing ($P \leq .001$), but neither knowledge nor behaviors improved for time and temperature abuse or thermometer use.

The FDA explored the impact of certification on the control of foodborne illness risk factors within foodservice establishments *(22)*. In full-service restaurants, personal hygiene and protecting contaminated equipment were significantly better for operations with a certified manager. For quick-service operations, statistically significant differences were noted in two categories, improper holding/time and temperature and protecting contaminated equipment; the certified managers outperformed the non-certified with regard to those operations. However, many basic food safety practices, including purchasing food from safe sources, proper cooking, and chemical control, did not increase significantly.

Training is an important aspect of any overall food safety program. Therefore, managers must train their employees accordingly, which includes allowing them to attend or participate in food safety training classes. ServSafe®, sponsored by the National Restaurant Association Educational Foundation, is the most widely used food safety training program. The National Restaurant Association has estimated that approximately two million food handlers have been trained in ServSafe®, which is equal to less than 16% of the 12.8 million employed in the restaurant industry.

Although this indicates that many foodservice employees have not been trained, no research to date has been conducted to explain managers' beliefs about implementing training or providing training for their employees. To design an effective training program that not only is useful to restaurant managers but would also be used by them, it is necessary to explore the factors that underlie their intention to train employees, including the impact that manager food safety certification has on the intention to train employees and the differences in chain and independent restaurants, because training may be different between the groups.

One way to explore behavioral intention and the cognitive beliefs underlying the formation of intention is through the use of the Theory of Planned Behavior (TpB). The TpB states that behavior intention is based on a person's attitude (one's evaluation of the behavior), subjective norm (one's perception that those who are important to the person think that he/she should or should not perform the behavior), and perceived behavioral control (one's ability to perform a behavior or barriers which would prevent one from performing it) *(2, 5)*.

Attitude, subjective norm, and perceived behavioral control can be assessed using direct measures that ask respondents to rate each overall construct on a set of scales *(3)*. These also can be measured indirectly, by asking respondents specifically about their beliefs. By utilizing predictor variables through the beliefs subjects hold, it is possible to understand why people hold certain overall attitudes, subjective norms, and perceptions of behavioral control *(4)*. Additionally, when belief-based measures are used, reliability is not a concern, because predictor variables are combined into a single composite score that represents the construct *(4)*.

The goal of this research was to explore the beliefs of restaurant managers have about offering food safety training to employees, by determining the antecedents of behavioral intention (beliefs, attitudes, subjective norms, and perceptions of control). Specific objectives were to (1) determine what the beliefs, attitudes, subjective norms, and perceptions of control managers have about offering food safety training to their employees; (2) determine if the beliefs, attitudes, subjective norms, and perceptions of control differ based on ownership structure (chain or independent); and (3) determine if certification status (certified vs. non-certified) has an impact on the beliefs, attitudes, subjective norms, and perceptions of control of the managers.

METHODOLOGY

Sample

Commercial foodservice operations in the state of Kansas were the targeted population for this study. A listing of operations licensed to sell food within the state was obtained from the Kansas Department of Health and Environment. Of the 7,558 operations licensed, 5,468 operations were selected as meeting the predefined criteria of being a commercial foodservice operation. Of those, 50 operations were chosen for a pilot test. From the remaining, approximately 25% (1,347 operations) were selected to provide a final sample size large enough to ensure that the data were valid and reliable. Utilizing online research to determine which operations did not meet the commercial foodservice classification, of the sample was further refined which removed 26 operations, yielding a final sample of 1,321 operations.

Data collection

A telephone survey was utilized to collect the data. The 1,321 operations were divided into seven different groups; each group of 188 was contacted over the course of the seven-week study. Advance letters introducing managers of the operations to the purpose of the study, their rights in the research process,

and the researchers' contact information were sent to all operations approximately five days prior to the initial telephone call. The research protocol was approved by the Kansas State University Institutional Review Board.

Instrument development

The questionnaire was developed based on the Theory of Planned Behavior (TpB) *(1)*, which can be used to identify beliefs that prevent individuals from performing behaviors. In this study, the behavior in question is the offering of food safety training to employees. The TpB posits that a person's behavioral intention is based upon three antecedents: his or her attitude, the values of important referents (subjective norm), and one's ability to perform the behavior (perceived behavioral control) *(5, 18)*.

An elicitation study to determine what antecedents or beliefs about offering food safety training were most important to restaurant managers was conducted with a convenience sample of 20 restaurant managers. The elicitation study identified the commonly held beliefs that provided the basis for constructing the questionnaire. Examples of responses for each of the constructs included: behavioral beliefs (increase employee satisfaction, time to conduct food safety training), normative beliefs (employees, customers, health inspector), and control beliefs (time and money).

The initial questionnaire developed from the literature review and elicitation study was then reviewed by five graduate students and faculty familiar with food safety to ensure face validity. Major wording changes were made to the questionnaire and to the telephone scripting based on this review.

A pilot study was conducted with 50 operations drawn from the sample. Restaurant managers were sent an advance letter approximately one week prior to calling. Managers were then contacted by trained undergraduate research assistants; if there was no answer or if the manager was unavailable, the manager was contacted again at a later time. To track the time, date of each call, and the number of overall attempts to reach a manager, a call tracking form was used. Restaurants were contacted six times prior to being labeled as a "no response." A total of 19 of the 50 operations completed the questionnaire, for a 38% response rate. The pilot test did not yield any questions or wording that needed changing.

The final version of the instrument included 85 questions to measure the components of the TpB and demographic information. Part I included nine questions to measure operational demographic information such as seating capacity, number of employees, types of food safety training offered, etc.

Part II collected direct and indirect measures of the TpB. Direct measures of attitude, perceived behavioral control, subjective norm, and behavioral intention were measured on a 7-point scale. Therefore, direct measures range on a scale from 1 to 7, with higher numbers indicating more positive attitudes and subjective norms or higher perceived control and intention. Attitudes were measured on a set of five semantic scales: *good/bad*, *worthless/valuable*, *difficult/easy*, *unpleasant/pleasant*, and *unimportant/important*. Subjective norms were measured by asking managers to rate if their important referents would approve or disapprove of offering food safety training to their employees. For example, "Most people who are important to me think that I should offer food safety training to my employees within the next year." Perceived behavioral control was measured by two questions: "I am able to send my employees to food safety training if I choose" and "It is my choice whether I offer food safety training to my employees within the next year." Intention was measured with three items: "I will try to offer," "I intend to offer," and "I plan to offer" food safety training within the next year. For all three measurements, a 7-point disagree-agree scale was used anchored by (1) strongly disagree and (7) strongly agree.

Indirect measures included behavioral, normative, and control beliefs and ranged on a scale from -21 to 21. Measures represent the mean of the belief multiplied by the evaluation of that belief. Nine behavioral beliefs identified in the elicitation study were measured by asking the respondent to rate the strength of his/her belief on a 7-point scale from (1) *extremely unlikely* to (7) *extremely likely*. These beliefs included (1) increasing customer satisfaction, (2) ensuring safe food, (3) ensuring food quality, (4) reducing food waste, (5) increasing employees' food safety awareness, (6) maintaining the operation's reputation, (7) employee satisfaction, (8) reducing the likelihood of lawsuits, and (9) improving food safety practices of employees. Outcome evaluations were measured by asking respondents to rate how good or bad each of the beliefs were to them on a 7-point scale from (-3) *extremely bad* to (3) *extremely good*. The bipolar scoring (-3 to +3) is used in TpB research to reflect unfavorable evaluations as a negative score and positive evaluations as a positive score. Overall belief score was then calculated by multiplying the behavioral beliefs scores by the outcome evaluation to compute a total behavioral belief score.

Normative beliefs, or beliefs of how important referents (district managers, peer managers, etc.) view the behavior, are an important determinant of one's behavior *(5)*. The managers' supervisor, long-term employees, short-term employees, customers, health inspectors, and vendors were identified through the literature review and elicitation study as important referents (normative beliefs). The strength of their beliefs was measured by asking respondents to rate the likelihood that each referent group/individual would think that food safety training should be offered to employees. A 7-point scale from (-3) *extremely likely* to (3) *extremely unlikely* was used. The motivation to comply with those normative beliefs was evaluated by asking respondents how much they care what the referent group/individual thinks on a 7-point scale from (1) *not at all* to (7) *very much*. A total normative belief score was calculated by multiplying the individual normative beliefs by the motivation to comply to derive an overall belief score that was summed across all evaluations.

Employee availability, managers' time, financial resources, lack of off-site food safety training availability, lack of on-site food safety training availability, lack of targeted training materials, employees not following what they learn from food safety training, and the time commitment required for food safety training were identified as control beliefs from the elicitation study. Control beliefs are those beliefs that can inhibit the performing of the behavior *(5)*. These were measured by asking managers' to rate their agreement with the belief that it makes food safety training difficult on a 7-point scale ranging from *strongly disagree* (-3) to *strongly agree* (3). Perceived power was measured by asking respondents to rate how often not having the item affects their offering employee food safety training

TABLE 1. Characteristics of managers (n = 237)

Characteristic	n	%[a]
Responses may not equal 100% due to non-response to a question		
Age		
30 years or younger	81	34.2
31 – 40 years	52	21.9
41 – 50 years	56	23.6
51 – 60 years	38	16.0
60 years or older	8	3.4
Gender		
Male	119	50.4
Female	117	49.6
Education		
Less than high school degree	5	2.1
High school/GED	60	25.3
Some college	83	35.0
Associate's Degree	29	12.2
Bachelor's Degree	55	23.2
Graduate Degree	3	1.3
Food safety certification		
Yes	162	68.4
No	72	30.4
Which food safety certification		
ServSafe®	116	71.6
Serving-It-Safe	4	2.5
Other	42	25.9
Years employed in foodservice		
5 or less	0	0
6 – 15	84	35.4
16 – 25	53	22.4
26 or more	35	14.8
Years employed in the restaurant industry		
5 or less	45	19.0
6 – 15	112	47.3
16 – 25	54	22.8
26 or more	24	10.1
Years employed in current position		
5 or less	146	61.6
6 – 15	64	27.0
16 – 25	17	7.2
26 or more	7	2.9
Professional affiliations		
National Restaurant Association	32	13.5
Kansas Restaurant & Hospitality Association	38	16.0
Local Restaurant Association	10	4.2
Job title		
Owner/Co-owner	81	34.2
General manager	37	15.6
Department manager	108	45.6
Regional/district manager	4	1.7

on a 7-point scale from *very rarely* (1) to *very frequently* (7). A total control belief score was then calculated by multiplying the individual control beliefs scores by the power of those control beliefs to derive an overall belief score, which was then summed across all evaluations.

Part III included nine questions that obtained information about the demographics of the managers. These questions gathered data about age, gender, educational level, food safety certification status, and employment characteristics.

Data analysis

All data analysis procedures utilized the Statistical Package for the Social Sciences (SPSS, Version 11.5). Descriptive statistics, including means, standard deviations and frequencies, were calculated. Independent samples t-tests were used to determine the differences between mean item scores based on type of operation and certification status of the manager. Alpha levels of .05 were considered significant.

RESULTS

A total of 266 managers responded. Because of incomplete and missing data, 237 responses were usable. The final overall response rate was 17.9%. This is comparable to the response rates reported by Roberts and Sneed *(31)* and Cochran-Yantis et al. *(11)*, who achieved response rates of 19% and 20%, respectively.

Demographics

Respondent characteristics and operational data are presented in Tables 1 and 2, respectively. An approximately equal number of male (50.4%) and female (49.6%) managers participated in the study. This is comparable to results of a study by Roberts and Sneed *(31)*, in which 53% of the restaurant managers responding were male. The majority of managers were department managers (45.6%), such as back-of-the-house, food and beverage, and/or service managers. All managers had been employed in the industry for more than six years, with 14.8% having worked in the industry for 26 or more years.

The majority of operations had a seating capacity of less than 100 people

TABLE 2. Characteristics of the restaurants (n = 237)

Characteristic	Frequency n	Frequency %[a]
Seating Capacity		
50 or less	71	30.0
51–100	74	31.2
101–150	35	14.8
151–200	25	10.6
201–250	18	7.6
251–300	6	2.5
Greater than 300	8	3.4
Restaurant Classification		
Independent	119	50.2
Chain – franchised	52	21.9
Chain – corporate	68	27.8
Service Classification		
Quick service	74	31.2
Quick casual	73	30.8
Casual dining	85	35.9
Fine dining	5	2.1
Provided an opportunity to attend a ServSafe® Class within the last year		
Yes	122	51.5
No	114	48.1
If yes, where was the training conducted?		
In-house	31	25.4
Off-site	91	74.6
Percentage of total employees who were trained?		
25% or less	56	45.9
26% – 50%	18	14.8
51% – 75%	6	4.9
76% – 100%	16	13.1
Greater than 100%	6	4.9
Don't know/unsure	20	16.4
Estimated Annual Costs for Training/Employee		
$10 or less	4	11.5
$11 – $20	9	7.4
$21 – $30	3	2.5
$31 – $40	4	3.3
$50 or greater	10	8.2
Don't know/unsure	63	51.6
Number of Full-Time Employees		
15 or less	189	79.7
16 – 30	28	11.8
31 – 60	16	6.8
Greater than 60	4	1.7
Number of Part-Time Employees		
15 or less	175	73.8
16 – 30	53	22.4
31 – 60	8	3.4
Greater than 60	1	0.4
Total Number of Employees		
15 or less	117	49.4
16 – 30	61	25.7
31 – 60	43	18.1
Greater than 60	16	6.8
Percentage of employees knowledgeable in food safety to meet health code regulations		
25% or less	65	27.4
26% – 50%	58	24.5
51% – 75%	17	7.2
76% – 100%	63	26.6
Greater than 100%	11	4.6
Don't know/unsure	23	9.7
Operation has a person whose primary responsibility is food safety		
Yes	179	75.5
No	58	24.5

[a]Responses may not equal 100% due to non-response.

TABLE 3. TpB direct and indirect belief comparisons between chain and independent restaurant operations

	Mean ± Standard Deviation				
	Overall (n = 236)	Independent Operations (n = 119)	Chain Operations (n = 117)	t	p
Direct Measures[a]					
Attitude	6.26 ± 0.76	6.24 ± 0.75	6.29 ± 0.78	-0.537	0.592
Subjective norm	5.89 ± 1.39	5.82 ± 1.36	5.95 ± 1.44	-0.742	0.459
Perceived behavioral control	5.22 ± 2.10	5.68 ± 1.74	4.76 ± 2.33	3.432	0.001*
Behavioral intention	5.88 ± 1.59	5.84 ± 1.55	5.91 ± 1.63	-0.310	0.757
Indirect Measures[b]					
Behavioral Beliefs					
Ensuring safe food	18.43 ± 4.87	17.90 ± 5.39	18.97 ± 4.24	-1.678	0.095
Increase employees' awareness of food safety	17.68 ± 5.94	17.66 ± 5.90	17.71 ± 5.99	-0.070	0.945
Help maintain operations' reputation	17.66 ± 5.52	17.47 ± 5.71	17.85 ± 5.34	-0.534	0.594
Increase food safety practices of employees	17.42 ± 5.90	17.39 ± 5.87	17.44 ± 5.95	-0.075	0.940
Better food quality	17.16 ± 6.17	16.34 ± 6.77	17.98 ± 5.40	-2.071	0.039*
Decrease lawsuits	16.83 ± 7.13	16.34 ± 7.69	17.34 ± 6.50	-1.086	0.279
Keeping customers satisfied	16.36 ± 6.65	15.23 ± 7.09	17.50 ± 5.99	-2.668	0.008*
Reduce food waste	12.78 ± 8.32	12.66 ± 7.75	12.89 ± 8.88	-2.090	0.835
Increase employee satisfaction	12.67 ± 7.82	11.87 ± 7.88	13.48 ± 7.71	-1.581	0.115
Normative Beliefs					
Health inspector	19.10 ± 6.00	18.61 ± 6.86	19.59 ± 4.97	-1.271	0.205
Customers	15.85 ± 8.83	14.16 ± 10.01	17.58 ± 7.07	-3.031	0.003*
Long-term employees	13.04 ± 9.35	12.70 ± 10.12	13.39 ± 8.54	-0.569	0.570
Vendors	12.57 ± 9.73	11.92 ± 9.72	13.23 ± 9.74	-1.037	0.301
Supervisor	13.24 ± 9.96	9.59 ± 10.36	16.92 ± 8.04	-6.094	0.000*
Short-term employees	5.81 ± 11.31	5.82 ± 11.73	5.79 ± 10.92	0.019	0.985
Control Beliefs					
Employee scheduling	8.17 ± 9.30	8.68 ± 9.57	7.66 ± 9.03	0.844	0.399
Managers' time	7.38 ± 9.70	8.28 ± 9.78	6.49 ± 9.57	1.420	0.157
Time commitment for food safety training	6.52 ± 8.49	7.50 ± 8.91	5.54 ± 7.96	1.764	0.079
Lack of off-site training opportunities	5.53 ± 9.94	6.48 ± 10.41	4.56 ± 9.38	1.491	0.137
Financial resources	4.99 ± 9.36	5.57 ± 9.78	4.41 ± 8.93	0.953	0.342
Employees don't follow what they learn	5.83 ± 9.41	5.54 ± 9.63	6.12 ± 9.22	-0.474	0.636
Lack of on-site training opportunities	4.27 ± 10.31	4.61 ± 10.25	3.92 ± 10.40	0.510	0.610
Lack of targeted training materials	2.20 ± 8.64	1.44 ± 8.91	2.96 ± 8.34	-1.349	0.179

[a]Direct measures range from 1 to 7, with higher numbers indicating more positive attitudes and subjective norms or higher perceived control and intention.

[b]Indirect measures range from -21 to 21. Measures represent mean of the the belief multiplied by the evaluation of that belief.

(61.2%). Roberts and Sneed *(31)* found similar results; more than 70% of the operations in their sample of restaurants seated less than 100 people. There were approximately equal numbers of chain (49.7%) and independent (50.2) restaurants participating. The majority of operations (49.4%) had less than 15 employees.

Most managers in this study had food safety certification (68.3%), which is slightly higher than the national sample found in an FDA study *(22)* in which 58.4% of surveyed managers were certified in food safety. The majority of operations utilized off-site training (74.6%) and had trained only 25% or less of their total staff (45.9%). Over half of the managers (51.6%) were unsure of how much money they spent per employee annually for food safety training.

Overall analysis

The direct measures of attitudes, subjective norms, perceived behavioral controls, and behavioral intentions indicated that restaurant managers had fairly high intentions to offer food safety training to their employees (M = 5.88 ± 1.59) (Table 3). They also had positive attitudes (M = 6.26 ± 0.80), placed emphasis on their important referents (subjective norms) (M

TABLE 4. TpB direct and indirect belief comparisons between managers with and without food safety certification

	Mean ± Standard Deviation				
	Overall (n = 236)	Certified Operations (n = 162)	Non-certified Operations (n = 72)	t	p
Direct Measures[a]					
Attitude	6.26 ± 0.76	6.32 ± 0.75	6.14 ± 0.78	1.589	.115
Subjective norm	5.89 ± 1.39	6.08 ± 1.31	5.44 ± 1.52	3.097	.002*
Perceived behavioral control	5.22 ± 2.10	5.00 ± 2.21	5.67 ± 1.76	-2.500	.013*
Behavioral intention	5.88 ± 1.59	6.16 ± 1.34	5.22 ± 1.92	3.73	.000*
Indirect Measures[b]					
Behavioral Beliefs					
Ensuring safe food	18.43 ± 4.87	19.03 ± 4.48	17.11 ± 5.47	2.61	.010*
Increase employees' awareness of food safety	17.68 ± 5.94	18.39 ± 5.31	16.00 ± 6.95	2.599	.011*
Help maintain operations' reputation	17.66 ± 5.52	17.94 ± 5.23	16.93 ± 6.18	1.210	.229
Increase food safety practices of employees	17.42 ± 5.90	17.91 ± 5.53	16.19 ± 6.61	1.926	.057
Better food quality	17.16 ± 6.17	17.89 ± 5.65	15.35 ± 6.99	2.72	.008*
Decrease lawsuits	16.83 ± 7.13	17.50 ± 6.64	15.29 ± 8.03	2.044	.043*
Keeping customers satisfied	16.36 ± 6.65	16.57 ± 6.57	15.69 ± 6.89	0.908	.366
Reduce food waste	12.78 ± 8.32	13.56 ± 7.98	10.99 ± 8.89	2.105	.037*
Increase employee satisfaction	12.67 ± 7.82	12.94 ± 7.69	11.83 ± 8.15	.971	.333
Normative Beliefs					
Health inspector	19.10 ± 6.00	19.12 ± 5.83	18.97 ± 6.53	.162	.872
Customers	15.85 ± 8.83	15.58 ± 8.59	16.22 ± 9.51	-0.489	.626
Long-term employees	13.04 ± 9.35	13.90 ± 8.24	11.10 ± 11.38	1.878	.063
Vendors	12.57 ± 9.73	13.76 ± 8.97	10.06 ± 10.84	2.522	.013*
Supervisor	13.24 ± 9.96	14.59 ± 9.20	10.16 ± 10.93	2.994	.003*
Short-term employees	5.81 ± 11.31	6.34 ± 11.03	4.43 ± 11.88	1.156	.250

= 5.89 ± 1.39), and perceived that they are able (M = 5.22 ± 2.10) to offer food safety training to employees. These results are supported by Giampaoli, Sneed, Cluskey, and Koenig *(23)*, who also found that managers had a positive attitude about food safety programs.

For the indirect measures (see Table 3), managers generally believed that training would increase the probability of serving safe food (M = 18.43 ± 4.87), increase employees' awareness of food safety (M = 17.68 ± 5.94), and help maintain the operations' reputation (M = 17.66 ± 5.52). Managers also rated the health inspector (M = 19.10 ± 6.00), customers (M = 15.8 ± 8.83), and long-term employees (M = 13.04 ± 9.35) as the top three important referents who cared if they offered food safety training to employees. Managers felt that they had the most control over employee scheduling (M = 8.17 ± 9.30) and manager's time (M = 7.38 ± 9.70) and the least control over lack of targeted training materials (M = 2.20 ± 8.64) and lack of on-site training opportunities (M = 4.27 ± 10.31).

Ownership structure

Independent samples t-tests determined the differences in the direct measures and indirect measures based on whether managers classified their restaurant as an independent or chain operation (Table 3). For the direct measures, only perceived behavioral control was significantly different between the two. Chain operations had lower mean scores than their independent counterparts (t = 3.432, P = .001), indicating that chain operations felt that they had less control over offering food safety training than independent restaurant managers.

For indirect beliefs, managers in chain operations indicated that food safety training would improve overall food quality (t = -2.071, P = .039) and keep customers satisfied (t = -2.668, P = .008). Managers of chain operations also felt that their customers (t = -3.031, P = .003) and supervisors (t = -6.094, P = .000) had the greatest influence on their decision to train employees in food safety. There were no differences between the control beliefs (training, time, money, employees) of chain and independent restaurant managers.

Although the results of the comparisons between chain and independent restaurant operations are meaningful, it should be noted that this study a significantly greater number of restaurant managers certified in food safety were employed in chain operations (n = 92) than in independent operations (n = 72) (P = .002). Although this may seem to jeopardize these results, the demographic and training characteristics of the sample

used in this research are comparable to those of the sample used in other studies, and the results therefore still present a realistic picture of the differences between chain and independent operations.

Certification status

Independent samples t-tests determined differences in beliefs between respondents based on certification status (Table 4). Managers who were certified had stronger beliefs about their important referents (subjective norms) ($t = 3.097$, $P = .002$), indicating that they placed more importance on what others around them thought. Those who were certified believed that offering food safety training was not as much under their control; that is non-certified managers had significantly higher mean scores ($t = -2.500$, $P = .013$). As for behavioral intentions, managers who were certified had significantly higher intentions ($t = 3.73$, $P = .000$) to train their employees than their non-certified counterparts. This supports the findings of other food safety studies, which found that certified managers also perform better on health inspections than their non-certified counterparts *(11, 22)*.

For indirect beliefs, certified managers had more positive beliefs that food safety training would ensure safe food ($t = 2.61$, $P = .010$), increase employees' awareness of food safety ($t = 2.599$, $P = .011$), increase food quality ($t = 2.72$, $P = .008$), decrease lawsuits ($t = 2.044$, $P = .043$), and reduce food waste ($t = 2.105$, $P = .037$).

Certified managers thought that their vendors ($t = 2.522$, $P = .013$) and supervisors ($t = 2.994$, $P = .003$) were important referents in offering food safety. However, certified managers perceived stronger controls over the time commitment for food safety training ($t = -2.557$, $P = .012$) and lack of financial resources ($t = -2.205$, $P = .029$). The FDA (2004) found similar results, reporting that operations with certified managers outperformed those with non-certified managers. Managers who were certified perceived less control over off-site training opportunities ($t = -3.490$, $P = .001$) and had greater concern over a lack of financial resources ($t = -2.205$, $P = .029$) and the time required for food safety training ($t = -2.557$, $P = .012$).

DISCUSSION AND IMPLICATIONS

This research sought to determine the beliefs of restaurant managers about offering food safety training to their employees. Overall, the results of the direct measures of the TpB indicated that intention to offer food safety training to employees was high. Restaurant managers had a positive attitude toward food safety and rated their referents as important to the decision to offer food safety training, which indicates that they do care about others' opinions. Managers' indicated that their perception of control was high and that they are therefore able to offer food safety training to their employees if they choose.

The indirect measures related to the TpB provided insight into the reasons why food safety training is not being conducted for restaurant employees. Behavioral beliefs, which included ensuring safe food, increasing employee awareness of food safety, and maintaining the operation's reputation, were ranked high and thus are important reasons managers choose to offer food safety training for employees. The most important referents included the health inspector, customers and long-term employees. Control beliefs, while not ranked as high as behavioral and normative beliefs, can still provide insight into why managers are not providing food safety training. These beliefs included employee scheduling, manager's time, and the overall time commitment. These issues, while individual in nature, relate to financial resources.

Ownership structure

Between chain and independent restaurant managers, the only difference was that independent restaurant managers perceive greater control over being able to offer food safety training. This is an indication that while managers of chain operations have more support for food safety from the corporate office, they could be more restricted by company policies and procedures. Managers in chain operations have strict performance and financial goals to meet, which might result in less money being available for additional off-site training.

Chain managers felt more strongly than independent managers that offering food safety training to employees improves food quality and keeps customers satisfied and that customers and supervisors are more important referents. One explanation may be that chain operations face greater national exposure and financial losses should a foodborne illness outbreak occur, so that their success depends on the food quality and customer satisfaction not only in their restaurant, but in all of the chain's restaurants.

Certification status

Managers who were certified had a higher intention to train employees and placed more emphasis on their referents, but they felt they had less control over offering food safety training. Because certified managers may well have greater knowledge than non-certified managers about food safety, they rated ensuring safe food, increasing employees' awareness of food safety, improving food quality, decreasing lawsuits, and reducing food waste as more important. This would indicate that once certified, managers may be more aware of the serious consequences that can and will result from a foodborne illness outbreak, because most certification programs, including ServSafe®, emphasize this throughout the training.

Certified managers also realized that time, lack of off-site training opportunities, and financial resources were greater barriers to offering food safety training. This could be because managers who have gone through the training are more aware of the financial and time requirements necessary to complete a food safety training class and may be more aware of where to locate off-site training classes.

CONCLUSIONS AND APPLICATIONS

Overall, the results of this research indicate that although managers felt that food safety training for employees was important, there are important barriers, such as difficulty with employee scheduling, lack of management time, and lack of off-site training opportunities, that need to be addressed before employee food safety training can become more widespread. Managers felt that training employees was important for ensuring safe food and increasing employees' awareness of food safety. However, they did not feel as strongly that food safety training for employees would aid in the reduction of food waste or increasing employee satisfac-

tion. Managers placed emphasis on the opinions of health inspectors, customers, supervisors, and long-term employees and were least concerned about the opinions of short-term employees.

There were few differences in beliefs between chain and independent operations, but several differences in beliefs between certified and non-certified managers. Certification appears to help managers fully appreciate the impact of food safety training and the effect it can have on the operation. The FDA *(19, 20)* has recommended that states adopt a requirement that a person in charge of a restaurant is knowledgeable about food safety and about the relationship of food handling practices to foodborne illnesses, but not all states have adopted this policy. Currently, the State of Kansas does not mandate food safety training for food handlers. However, this study illustrates that many positive changes occur in manager attitudes and important referents once certification has taken place and verifies the importance of certification as an important tool in food safety training.

Sanitarians can use the results of this study in training and inspections to assist managers in becoming more aware of the need for employee training. It is imperative that sanitarians discuss the importance of food safety training for employees with the management team and stress the need for employee training and its impacts on overall food safety practices. During training, food safety educators should reinforce the importance of serving safe food to customers and maintaining the operation's reputation as primary reasons for providing employee training. Sanitarians also may want to discuss and reinforce these issues with managers during the inspection process. For example, knowing that managers perceive a lack of training materials as an issue, sanitarians can provide managers with information on this topic. Additionally, knowing that managers value the opinions of the health inspectors, customers, long-term employees, and supervisors, sanitarians can stress the importance of training and the relationship between safe food and increased customer satisfaction, the operations' reputation, food quality, and development of long-term employees. Sanitarians should discuss food safety training with owners and general and regional managers to assure that they are stressing food safety training with the store-level management team. Sanitarians and food safety educators may want to schedule shorter, more frequent food safety training sessions at varying times to reduce the barriers related to employee scheduling.

One limitation of this study is that the sample is limited to commercial restaurant operations in Kansas. Thus, the results cannot be generalized to other foodservice systems or to commercial restaurant operations in other states. Future studies could seek to understand the beliefs of restaurant managers in multiple parts of the United States and use region or location as a basis for comparison. Results could then be compared to state food safety programs in an attempt to uncover methods of food safety training that restaurant managers would be more apt to utilize. Other studies could seek to use the TpB with managers in non-commercial foodservice operations.

Another limitation is the response rate. Even though 237 responses were usable and adequate for data analysis, this represents only 17.9% of the sampling population and is a relatively small number. Non-response bias is also a potential limitation. Managers who participated in the study might be more responsive to food safety training than nonparticipants were, and therefore responses may be biased.

Another limitation of this research is that it does not explore the relationship between behavioral intention and behavior. Although the restaurant managers rated behavioral intention positively, the link between behavior and behavioral intention was not explored in this study. More in-depth research is needed to explore this relationship, because although restaurant managers perceive training as important, anecdotal evidence indicates that managers are not conducting training for employees.

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FOOD PROTECTION TRENDS

INSTRUCTIONS FOR AUTHORS

SCOPE OF THE JOURNAL

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

The major emphases include:

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

SUBMITTING ARTICLES AND OTHER MATERIALS

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

TYPES OF ARTICLES

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

Research Articles

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

General Interest or Review Articles

FPT publishes papers that are of practical technical interest to most IAFP members. These papers include topics such as the organization and application of food safety and quality control programs, methods for solving food safety and protection problems, and experiences resulting from such activities. Presentations at affiliate and annual meetings can be adjusted to make them appropriate for *FPT* publication.

Book Reviews

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

Opinion-based Submissions

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

Manuscripts of a Sensitive Nature

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

LETTERS TO THE EDITOR POLICY

FPT invites Letters to the Editor. Letters commenting on articles printed in this publication are subject to review by the Scientific Editor before acceptance. Letters to the Editor are limited to no more than five double-spaced pages. The author of the article that is the focus of the letter is provided the opportunity to respond to the comments. This response is sent back to the author of the letter, who is then given the option of continuing with the publication process or withdrawing the Letter to the Editor. If the letter is

withdrawn, neither it nor the author's response will be published. If not withdrawn, both the Letter to the Editor and the author's response will be published in their entirety. Please send all Letters to the Editor as an E-mail attachment to the Production Editor (dbahun@foodprotection.org).

PREPARATION OF ARTICLES

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

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

Manuscripts are divided into sections, which must be arranged in the following order: Title page, Abstract, Introduction, Materials and Methods, Results, Discussion, Acknowledgments, References, Figure legends, Tables, and Figures. Except for the Introduction, all of these sections should have separate headings, which should appear in the manuscript worded exactly as stated above. Subheadings take the form of paragraph lead-ins. Paragraph lead-ins should be boldface and indented, and should run in with the text, separated by a period. Third-order subheadings will not be accepted.

FPT follows many of the recommendations for manuscript preparation in the ASM Style Manual, 2nd ed., 1991, published by the American Society for Microbiology. Authors will find useful guidance concerning scientific nomenclature, abbreviations, numbers and measurements, English, references, tables, and figures, as well as a helpful bibliography. For further reference, see Scientific Style and Format: The CBE Manual, 6th ed., Cambridge University Press, 1994, as well as The Chicago Manual of Style, 15th ed., University of Chicago Press, 2003, and the bibliographies in these guides.

ORGANIZATION OF RESEARCH ARTICLES

Title Page

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

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

Abstract

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

Introduction

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

Materials and Methods

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

Results and Discussion

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

Conclusions/Recommendations

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

Acknowledgments

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

References

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

Paper in journal

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

Paper in book

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

Book by author(s)

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

Book by editor(s)

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

Patent

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

Publication with no identifiable author or editor

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

Unpublished data, personal and electronic communications

References citing "personal communication" or "unpublished data" are discouraged, although it is recognized that sometimes their use is unavoidable. An author may be asked to provide evidence of such references. If the communication was done via e-mail, the citation should include the name of the person who sent the message, the date, the subject, the sender's E-mail address, and availability (if appropriate).

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

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

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

Web citations

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

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

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

ORGANIZATION OF REVIEW OR GENERAL INTEREST PAPERS

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

PREPARATION OF TABLES

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

PREPARATION OF ILLUSTRATIONS, PHOTOGRAPHS, AND FIGURES

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

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

Figure legends should be double spaced in a list on a page separate from the figures. Number figures consecutively as cited in the test. Figures containing multiple components (e.g., 1A, 1B, 1C, etc.) should have all components on the same page, with appropriate labels. Place the figure number on the upper right hand corner of the page. Data presented in figures must not be repeated in the tables. A well-prepared figure should be understandable without reference to the text of the paper.

Photographs

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

COMMON ABBREVIATIONS

Frequently used acceptable abbreviations are given below. For further details on abbreviations, see the current edition of the ASM Style Manual. Note that a period is used with some but not all abbreviations. Abbreviations of non-SI units (e.g., atm) must be followed by the corresponding converted quantity and SI unit in parentheses: 1 atm = 101.29 kPa. (Exception: lb/in^2.)

ångström, Å
atmosphere, atm
base pairs, bp
British thermal unit, BTU
calorie, cal
centimeter, cm
CFU (never spelled out: colony-forming units)
cubic centimeter, cm^3
day (never abbreviated)
degree Celsius, °C
degree Fahrenheit, °F
diameter, diam
enzyme-linked immunosorbent assay, ELISA
equivalent weight, equiv wt
fluid ounce, fl oz
foot (feet), ft
gallon, gal
gram, g
gravity, g
hour(s), h
inch, in.
international unit, IU
intramuscular, i.m.
intraperitoneal, i.p.
intravenous, i.v.
kilocalorie, kcal
kilogram, kg
kilometer, km
lethal dose, median, LD_{50}
liter (no abbreviation)
logarithm (base 10), log
logarithm (base e), ln
lumen, lm
lux, lx
meter, m
microequivalent, µeq
microgram, µg
microliter, µl

micrometer, µm
micromole, µmol
milliequivalent, meq
milligram, mg
milliliter, ml
millimeter, mm
millimolar, mM
minute(s), min
molar, M
mole, mol
most probable number, MPN
nanometer, nm
normal, N
number, no.
parts per billion, ppb
parts per million, ppm
percent, %
PCR (never spelled out: polymerase chain reaction)
pound, lb
pounds per square inch, lb/in^2
Pulsed-Field Gel Electrophoresis (PFGE)
revolutions per minute, rpm
second, s
species (singular), sp.
species (plural), spp.
specific activity, sp act
UV (never spelled out: ultraviolet)
volume, vol
weight, wt

POLICY ON COMMERCIALISM

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

REVIEW PROCEDURE

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

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

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

REPRINTS

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

INDEXES

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

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Lisbon Highlights

The International Association for Food Protection, in collaboration with ILSI Europe, the Society for Applied Microbiology and the World Health Organization, with the technical cooperation of the Food and Agriculture Organization of the United Nations hosted IAFP's Fourth European Symposium: *Advancements in Food Safety*. The Symposium was held 19–21 November 2008 at the SANA Lisboa Hotel in Lisbon, Portugal. More than 210 attendees from 28 countries participated.

The meeting began with a keynote presentation on *Food Safety in Portugal* by Professor Laurentina Pedroso, Universidade Lusófona de Humanidades e Tecnologies, Portugal. Other sessions included: The Thin Line between Microbiological Quality & Safety; Microbial Hazards: Recently Emerged Pathogens; Risk Assessment and Risk Management; Risk Communication; Impact of Changing Climate and Changing Demographics on Food Safety; and Hot Topics in Food Safety. In total, there were 28 presentations which are now posted on the IAFP Web site.

In addition to the sessions, 56 posters were presented. Nineteen companies or organizations provided current food safety products and information through their stands in the exhibit area. The exhibitors were: 3M Microbiology, AES CHEMUNEX, Applied Biosystems, Inc., BD Diagnostics, Inc., bioMérieux, Bio-Rad Laboratories, *British Food Journal*, Charm Sciences Inc., DuPont Qualicon, Food and Agricultural Organization of the United Nations (FAO), FOOD DIAGNOSTICS, ILSI Europe, *International Food Hygiene*, MATRIX Microscience, PURAC, Silliker Group Corp., Society for Applied Microbiology, Springer, and World Health Organization. Attendees networked during coffee breaks, a Thursday evening reception, and Friday lunch, which were all held in the exhibit area and poster session area. An evening Lisbon city tour and dinner, hosted by bioMérieux Industry provided opportunity for casual networking

with colleagues from around the world.

IAFP thanks the Organizing Committee, chaired by Prof. Christopher J. Griffith, for their effort in making the symposium a success. A special thank you to the sponsoring organizations for their support of the symposium. It is through this support that IAFP is able to develop its international involvement and expand our international network of food safety professionals. We are looking forward to continuing IAFP's European presence with a fifth symposium being held in Berlin, Germany in the fall of 2009.

Student Travel Scholarship Award

Christopher Nnadozie Njoku
Linkoping University
Sweden

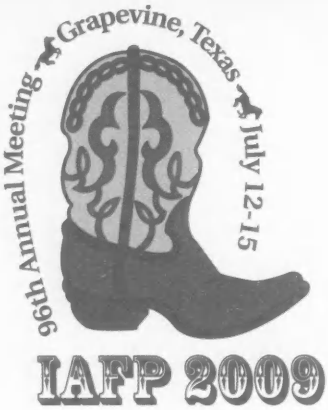
Although I was unable to attend IAFP 2008 in Columbus, Ohio, participating in the IAFP Fourth European Symposium on Food Safety in Lisbon, Portugal, gave me another opportunity to meet many food safety professionals in person.

The symposium was fantastic. Despite the fact that I arrived late, I was able to attend seminars presented by a variety of knowledgeable professionals. The most interesting part of being in Lisbon was when we traveled around at night to visit some of the city's ancient and recognized places. This three-hour journey was followed up by dinner, after which we all went back to our various hotels.

Friday was a great day for me, because I had the opportunity to have breakfast with Executive Director David Tharp, his wife, and other professionals before joining the Organizing Committee for their brief meeting concerning the planning and different opinions on how to improve the 2009 European Symposium in Berlin, Germany. At the beginning of Friday's session, I was invited to come forward for the award plaque, which was presented to me by IAFP President Stan Bailey.

Many of the presentations were geared towards risk assessment and risk management; but when I came across a paper on climate change implications for food safety, I realized that my overall conference experience would help me to educate some of the students in my home country of Nigeria. A few days after I arrived home, I was able to create awareness among my students on the need to advance food safety throughout the whole world.

I thank IAFP for choosing me to receive a 2008 Student Travel Scholarship.



AWARD NOMINATIONS

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

www.foodprotection.org

Nominations deadline is February 3, 2009

You may make multiple nominations. All nominations must be received at the IAFP office by February 3, 2009.

- Persons nominated for individual awards must be current IAFP Members. Black Pearl Award nominees must be companies employing current IAFP Members. GMA Food Safety Award nominees do not have to be IAFP Members.
- Previous award winners are not eligible for the same award.
- Executive Board Members and Awards Committee Members are not eligible for nomination.
- Presentation of awards will be during the Awards Banquet at IAFP 2009 – the Association's 96th Annual Meeting in Grapevine, Texas on July 15, 2009.

Contact IAFP for questions regarding nominations.

6200 Aurora Ave., Suite 200W
Des Moines, IA 50322-2864, USA
Phone: 800.369.6337; 515.276.3344
E-mail: info@foodprotection.org

Nominations will be accepted for the following Awards:

Black Pearl Award

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

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

Fellow Award

Distinguished Plaque

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

Honorary Life Membership Award

Plaque and Lifetime Membership in IAFP

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

Harry Haverland Citation Award

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

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

Food Safety Innovation Award

Plaque and $2,500 Honorarium, *Sponsored by 3M Microbiology*

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

International Leadership Award

Plaque, $1,500 Honorarium and Reimbursement to attend IAFP 2009, *Sponsored by Cargill, Inc.*

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

GMA Food Safety Award

Plaque and $3,000 Honorarium, *Sponsored by GMA*

This Award alternates between individuals and groups or organizations. In 2009, the award will be presented to an individual in recognition of a long history of outstanding contributions to food safety research and education.

Maurice Weber Laboratorian Award

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

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

Larry Beuchat Young Researcher Award

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

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

Sanitarian Award

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

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

Elmer Marth Educator Award

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

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

Harold Barnum Industry Award

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

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

NEW MEMBERS

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Dept. of Primary Industries
Carlton, Victoria

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HK Ruokatalo
Vantaa

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Nurmo, Ostrobotnia

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Westchester

MARYLAND

Kevin D. Blackburn
University of Maryland University College
Germantown

Tara D. Smith
USDA-ARS
Beltsville

MINNESOTA

Tonya C. Schoenfuss
University of Minnesota
St. Paul

MISSISSIPPI

Richard H. Bailey
Mississippi State University
Mississippi State

NEW YORK

Sam R. Nugen
Cornell University
Ithaca

WISCONSIN

Cynthia R. Hoffmann
Badger State Fruit Processing
Pittsville

Andrew L. Milkowski
University of Wisconsin
Cottage Grove

Shawn K. Stevens
Gass Weber Mullins
Milwaukee

NEW SUSTAINING MEMBER

Chemir Analytical Services
Rachel Linck
Maryland Heights, MO

WHAT'S HAPPENING IN FOOD SAFETY

Genetically-Engineered Food: Potential Threat to Fertility

A study published by the Austrian government identified serious health threats of genetically engineered (GE) crops. In one of the very few long-term feeding studies ever conducted with GE crops, the fertility of mice fed with GE maize was found to be severely impaired, with fewer offspring being produced than by mice fed on natural crops. Considering the severity of the potential threat to human health and reproduction, Greenpeace is demanding a recall of all GE food and crops from the market, worldwide.

The study, sponsored by the Austrian Ministries for Agriculture and Health, was presented at a scientific seminar in Vienna, Austria. Dr. JÃnrgen Zentek, professor of veterinary medicine at the University of Vienna and lead author of the study, summarized the findings: Mice fed with GE maize had less offspring in the third and fourth generations, and these differences were statistically significant. Mice fed with non-GE maize reproduced more efficiently. This effect can be attributed to the differences in the food source.

"GE food appears to be acting as a birth control agent, potentially leading to infertility – if this is not reason enough to close down the whole biotech industry once and for all, I am not sure what kind of disaster we are waiting for," said Dr. Jan van Aken, GE expert at Greenpeace International. "Playing genetic roulette with our food crops is like playing Russian roulette with consumers and public health."

The Austrian scientists performed several long-term feeding trials with laboratory mice over a course of 20 weeks. One of the studies was a so-called reproductive assessment by continuous breeding (RACB) trial, in which the same parent generation gave birth to several litters of baby mice. The parents were fed either with a diet containing 33% of a GE maize variety (NK 603 x MON 810), or a closely related non-GE variety. A decrease in litter size and weight was found to be statistically significant in the third and fourth litters in the GE-fed mice compared to the control group.

Owned by Monsanto, the GE maize variety tested in this study is tolerant to a herbicide and resistant to certain insect pests. It has been approved for planting and food use in a variety of countries, including the US, Argentina, Japan, Philippines and South Africa. In Mexico and the European Union, it is approved for food and feed use.

"This study is yet another example that the food and feed safety of GE crops and food cannot be guaranteed. The reproductive toxicity of this GE maize was a totally unexpected result, but regulators around the world had considered this GE maize variety as safe as non-GE varieties – a potentially devastating error," said Dr. van Aken.

FAAN Names New CEO

The Food Allergy & Anaphylaxis Network (FAAN) has named Julia E. Bradsher, Ph.D., as its new CEO, replacing Founder Anne Muñoz-Furlong, who is retiring.

Dr. Bradsher brings to FAAN extensive knowledge of anaphylaxis, a severe, potentially fatal allergic reaction. For the past six years, as senior director of marketing, she led the marketing team and strategic planning for all Dey Pharmaceutical products, including EpiPen®, an auto-injector device containing epinephrine, a drug that can stop an anaphylactic reaction. In that role, she has dealt extensively with leaders in the allergy-related scientific community. She has also conducted research on the needs of those who suffer from food allergy and anaphylaxis.

Frank Yiannas, FAAN's Chairman of the Board, said, "Julia's background in the treatment of anaphylaxis, her knowledge of the allergy community, and her passion for protecting food-allergic individuals are what made her an ideal candidate for this position. She is well positioned to help set FAAN's strategic agenda for the next five years."

Hugh Sampson, M.D., FAAN's medical director, said, "Julia's background in health policy and administration, her understanding of anaphylaxis and its effects on patients and their families, and her appreciation of the history and culture of FAAN make her an ideal candidate to lead the organization over the coming years. With Julia, our patients' welfare and scientific accuracy will remain at the forefront of FAAN's mission."

Ms. Bradsher holds a Ph.D. in medical sociology from the University of Miami and a master's in business administration from the Sawyer School of Management at Suffolk University in Boston. She has authored 10 journal articles, seven book chapters, and other solicited publications, and she has held research and faculty appointments in private research institutes and universities.

Anne Muñoz-Furlong, FAAN's Founder and CEO for its first 18 years, said, "We have been searching for someone who can provide the intellectual leadership and the

compassion for the families affected by food allergy and anaphylaxis. Julia has both and will lead FAAN into the next phase of its growth."

Silliker North America Names Johannes Burlin New President and Other Personnel Changes

Silliker has named Johannes Burlin as the new president of Silliker North America, effective October 2008. Burlin joins Silliker from Advanced Bioscience Laboratories, a Mérieux Alliance company, where he has served as president and CEO since 2003. Mr. Burlin replaces Jim Ondyak who has decided to retire.

From 2000 until 2003, Mr. Burlin served as vice president of business development for the Mérieux Group located in Lyon, France. From 1995 to 2000, he served as the general counsel of bioMérieux, Inc., the US subsidiary of bioMérieux, where he was also responsible for licensing and intellectual property. Prior to joining bioMérieux in 1995, he practiced corporate law with the law firm of Bryan Cave.

A native of Sweden, he holds a Bachelor of Arts from Hamilton College in economics and a Juris Doctor from Georgetown University Law School. Burlin brings a group perspective to the company, having played an integral part in the original Mérieux Alliance investments in Silliker in 1997 and 1999.

Silliker, Inc. also announced the following personnel moves at its corporate headquarters:

Dr. Vidhya Gangar was promoted to division vice president.

Kim Brown was hired as laboratory director of its Dimmitt (TX), Stephenville (TX), and Artesia (NM) operations.

Anthony Fontana, Ph.D., joined the company as technical director of chemistry.

DPC® Selects New Executive Vice President, Office Will Move to Pennsylvania

The Dairy Practices Council® has announced that M. Jeffery Bloom became the executive vice president of DPC effective January 1, 2009.

Jeff replaced Terry Musson who has served in that position for 11 years since retiring from FDA.

Jeff has been involved in the dairy industry since receiving his BS in biology, 1971, Delaware Valley College of Science & Agriculture, Doylestown, PA. He has held various management positions for Dairylea Cooperative Inc., Agri-Mark, Inc., Environmental Systems Service, Ltd., Culpeper, VA, The Häagen-Dazs Co., Inc., Woodbridge, NJ, Weber Scientific, Inc., Hamilton, NJ and Johnson-Diversey. He served as president of The Dairy Practices Council 2003–2006.

The new office address as of January 1, 2009 is The Dairy Practices Council®, 319 Springhouse Road, Newtown, PA 18940, USA; Phone: 215. 860.1836.

Maple Leaf Names Chief Food Safety Officer

Maple Leaf Foods has appointed a chief food safety officer, a first for the company and potentially the industry, as the company tries to recover from a deadly *Listeria* outbreak.

"I think we're the first in Canada and… possibly in North America to have that role inside a major food company," Maple Leaf president and CEO Michael McCain said. Bacteria from a Maple Leaf plant in Toronto were linked to the deaths of 20 people in a nationwide outbreak. "We experienced a very deep tragedy in what occurred a few months ago and took responsibility for that outcome. Part of that responsibility is (to) develop an action plan looking forward," Mr. McCain said.

The chief food safety officer will be responsible for leading Maple Leaf's food safety and quality programs across the country, the company said. Randall Huffman, currently the president of the American Meat Institute, stepped into the new role January 5.

New CEO Named at American Dairy Products Institute

American Dairy Products Institute recently announced the appointment of Dale Kleber as the organization's new chief executive officer. He will be responsible for guiding ADPI's executive team and furthering ADPI's mission.

"This position is critical to the success of ADPI programs. We are fortunate to have found Dale. His unique skill set complements our organization well and we look forward to the positive direction his vast experience will provide as we move forward in our efforts to advance dairy products in both domestic and international markets," notes Rick Kaepernick, president of the Board of Directors, ADPI.

Mr. Kleber offers ADPI a diverse dairy industry background with more than 20 years of experience in dairy and food-related businesses. During the course of his career, he has practiced as a corporate attorney and brings to the position additional expertise in government relations, having served as a senior congressional staff member.

After graduating from Vanderbilt University in 1978 with a degree in business administration, Mr. Kleber served as the press secretary and the chief legislative aide, respectively, for two US congressmen. Thereafter, he returned to Vanderbilt and graduated from the School of Law in 1983, while serving on the school's Law Review.

Beginning his legal career with one of Chicago's largest law firms, now know as DLA Piper, Mr. Kleber soon moved in-house to work for a publicly-held food manufacturing company. He then joined Dean Foods Company where he worked for fourteen years, holding the position of vice president, secretary and general counsel. He also served on the company's operating committee while Dean Foods was headquartered in the Chicago area. After the company was acquired, Mr. Kleber was a founding member of a dairy cost consulting firm also based in the Chicago area.

Industry Veteran Alan Bernon Joins Dairy Farmers of America

The Board of Directors and management of Dairy Farmers of America, Inc. (DFA) announce the addition of a well-known leader in the dairy industry, Alan Bernon, to the cooperative. Bernon will serve as senior advisor and president – affiliate division.

In this role, he will help provide oversight to DFA's varied investments and joint ventures. In addition, he will help guide and support any future merger, acquisition and joint venture opportunities for the national milk marketing cooperative.

Mr. Bernon brings a solid track record of leadership in the dairy industry to his role at DFA. Most recently, he served as president of Dean Foods Dairy Group. Mr. Bernon began his dairy career in 1976 when he joined his brother, Peter, in the family business, Garelick Farms, in Franklin, MA. In 1985, he became president.

In 1997, the Bernons sold the Garelick Companies to Suiza Foods. It was this acquisition that launched Suiza on its path as the leading consolidator of dairy businesses throughout the United States. In 2001, Suiza acquired Dean Foods and the company's name.

Following the sale of Garelick to Suiza, Mr. Bernon joined the Dean Foods Company Board of Directors, while also assuming responsibility for Dean's Northeast region as its chief operating officer. Bernon played a key role in identifying, acquiring and integrating Dean's expanded operations in the Northeast and Mid-Atlantic regions. Bernon became president of Dean Foods Dairy Group in January 2006.

In his tenure at Dean Foods, Mr. Bernon is credited with increasing sales in the company's Northeast region from $300 million in 1997 to approximately $1.5 billion in 2003.

Sun Chemical Names Chief Marketing Officer and Vice President of Strategy and Business Development

Sun Chemical named Felipe Mellado chief marketing officer and Bradley Schrader vice president of strategy and business development.

As the chief marketing officer, Mr. Mellado will oversee all of Sun Chemical's corporate marketing activities and product management including global branding activities, trade show participation, and all other marketing communications.

Mr. Schrader becomes vice president of strategy and business development after serving as the company's chief marketing officer for the past two years.

"Brad has played a key role in Sun Chemical's growth, and this new role capitalizes on his strengths in global business strategy," Rudi Lenz, CEO, Sun Chemical said. "Brad will spearhead our strategy for growth, both in our core ink and pigments business, and in new adjacent businesses. He will also lead all merger and acquisition activities. His appointment reflects our commitment to successfully growing Sun Chemical globally."

New NACCHO Executive Director Pestronk Assumes Leadership Duties

Robert M. (Bobby) Pestronk, MPH, officially assumed his duties as NACCHO executive director, succeeding Patrick Libbey. Mr. Pestronk, who is NACCHO's immediate past president, was previously Health Officer for Genesee County, MI, where he protected and improved the health of the county's 430,000 residents in partnership with community members. As the director of the Genesee County Health Department, a position he held since 1986, Mr. Pestronk administered clinical, regulatory, and other human service programs in the areas of personal, community, behavioral, and environmental health.

Mr. Pestronk contributed to many innovative national public health endeavors during his years of volunteer service to NACCHO. As NACCHO President, he led the development of the Healthiest Nation Alliance in collaboration with the Centers for Disease Control and Prevention (CDC) and the Association of State and Territorial Health Officials (ASTHO). The Alliance is a national public-private partnership

aimed at establishing a 21st century health system that emphasizes wellness and prevention. Pestronk also chaired NACCHO's Workforce Development Committee, which seeks solutions to the growing national shortages of public health professionals, oversaw NACCHO finances as chair of the Finance Committee, and led a restructuring of NACCHO's internal committee system.

"Health and quality of life for people nationwide can be improved. Local health departments across the country are essential to achieve these goals," said Mr. Pestronk.

Mr. Pestronk has long been a leader in public health organizations and associations. He is a past board member of the Michigan Health Officers Association and has served on the Board of the Michigan Association for Local Public Health. He is past president of both the Primary Care Fellowship Society and the Public Health Leadership Society Council. His accomplishments in Genesee County earned him a spot on the National Advisory Committee for *Turning Point: Collaborating for a New Century of Public Health*, a Robert Wood Johnson Foundation initiative that transformed and strengthened the US public health system, as well as membership on the Institute of Medicine Public Health Roundtable. He also served as the first president of the Public Health Law Association.

A Primary Care Policy Fellow through the United States Department of Health and Human Services and a Public Health Leadership Institute Scholar, Mr. Pestronk has written extensively on reducing infant mortality, emergency preparedness, public health law, food safety, and other topics. His published work includes articles in the *Journal of Public Health Management and Practice*, the *Journal of Law, Medicine & Ethics*, the *Journal of the American Public Health Association*, *Health Education and Behavior*, *Public Health Reports*, and the *Journal of the American Academy of Nurse Practitioners*. Chapters in books include those published by the American Public Health Association and Oxford University Press.

Mr. Pestronk received the John H. Romani Outstanding Alumni Award from the University of Michigan School of Public Health Department of Public Health Policy and Administration and was presented the Distinguished Alumnus Award by the University of Michigan School of Public Health.

DPC® Elects Two New Board Members at the 2008 Annual Meeting

The Dairy Practices Council® held its annual meeting at the Kellogg Hotel and Conference Center in East Lansing, MI, November 5-7, 2008.

The meeting was one of the best attended in recent years with excellent speakers covering timely topics. There were representatives from Canada and 22 states in attendance. The International Milk Haulers Association held their Board Meeting in conjunction with the DPC® meeting.

Two new Board Members were elected: Greg Leach, HP Hood, LaFargeville, NY and Robert Peters, University of Maryland, College Park, MD. Chris Thompson, University of Kentucky, Regulatory Services, Lexington, KY was re-elected to a second 3-year term. EVP Terry Musson is completing his last year in that position.

The remainder of the DPC® Board are: Don Breiner, president DPC, Land O'Lakes; Michael Schutz vice president DPC, Purdue University; Kelly Wedding, USDA Milk Market Administrator Office; Meikel Brewster, Charm Sciences, Inc.; Ellen Fitzgibbons, MA Dept of Public Health; Lloyd Kinzel, Food and Drug Administration; Neil Bendixen, Dairy Marketing Services, LLC; Dr. Robert Roberts, The Pennsylvania State University; and Joseph Zulovich, University of Missouri.

The president appointed two new task force directors with the Executive Board consent. Task Force III Nancy Carey, Cornell University, and Task Force IV Phil Wolff, USDA.

The remainder of the DPC® task force directors are: Task Force I Robert Graves, The Pennsylvania State University; Task Force II John Partridge, University of Michigan, Task Force V Miles Beard, IBA Inc., and Task Force VI Lynn Hinckley, University of Connecticut.

INDUSTRY PRODUCTS

Synbiosis

New ProtoCOL UV is World's First Automated UV/Visible Colony Counter and Zone Sizing System

Synbiosis, a manufacturer of automated microbiological systems, is proud to announce its new multi-application ProtoCOL UV; automated colony counting and zone measurement system is now available. This high specification system will ensure that scientists will save hours by rapidly and accurately counting colonies or imaging zones illuminated by UV or white light.

The ProtoCOL UV, based on up-to-the-minute imaging technology, has a high resolution camera inside a light, tight darkroom with built-in UV and white light, making it the only system currently on the market versatile enough to image fluorescing and visible colonies as well as inhibition zones. The system is easy to connect to a PC allowing researchers to instantly capture, print and save accurate images in a BMP format. The images can then be used for archiving or analysis with new ProtoCOL V1.4 software, which is included with the system.

The ProtoCOL UV's universal darkroom is cleverly and safely designed for many different applications. For example, it can accommodate standard pour, spiral or surface inoculated plates, as well as large bioassay and Single Radial Immunodiffusion (SRD) plates. The darkroom has a sliding, auto-locking door to prevent accidental UV exposure and a filter drawer, which means scientists can add filters for visualizing naturally fluorescing bacteria, such as *Pseudomonas fluorescens*, or recombinant *E. coli* expressing green fluorescent protein.

Martin Smith of Synbiosis stated, "We are delighted to build on the success of our long-established ProtoCOL range to produce the next generation with our ProtoCOL UV. The system's innovative configuration allows scientists to switch effortlessly between visible and UV light and its filter drawer ensures they can image colonies fluorescing across the entire color spectrum if, and when, they need to. Any microbiologist or molecular biologist looking for a cost-effective, multi-application colony-counting and zone-sizing system will find ProtoCOL UV a perfect solution."

Synbiosis
800.686.4451
Frederick, MD
www.synbiosis.com

DuPont Qualicon Registered to ISO 9001:2000 Standard

DuPont Qualicon is pleased to announce that it has been independently audited and certified to be in conformance with the ISO 9001:2000 standard. This registration applies to the quality system involved in the design, manufacture, integration, packaging and design of DuPont Qualicon products.

An audit by Underwriters Laboratories, Inc. found that DuPont Qualicon practices a quality policy that reflects their commitment to customer satisfaction and continual improvement. The company has established an effective system for determining customer satisfaction and acting on that feedback. Significant strengths include management commitment and employee awareness of individual roles in supporting the quality system.

"As a customer-focused business, we have always valued world-class service that meets or exceeds customer expectations," said Kevin Huttman, president – DuPont Qualicon. "This ISO 9001:2000 certification now provides the entire food industry with independent assurance that our systems and staff are aligned with the best practices for highest quality."

Food processing companies around the world rely on the BAX® system to detect pathogens or other organisms in raw ingredients, finished products and environmental samples. The automated system

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

uses leading-edge technology, including polymerase chain reaction (PCR) assays, tableted reagents and optimized media, to detect *Salmonella*, *Listeria*, *Listeria monocytogenes*, *E. coli* O157:H7, *Enterobacter sakazakii*, *Campylobacter*, *Staphylococcus aureus*, yeast and mold. With certifications and regulatory approvals in the Americas, Asia and Europe, the BAX® system is recognized globally as an advanced pathogen testing system available to food companies.

DuPont Qualicon
302.695.5300
Wilmington, DE
www.qualicon.com

Innovative X-ray Inspection System for Bulk and Packaged Products by Mettler-Toledo Safeline

Mettler-Toledo Safeline introduces the PowerChekPlus, a powerful x-ray inspection system providing contaminant detection and quality assurance for bulk and packaged products.

Safeline's PowerChekPlus unit uses low energy, electronically-generated x-ray technology for optimal sensitivity in detecting and automatically rejecting many contaminants including metal, stone, bone, glass, and high-density plastics. It can also measure product mass, monitor overfill and underfill, and find a damaged or incorrectly packaged product – even in metal foil to fully protect your brand. PowerChekPlus can check the integrity of package seals and identify any seals that have been compromised from trapped product. The system stores images of rejected products for further analysis and ultimate product traceability.

A PowerChekPlus unit has been shown with a conveyor system that meets the hygienic 3-A Sanitary standard 41-02 as determined by inspection by a 3-A SSI Certified Conformance Evaluator. This standard requires the unit insures cleanability to a microbiological level. Non-product areas are designed to eliminate debris build-up and potential bacterial reservoirs and product contact areas are corrosion-resistant, non-toxic and non-absorbent.

With PowerChekPlus' 15" full color, touch screen display and real automatic set-up software, users can easily operate the system with little training. Mettler-Toledo Safeline's adaptive automatic product variation compensation software enables more uptime and minimizes false rejects.

Mettler-Toledo Safeline
800.447.4439
Tampa, FL
www.mt.com/safelineus

Eriez® RE Drum Separators Provide Superior Protection Against Ferrous Contamination

Rare Earth (RE) Drum Separators from Eriez® feature Erium® 3000, a high quality rare earth permanent magnetic power source. Eriez RE Drum Separators deliver unmatched performance, purifying large quantities of bulk materials such as foods, plastics, abrasives, metal powders, ceramic material, paper, glass cullet, soda ash, kaolin clay, chemicals, gypsum and quartz powder. They remove very fine ferrous particles, locked particles, and even strongly paramagnetic particles.

Neodymium-boron-iron rare earth permanent magnets develop magnetic fields up to 25 times stronger than conventional ceramic or alnico units, with no increase in size. The additional strength helps in removing weakly magnetic or very fine iron contaminants from a wide variety of powdery, dry bulk materials as well as slurries.

The increased strength at a greater distance, high gradients and increased holding force of Eriez RE Drums allows them to hold magnetic or fine iron contaminants so tightly that wipe-off by product flow is virtually eliminated. These drums are an ideal choice where high product purity is required.

Eriez RE Drums are part of the complete line of drums from Eriez, which includes standard models in diameters from 12 to 36 inches (305 to 915 mm), and widths from 12 to 60 inches (305 to 1525 mm). These units provide efficient separation on feed rates up to 100 TPH.

Eriez
888.300.ERIEZ
Erie, PA
www.eriez.com

Rutgers Food Innovation Center – First Food Business Incubation Facility to Use AiroCide PPT Air Sanitation Technology

KES Science and Technology, Inc. announces that the Rutgers Food Innovation Center (FIC) will be the first food business incubator program in the country to include the NASA-developed AiroCide PPT air sanitation technology for use in its facility. The mission of the FIC is

to showcase food-processing innovation and to provide opportunities for processors to benefit from the full spectrum of capabilities that exist at its USDA and FDA inspected food incubator. Because airborne cross contamination poses a threat to food safety, the chemical-free AiroCide system, which kills airborne mold, fungi, bacteria and viruses, as well as removes volatile organic compounds (VOCs), provides added protection to enhance quality assurance in the food processing environment.

KES Science and Technology became a part of the Rutgers FIC Industry Partners Program during the planning stages of its new food incubator facility. President and chief executive officer of KES, John Hayman III said, "KES was honored to be included as an industry partner with this prestigious institution. Food safety is a most prominent issue for both food handlers and consumers. Preventing airborne cross contamination is an important element to consider in the food processing environment."

Lou Cooperhouse, director of the Rutgers Food Innovation Center, said, "As we developed plans for our new food business incubation facility, we wanted to implement best practices in all aspects of our operation. It is well-recognized in industry that minimizing the potential for airborne contamination is an important component of an effective food safety program, as this can minimize the potential incidence of product contamination by pathogens. Furthermore, the minimization of airborne microorganisms will generally result in an extension of raw material shelf life, and result in improvements in quality and a reduction in food waste. We are extremely pleased to partner with KES, and grateful for the generous donation of this equipment, which we will be pleased to demonstrate to our clients." The AiroCide system is installed in the microbiology and chemistry labs, the test kitchen, food processing rooms, and in the perishable food storage areas of the Rutgers FIC facility.

The AiroCide technology is not a filter and compliments results of filtration systems like HEPA/MERV. The patented technology, integrated with Photocatalytic Oxidation (PCO), work in unison to destroy harmful airborne microbes and dismantle volatile organic compounds (VOC). Clinical studies show a six-log kill rate for microbials and up to 99% removal for VOCs. The AiroCide technology is a FDA listed class II medical device that is also used in health care settings. The "plug and play" technology is also energy efficient, as it was originally designed for the NASA space station program to successfully conduct astroculture experiments that required air free of mold spores and ethylene gas.

The FIC facility includes a product development test kitchen, focus group and sensory analysis capabilities, microbiology and chemistry analytical laboratories, state-of-the-art distance learning and education equipment, and a complete production area for shared-use food processing.

The AiroCide PPT system is used in the perishable foods and beverages industries that include retail (grocery and floral), distribution (produce and floral), food and beverage and analytical laboratories (tissue culture and food processing).

The air purifying systems contain the same technology that is used in all AiroCide products that serve multiple industries and applications.

KesAir Technologies
678.641.5238
Atlanta, GA
www.kesscience.com

Nilfisk CFM

Nilfisk CFM SL Vacuum Series are Affordable and Durable

In these volatile economic times, it is so important that food manufacturers are efficient across the board, especially when it comes to meeting their strict maintenance requirements. It's all about cleaning smarter, and Nilfisk CFM's SL vacuum series is engineered to do the job right the first time – saving time and money.

Think about it. An army of workers with mops and brooms burns a lot of valuable man-hours. Low-end shop-style vacs waste time breaking down or clogging up and leave 20% of the dust behind. The Nilfisk CFM SL vacuum series, which include the 3SL, 5SL, and 5WSL, meet the twin concerns of cost and performance, featuring solid con-

struction and strong performance at an affordable price, making them a cost-effective solution for many food processing companies. Day after day, year after year, the savings add up.

Lightweight and highly maneuverable, the SL Vacs are ideal for picking up powders, liquids, dust and debris. Featuring all the "bells and whistles" of higher-priced industrial vacuums, they are also available with HEPA filtration, to capture 99.97% of particles, down to and including 0.3 microns. A unique release lever that lowers the wheeled collection container also makes disposal of collected debris a breeze. Like all Nilfisk CFM vacuums, the SL series is compatible with the company's comprehensive line of hose and accessories to suit a wide range of cleaning applications.

Nilfisk CFM
800.645.3475
Malvern, PA
www.pa.nilfisk-advance.com

Start-Stop Data Loggers Now Available from Dickson

Monitoring temperature and/or humidity is now far easier with the new Dickson Multi-feature Digital Display Temperature and Humidity Data Loggers (TP425) with both push-to-start and push-to-stop functions. Data recording is clean and easy-to-read. A temperature only version is also available (SP425).

Chris Sorensen, Dickson VP, explains, "If you are trying to map temperature and/or humidity conditions you want to know when data recording starts and stops. Without this ability to control the start and stop of data recording, unnecessary readings mixed in with your real data, making it more difficult to make an analysis." The Dickson Multi-feature Digital Display Temperature & Humidity Data Logger also includes:

- Easy-to-read digital displays that let you visually keep track of temperature and humidity conditions in between data downloads.
- Options to display current or min/max temperature and humidity readings.
- User-replaceable battery.
- USB-enabled triple-speed data downloading.

Dickson
800.323.2448
Addison, IL
www.dicksondata.com

Steritech is Now a Licensed SQF Certifying Body

The Steritech Group, Inc., a provider of technical services in the areas of supply chain food safety and quality, is pleased to announce that it is now a licensed SQF Certifying Body.

SQF (Safe Quality Food) is rapidly becoming recognized as the standard in North America for food safety and quality. Designed to meet the needs of industry stakeholders in all major food categories throughout the supply chain, the SQF standard has been benchmarked against the Global Food Safety Initiative (GFSI) Guidance Document alongside the BRC (British Retail Consortium), IFS and Dutch HACCP standards.

"Globalization of the world's food supply has added complexity to the already challenging job of managing food safety and quality," said Steritech CEO Mark Jarvis. "As an SQF Certifying Body, we are better positioned to help our clients manage risk and restore consumer confidence in their products and services."

Steritech offers a range of enterprise level solutions and services including systems development, consulting, training, certification, conformity assessments and technology to help primary producers, manufacturers and distributors in the food industry meet globally recognized standards of food safety and quality.

Steritech Group, Inc.
800.868.0089
Charlotte, NC
www.steritech.com

COMING EVENTS

FEBRUARY

- **3–4, Industrial Cheese Making Workshop,** University of Idaho, Food Science and Toxicology Dept., Twin Falls, ID. For more information, contact Paula Peterman at 208.364.6188; E-mail: paulap@uidaho.edu.
- **3–5, Food Defense Coordinator Certification Training,** Charlotte, NC. For more information, call AIB at 800.242.2534 or go to www.aibonline.org.
- **4–6, CIES International Food Safety Conference,** Barcelona, Spain. For more information, contact Marjo Jarvinen at 33.1.44.69.84.82 or go to www.ciesfoodsafety.com.
- **9–12, Dairy Technology Workshop,** Birmingham, AL. For more information, contact Randolph Associates, Inc. at 205.595.6455; E-mail: henry.randolph@raiconsult.com.
- **17, Georgia Association for Food Protection Winter Meeting,** CDC Tom Harkin Global Communications Center, Atlanta, GA. For more information, contact Pam Metheny at 678.450.3061; E-mail: pam.metheny@waynefarms.com or or visit www.gaafp.org.
- **18–19, Kentucky Association of Milk, Food and Environmental Sanitarians Meeting,** Executive West Hotel, Louisville, KY. For more information, or visit www.kamfes.com.
- **21–25, 2009 AFFI Frozen Food Convention,** Monterrey, CA. For more information, go to www.affi.com.
- **23–24, Introduction to HACCP,** Eagan, MN. For more information, E-mail foodsafety@ecolab.com.
- **24–26, Dubai International Food Safety Conference,** Dubai Convention and Exhibition Centre, Dubai. For more information, go to www.foodsafetydubai.com.
- **24–26, Food Defense Coordinator Certification Training,** Phoenix, AZ. For more information, call AIB at 800.242.2534 or go to www.aibonline.org.
- **24–26, GMA Food Claims and Litigation Conference: Emerging Issues in Food-Related Litigation,** Rancho Mirage, CA. For more information, contact Mary Olsen at 202.639.5968; Web site: www.gmalitigationconference.com.
- **24–27, 6th ASM Biodefense and Emerging Disease Research Meeting,** Baltimore, MD. For more information, go to www.asm.org.
- **25–26, Implementing SQF 2000 Systems,** Eagan, MN. For more information, E-mail foodsafety@ecolab.com.

MARCH

- **2–3, 9th Annual ASQ Lean Six Sigma Conference,** Phoenix, AZ. For more information, call 800.248.1946 or go to www.asq.org.
- **4–5, Implementing SQF 2000 Systems,** Eagan, MN. For more information, E-mail foodsafety@ecolab.com.
- **10–13, HTST Workshop,** Murfreesboro, TN. For more information, call Randolph Associates at 205.595.6455; E-mail henry.randolph@raiconsult.com.
- **18–20, Idaho Environmental Health Association Annual Education Conference,** Boise State University, Boise, ID. For more information, contact Bob Erickson at 208.788.4335; E-mail: berickson@phd5.idaho.gov or visit www.idahoenvironmentalhealth.org.
- **23–24, Introduction to HACCP,** Eagan, MN. For more information, E-mail foodsafety@ecolab.com.
- **25, Advanced Artisan Cheese Making Workshop,** University of Idaho, Food Science and Toxicology Dept., Gooding, ID. For more information, contact Paula Peterman at 208.364.6188; E-mail: paulap@uidaho.edu.
- **31–April 1, NIAA's 2009 Annual Meeting,** Louisville, KY. For more information, call 270.782.9798 or go to www.animalagriculture.org.

APRIL

- **1–3, Missouri Milk, Food and Environmental Health Association Annual Educational Conference,** Stoney Creek Inn, Columbia, MO. For more information, contact Gala Miller at 573.659.0706; E-mail: galaj@socket.net or go to www.mmfeha.org.
- **8–9, Implementing SQF 2000 Systems,** Eagan, MN. For more information, E-mail foodsafety@ecolab.com.
- **22, SfAM Spring Meeting,** Aston University, Birmingham, UK. For more information, go to www.sfam.org.uk/spring_meetings.php.
- **25–26, 1st International Congress of Food Hygiene,** Tehran-Iran. For more information, go to www.icfh2009.com.
- **26–28, 2009 ADPI/ABI Annual Conference,** Hyatt Regency, Chicago, IL. For more information, go to www.adpi.org/Events/tabid/83/Default.aspx.
- **27–29, 2009 Food Safety Summit,** Washington, D.C. Convention Center, Washington, D.C. For more information, go to www.foodsafetysummit.com.

MAY

- **4–6, Food Marketing Institute Future Connect Conference,** Hyatt Regency, Dallas, TX. For more information, go to www.fmifutureconnect.com.

IAFP UPCOMING MEETINGS

JULY 12-15, 2009
Grapevine, Texas

AUGUST 1-4, 2010
Anaheim, California

COMING EVENTS

- **6, Metropolitan Association for Food Protection Spring Seminar,** Rutgers University, Cook College Campus Center, New Brunswick, NJ. For more information, contact Carol Schwar at 908.475.7960; E-mail: cschwar@co.warren.nj.us or visit www.metrofoodprotection.org.
- **10–13, VTEC 2009 7th International Symposium on Shiga Toxin (Verocytotoxin) Producing *Escherichia coli* Infections,** Centro Cultural Borges, Bueno Aires, Argentina. For more information, go to www.vtec2009.com.ar/.
- **18–22, 2009 3-A SSI Education Meeting and Annual Meeting,** Milwaukee Airport Hotel and Convention Center, Milwaukee, WI. For more information, call 703.790.0295 or go to www.3-a.org.
- **25–27, Brazil Association for Food Protection Annaul Meeting,** Conselho Regional de Quimica, São Paulo, Brazil. For more information, visit www.abrappa.org.

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