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PERIODICALS

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# FOOD PROTECTION

## TRENDS

SCIENCE AND NEWS

FROM THE  
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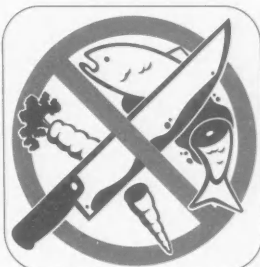
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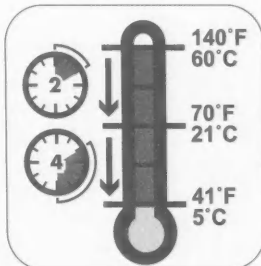
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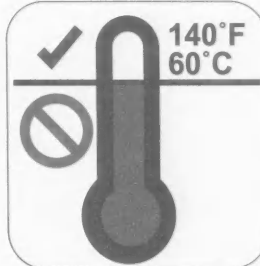
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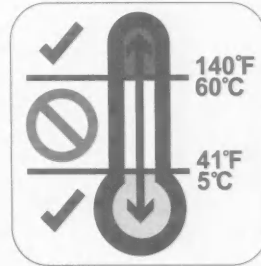
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## "PRESIDENT'S" PERSPECTIVE

One of the attractive features of our organization is that we continually strive to be all-inclusive. We are an international food safety organization with active participation of our membership from around the world. Your Executive Board is continually striving to find new ideas to grow the organization — whether it be through the addition of international affiliates, formation of Professional Development Groups, sponsorship of professional workshops, or nurturing student involvement, to name a few. Victor Hugo, the great French Romantic writer concluded in this "Histoire d'un Crime" in 1877 that "One can resist the invasion of armies; one cannot resist the invasion of ideas." The future of any organization is a function of the number of quality ideas that are implemented.

I firmly believe that the best ideas rise to the top when there is a diversity of background and experience shaping and growing those ideas. That is certainly one of the strengths of our organization — we are a diverse Association. Among others, we have membership from multiple countries around the globe, we have representation from industry, government, and academia and we have a diverse range of experience — from the "grizzled veteran" to the "neophyte." I believe the key to the quality of ideas is the diversity in thought and perspective.

We need to encourage the active participation of our members, particularly, our younger members. The great Chinese



By **PAUL A. HALL**  
PRESIDENT

**"New Blood...  
New Ideas...  
New Life"**

philosopher, Confucius, said, "A youth is to be regarded with respect." I don't mean to minimize or discount the wisdom that comes with experience, but the exuberance of youthful ideas is invigorating and often contagious. There are some that believe in the notion of "having to pay your dues." While length of service to our profession is an important criterion, it should not be the sole criterion for basing decisions for participation or involvement. For example, our Association has a number of committees that have a broad range

of background and experience. One of the most important committees our Association has is the Program Committee. This committee has the charge to set the program for our Annual Meeting and the associated workshops. It is a committee with a tough job, but it is a tribute to our membership that year-in and year-out we have more volunteers asking to serve on this committee than any other. The appointments are always tough to make because the pool of potential members is much larger than the number of slots open on the committee. It would be easy simply to use length of service to our Association as the primary determinant and, in fact, it is an important but not sole determinant for committee appointment. I believe it benefits our Association to have representation from the "less seasoned" segment of our membership on this committee, as well as our other committees. I believe that in the end, we wind up with more quality ideas and a better program than we otherwise would.

As always, I encourage all of you to actively participate in your Association. IAFP exists for your benefit and it is only with your involvement and your ideas that the organization will continue to thrive and grow. I encourage you to invite new members to join and your younger members to become actively engaged in the organization. Only with their active involvement will we have, as Victor Hugo described, "...an invasion of ideas." This is one invasion we want to encourage, not resist.

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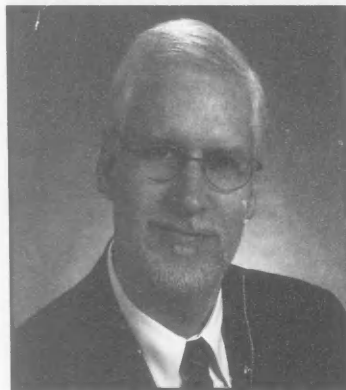
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## “COMMENTARY” FROM THE EXECUTIVE DIRECTOR

The election results are complete and Gary Acuff from Texas A&M was selected to become the next Member of our Executive Board. Gary's term will commence upon completion of the Awards Banquet on August 11 in Phoenix. The vote count was finalized at the end of March and Gary was ready for action well before his term is scheduled to begin. A long-range planning session was scheduled in conjunction with the April Board meeting and Gary was able to attend and contribute significantly to the discussions.

This month's column focuses on the time and dedication of our Executive Board Members. In addition, I will share some details of a planning session held at the April Board meeting. First off, a candidate for Secretary commits to serving the Association over the next five years when they agree to being a candidate for office. This is a huge commitment and one that should be appreciated by all IAFF Members. To think, Members (and their employers) are willing to donate their time and effort to help lead this Association into the future is quite humbling.

We want to thank David Golden from the University of Tennessee for being willing to stand for election to the Executive Board. David is a past Chairperson of the Program Committee and has been very involved in IAFF over the years of his Membership. We look forward to David's continued involvement and are appreciative that he was more than willing to



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

***“Without great leadership from your Executive Board, both present and past Boards, we would not be the leaders in “Advancing Food Safety Worldwide”***

contribute to IAFF on the Executive Board over the next five years. That is truly a tribute to his dedication to IAFF!

Typically, there are four Board meetings per year. These may range from a multi-hour teleconference to a meeting taking up to three days of a Board Member's time. In addition, there are normally many hours spent prior to a Board meeting studying materials provided to allow

for efficient discussion of agenda items. Often times, there are issues that arise between Board meetings that need input from all Board Members. Much of this discussion can take place via E-mail, but some issues require additional teleconferences to make decisions.

From this you can see, a Board Member's job is never done. There are always more issues to discuss, decisions to be made and direction to be given to make IAFF the strongest it can be!

I mentioned that we held a planning session at the April Board meeting. All Board Members and all staff were present along with Gary Acuff and Stephanie Olmsted will also join the Executive Board as the Affiliate Council Chairperson as of August 12. The full-day session produced an abundance of ideas and directions to take. By the end of the day, our facilitator had our focus narrowed to five categories of projects. Some of the categories had more than one goal to accomplish. Before the day ended, we were able to identify various tasks associated with working toward achieving our goals. Future columns by our President or me will give additional details about the results of the planning session. There are many exciting goals included and we look forward to sharing the complete report with you!

As you can see, our IAFF Board Members dedicate a lot of their work time and personal time to helping to lead the Association down the right path to the future. For that we want to thank Paul Hall, Kathy

Glass, Jeff Farber, Frank Yiannas, Anna Lammerding and Steve Murphy; our current Executive Board Members. We also want to thank Gary Acuff, Incoming

Secretary and Stephanie Olmsted, our Incoming Affiliate Council Chairperson for the time they dedicated during the April Board meeting and planning session.

Without great leadership from your Executive Board, both present and past Boards, we would not be the leaders in "Advancing Food Safety Worldwide."

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# Comparison of Total Cost, Method Efficiency, and Laboratory Productivity of Selected Microbiological Test Kits

DEBORAH A. MCINTYRE

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## SUMMARY

Several microbiology rapid test kit methods are available for use in the isolation and detection of *Salmonella*, *Listeria*, and *Escherichia coli* O157:H7 from foods. Government and commercial laboratories that screen for these analytes must decide whether to use the standard reference method, as outlined for the detection of these organisms, or one of the commercially available test kits. The objective of this study was to analyze the comparative value of five commercially available test kits (BioControl Assurance<sup>®</sup> EIA, bioMérieux VIDAS<sup>®</sup>, Neogen REVEAL<sup>®</sup>, DuPont Qualicon BAX<sup>®</sup> automated detection system, and TECRA<sup>®</sup> Visual ImmunoAssay), as well as the standard reference methods for each of the test organisms (*Salmonella*, *Listeria*, and *Escherichia coli* O157:H7). Twenty-six collaborating laboratories submitted information on the amount of hands-on labor; total elapsed time, and cost of the materials and disposables utilized in the test methods for each of the seven processing steps (sample receipt and recording; sample preparation; sample enrichment; sample screening; result analysis; result confirmation; and result reporting). Results of the comparative study indicated that hands-on labor and total elapsed time are factors that most differentiate the methods, directly relating to the overall method efficiency and utilization of labor within the laboratory. Material and disposable costs were not found to be a significant factor in differentiating the various methods. However, many of the test kit methods require initial purchase of instrumentation in order to run the assay and this should be taken into consideration when reviewing a particular method. Thus, total cost, method efficiency, and labor productivity are all factors that should be thoroughly reviewed when selecting the appropriate test method for a laboratory.

A peer-reviewed article

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**TABLE 1. Specific test methods used for each target analyte**

Test Method	Specific Method per Analyte		
	<i>Salmonella</i>	<i>Listeria</i>	<i>E. coli</i> O157
BioControl Assurance® EIA	EIA Salmonella	EIA Listeria	EIA EHEC
bioMérieux VIDAS®	VIDAS® SLM	VIDAS® LIS	—
DuPont Qualicon BAX® automated system	BAX® Salmonella	BAX® Listeria	BAX® E. coli O157:H7
TECRA® Visual Immunoassay (VIA™)	Salmonella VIA™	Listeria VIA™	E. coli O157 VIA™
Neogen REVEAL®	—	—	REVEAL® for E. coli O157:H7
Standard Reference Method	FDA BAM	USDA-FSIS	FDA BAM

## INTRODUCTION

A number of microbiological rapid test methods have been developed for the isolation and detection of *Salmonella*, *Listeria*, and *Escherichia coli* O157:H7 in foods, including the BioControl Assurance® EIA, bioMérieux VIDAS®, Neogen REVEAL®, DuPont Qualicon BAX® automated detection system, and the TECRA® Visual ImmunoAssay. Published studies involving one or more of these test kits have addressed individual test kit performance for pathogen detection in a variety of food products (19, 23) as well as their performance in comparison with traditional cultural reference methods (3, 4, 6, 8, 9, 10, 11, 12, 14, 15, 16, 17, 26). Other published studies have compared two or more commercially available rapid methods, focusing on the specificity and sensitivity of the results generated (2, 7, 13, 18, 20, 21, 22, 24). In these studies, inclusivity data is typically presented to demonstrate specificity of the methods. Exclusivity data is often included to demonstrate non-interference from competitive organisms. A variety of food types (naturally contaminated and inoculated) are also tested with rapid test kit methods for comparison to the traditional cultural meth-

ods. Results for each test kit method are listed and then compared to determine if any statistical differences are noted in performance. Incidences of false positive and false negative rates are also included.

Although it is critical for a testing laboratory to review and understand the performance characteristics of a rapid microbiology test kit method with respect to sensitivity, specificity, and false negative and positive rates, other important factors that a laboratory may consider include cost, as well as the amount of time and labor required to run the assay. No previously published studies were found that compared material and disposable costs, hands-on labor, and total elapsed time required for running the rapid microbiology test kit methods. Therefore, this study was conducted to analyze the comparative value of five commercially available test kits, as well as the standard reference methods for each of the test organisms (*Salmonella*, *Listeria*, and *Escherichia coli* O157:H7). By obtaining actual laboratory data for comparison, operational efficiencies and laboratory productivity for the various methods can ultimately be evaluated.

## MATERIALS AND METHODS

Government and commercial laboratories were contacted to determine which methods their laboratory used routinely for the detection of *Salmonella*, *Listeria*, and *E. coli* O157:H7. Methods for detecting these three analytes using the standard cultural reference method [FDA-Bacteriological Analytical Manual, BAM (1) or USDA-Food Safety Inspection Services, FSIS (25)], BioControl Assurance EIA®, bioMérieux VIDAS®, Neogen REVEAL®, DuPont Qualicon BAX® automated detection system, and the TECRA® Visual ImmunoAssay were reviewed. A specific questionnaire, prepared for each test method and test analyte, requested information on the amount of hands-on labor, total elapsed time, and cost of the materials and disposables utilized in the method. The questionnaire was divided into seven processing steps: sample receipt and recording, sample preparation, sample enrichment, sample screening, result analysis, result confirmation, and reporting of the results.

Collaborators were sent questionnaires specific for the test kits or standard reference methods routinely

**TABLE 2. Incomplete block design for analyzing *Salmonella* and *Listeria* test methods**

Block	Reps I and II		Block	Reps III and IV	
1	BAX®	VIDAS®	6	BAX®	Assurance®
2	TECRA®	Assurance®	7	VIDAS®	TECRA®
3	VIDAS®	FDA-BAM (Sal) USDA-FSIS (Lis)	8	TECRA®	FDA-BAM (Sal) USDA-FSIS (Lis)
4	BAX®	TECRA®	9	BAX®	FDA-BAM (Sal) USDA-FSIS (Lis)
5	Assurance®	FDA-BAM (Sal) USDA-FSIS (Lis)	10	VIDAS®	Assurance®

$t=5, k=2, r=4, b=10, \lambda=1, E=.62, \text{type V}$

**TABLE 3. Incomplete block design for analyzing *E. coli* O157 test methods**

Block	Reps I and II		Block	Reps III and IV	
1	BAX®	REVEAL®	6	BAX®	REVEAL®
2	TECRA®	Assurance®	7	REVEAL®	TECRA®
3	REVEAL®	FDA-BAM	8	TECRA®	FDA-BAM
4	BAX®	TECRA®	9	BAX®	FDA-BAM
5	Assurance®	FDA-BAM	10	REVEAL®	Assurance®

$t=5, k=2, r=4, b=10, \lambda=1, E=.62, \text{type V}$

used in their laboratory, along with instructions to complete the form in their laboratory within a 6-week time frame. It was required that each collaborator specify the food product-type tested, as well as the number of samples tested in that batch of analysis. The collaborators were instructed to use a stopwatch or timer to record the time involved for hands-on labor for each processing step and to specify units in either minutes or hours. Hands-on labor was defined as any time involved for an analyst to perform a step or to prepare reagents and materials. Total elapsed time was also recorded and was defined as both time for hands-on labor and any additional time neces-

sary to complete the process (e.g., incubation periods). The collaborators were also instructed to provide cost information for materials and disposables used in their laboratory to complete the method.

Five methods were compared for each test analyte (Table 1). The following methods were reviewed for detection of *Salmonella*: BioControl Assurance® EIA *Salmonella*; bioMérieux VIDAS® *Salmonella*; DuPont Qualicon BAX® *Salmonella*; TECRA® *Salmonella* Visual Immunoassay (VIA™); and the FDA-BAM *Salmonella* standard cultural reference method. For *Listeria*, the following methods were reviewed: BioControl Assurance® EIA *Listeria*; bioMérieux VIDAS® *Listeria*; DuPont Qualicon BAX® *Listeria*

monocytogenes; TECRA® *Listeria* Visual Immunoassay (VIA™); and the USDA-FSIS *Listeria* standard cultural reference method. For *E. coli* O157, the following methods were reviewed: BioControl Assurance® EIA EHEC; Neogen REVEAL® for *E. coli* O157:H7; DuPont Qualicon BAX® *E. coli* O157:H7; TECRA® *E. coli* O157 Visual Immunoassay (VIA™); and the FDA-BAM *E. coli* O157:H7 standard cultural reference method. Because of the unavailability of collaborating laboratories using the Neogen REVEAL® system for detection of *Listeria* and *Salmonella* and the bioMérieux VIDAS® for detection of *E. coli* O157:H7, these comparisons were eliminated from the study.

**TABLE 4. Average hands-on labor associated with *Salmonella* testing**

	BAX	BioControl	Standard	TECRA	VIDAS
Sample Receipt and Recording	$\bar{x}$ =3.45 s =3.41	$\bar{x}$ =4.00 s =2.00	$\bar{x}$ =4.25 s =4.27	$\bar{x}$ =4.94 s =3.77	$\bar{x}$ = 8.63 s =14.27
Sample Preparation	$\bar{x}$ =4.68 s =3.87	$\bar{x}$ =7.60 s =6.30	$\bar{x}$ =3.02 s =1.41	$\bar{x}$ =5.94 s =3.03	$\bar{x}$ =9.58 s =14.98
Sample Enrichment	$\bar{x}$ =3.75 s =1.71	$\bar{x}$ =19.50 s =19.50	$\bar{x}$ =4.42 s =1.24	$\bar{x}$ =16.25 s =8.66	$\bar{x}$ =12.54 s =17.12
Sample Screening	$\bar{x}$ =12.20 s =15.31	$\bar{x}$ =24.17 s =23.95	$\bar{x}$ =16.53 s =14.20	$\bar{x}$ =40.35 s =19.41	$\bar{x}$ =9.13 s =5.81
Result Analysis	$\bar{x}$ =1.56 s =2.14	$\bar{x}$ =2.27 s =2.16	$\bar{x}$ =6.25 s =5.56	$\bar{x}$ =0.68 s =0.30	$\bar{x}$ =0.90 s =0.81
Result Reporting	$\bar{x}$ =3.00 s =2.45	$\bar{x}$ =6.50 s =5.97	$\bar{x}$ =5.75 s =3.77	$\bar{x}$ =2.70 s =2.94	$\bar{x}$ =6.92 s =8.90
Total	$\bar{x}$ =28.63 s =21.73	$\bar{x}$ =64.04 s =54.30	$\bar{x}$ =40.22 s =26.52	$\bar{x}$ =70.86 s =26.30	$\bar{x}$ =47.70 s =61.05

$\bar{x}$  = average (in minutes)

s = standard deviation

A balanced incomplete block design was developed to ensure a valid statistical comparison of the five methods for each analyte (5). The resulting designs (Tables 2 and 3) indicated that for a valid study, a minimum of ten laboratories was needed to submit data for no more than two methods per analyte. This comparison resulted in four replications for each test method. Analysis of variance was used to determine whether differences in the variables (hands-on labor, total elapsed time, and cost) were significant for the different methods. In all statistical tests, a value of  $P < 0.05$  was taken to indicate a significant difference.

## RESULTS AND DISCUSSION

Questionnaires for the specific test methods were completed by the collaborating laboratories, results were returned to the coordinating laboratory, and the data were com-

pared. Raw data for hands-on labor, total elapsed time, and cost for each method were converted to a per-sample basis by noting the number of samples recorded by the collaborator and converting the amount accordingly. The average hands-on labor (in minutes) and the associated variation reported for testing *Salmonella*, *Listeria*, and *E. coli* O157 are listed in Tables 4, 5, and 6, respectively, for each processing step. Because minimal data were obtained from the laboratories regarding confirmation (i.e., confirmation was recorded only when a sample was positive, and this was reported infrequently), the confirmation step was eliminated from the tables. Confirmation of a positive result using the test kit methods would typically be performed according to the standard cultural methods and would therefore require the same amount of hands-on labor. Although all data for the other six processing steps are presented in Tables 4, 5, and 6, the average hands-on labor data for the

Sample Enrichment and Sample Screening steps appeared to constitute most of the analysis time for the standard and test kit methods (data outlined in tables).

Analysis of variance of the hands-on labor data indicated that there were no statistically significant differences for the methods used for detecting *Salmonella* or *E. coli* O157. For *Listeria*, there was a significant difference for hands-on labor, with the USDA standard method requiring significantly more labor (on average, 67.44 minutes of total hands-on time) than the test kit methods (average of 26.85 minutes hands-on time). The standard method for *E. coli* O157:H7 (FDA-BAM) also required the longest hands-on time for testing; however, the difference from the test kit methods was not significant. It was also noted that the BAX automated system consistently required less hands-on time than the other test methods for all three target analytes. Comparison of the average total

**TABLE 5. Average hands-on labor associated with *Listeria* testing**

	BAX	BioControl	Standard	TECRA	VIDAS
Sample Receipt and Recording	$\bar{x}$ =3.16 s =4.60	$\bar{x}$ =2.07 s =2.08	$\bar{x}$ =4.03 s =4.50	$\bar{x}$ =6.40 s =3.86	$\bar{x}$ =3.47 s =3.38
Sample Preparation	$\bar{x}$ =2.07 s =1.70	$\bar{x}$ =5.03 s =4.72	$\bar{x}$ =3.68 s =2.95	$\bar{x}$ =3.23 s =1.48	$\bar{x}$ =3.89 s =3.69
Sample Enrichment	$\bar{x}$ =3.92 s =3.76	$\bar{x}$ =7.18 s =6.81	$\bar{x}$ =4.11 s =3.12	$\bar{x}$ =3.95 s =1.82	$\bar{x}$ =8.33 s =9.60
Sample Screening	$\bar{x}$ =5.35 s =2.09	$\bar{x}$ =13.75 s =17.71	$\bar{x}$ =34.69 s =32.48	$\bar{x}$ =10.20 s =8.18	$\bar{x}$ =8.51 s =8.81
Result Analysis	$\bar{x}$ =0.37 s =0.43	$\bar{x}$ =1.47 s =1.36	$\bar{x}$ =11.30 s =8.45	$\bar{x}$ =0.52 s =0.40	$\bar{x}$ =0.65 s =0.44
Result Reporting	$\bar{x}$ =1.50 s =0.71	$\bar{x}$ =2.33 s =2.11	$\bar{x}$ =9.63 s =7.76	$\bar{x}$ =5.17 s =2.36	$\bar{x}$ =4.87 s =3.80
Total	$\bar{x}$ =16.37 s =12.39	$\bar{x}$ =32.21 s =33.70	$\bar{x}$ =67.44 s =48.21	$\bar{x}$ =29.47 s =16.77	$\bar{x}$ =29.72 s =24.45

$\bar{x}$  = average (in minutes)

s = standard deviation

**TABLE 6. Average hands-on labor associated with *E. coli* O157 testing**

	BAX	BioControl	Neogen	Standard	TECRA
Sample Receipt and Recording	$\bar{x}$ =4.75 s =3.86	$\bar{x}$ =1.09 s =0.63	$\bar{x}$ =6.50 s =5.51	$\bar{x}$ =13.15 s =21.31	$\bar{x}$ =2.90 s =2.43
Sample Preparation	$\bar{x}$ =3.00 s =1.83	$\bar{x}$ =2.44 s =1.98	$\bar{x}$ =4.00 s =2.16	$\bar{x}$ =3.50 s =1.00	$\bar{x}$ =3.40 s =3.22
Sample Enrichment	$\bar{x}$ =3.00 s =2.16	$\bar{x}$ =2.95 s =1.38	$\bar{x}$ =5.75 =1.95	$\bar{x}$ =21.25 s =27.20	$\bar{x}$ =1.45 s =0.68
Sample Screening	$\bar{x}$ =6.25 s =4.57	$\bar{x}$ =2.67 s =2.67	$\bar{x}$ =1.40 s =0.71	$\bar{x}$ =10.65 s =9.78	$\bar{x}$ =15.40 s =15.71
Result Analysis	$\bar{x}$ =1.00 s =0.00	$\bar{x}$ =8.05 s =14.63	$\bar{x}$ =5.15 s =6.26	$\bar{x}$ =2.00 s =1.00	$\bar{x}$ =2.65 s =2.18
Result Reporting	$\bar{x}$ =1.50 s =1.00	$\bar{x}$ =8.35 s =14.44	$\bar{x}$ =14.60 s =20.32	$\bar{x}$ =13.15 s =21.31	$\bar{x}$ =2.80 s =2.54
Total	$\bar{x}$ =19.50 s =5.45	$\bar{x}$ =25.55 s =28.67	$\bar{x}$ =37.40 s =23.24	$\bar{x}$ =63.70 s =35.17	$\bar{x}$ =28.60 s =24.06

$\bar{x}$  = average (in minutes)

s = standard deviation

hands-on labor required for all of the test methods is depicted in Figure 1 for (a) *Salmonella*, (b) *Listeria*, and (c) *E. coli* O157.

Average total elapsed time and associated variation for testing each

of the three analytes are listed in Table 7. Because total elapsed time included both hands-on labor as well as incubation periods and any additional time to complete the testing process, long periods of time were included

and these values were recorded in hours. The only processing steps that contributed significantly to the overall elapsed time of the testing were determined to be the Sample Enrichment and Sample Screening process-

**TABLE 7. Total elapsed time associated with *Salmonella*, *Listeria*, and *E. coli* O157 testing**

<b>Salmonella- Total Elapsed Time (in hrs)</b>					
	BAX	BioControl	Standard	TECRA	VIDAS
Sample Enrichment	$\bar{x}$ =22.84 s =3.42	$\bar{x}$ =43.97 s =3.60	$\bar{x}$ =81.41 s =17.06	$\bar{x}$ =51.61 s =5.28	$\bar{x}$ =47.36 s =11.65
Sample Screening	$\bar{x}$ =4.61 s =1.96	$\bar{x}$ =2.61 s =1.36	$\bar{x}$ =48.67 s =18.54	$\bar{x}$ =2.94 s =0.61	$\bar{x}$ =1.60 s =0.54
Total	$\bar{x}$ =27.45 s =3.58	$\bar{x}$ =46.58 s =4.76	$\bar{x}$ =130.08 s =35.18	$\bar{x}$ =54.55 s =5.36	$\bar{x}$ =48.96 s =11.48
<b>Listeria- Total Elapsed Time (in hrs)</b>					
	BAX	BioControl	Standard	TECRA	VIDAS
Sample Enrichment	$\bar{x}$ =46.65 s =2.07	$\bar{x}$ =50.07 s =1.39	$\bar{x}$ =54.57 s =10.44	$\bar{x}$ =47.13 s =1.08	$\bar{x}$ =47.68 s =2.21
Sample Screening	$\bar{x}$ =5.88 s =0.35	$\bar{x}$ =3.09 s =1.13	$\bar{x}$ =66.26 s =19.16	$\bar{x}$ =2.66 s =0.58	$\bar{x}$ =1.20 s =0.35
Total	$\bar{x}$ =52.53 s =2.35	$\bar{x}$ =53.16 s =1.37	$\bar{x}$ =120.83 s =25.11	$\bar{x}$ =49.79 s =1.65	$\bar{x}$ =48.88 s =2.43
<b>E. coli- Total Elapsed Time (in hrs)</b>					
	BAX	BioControl	Neogen	Standard	TECRA
Sample Enrichment	$\bar{x}$ =23.55 s =1.02	$\bar{x}$ =21.16 s =3.14	$\bar{x}$ =8.36 s =0.47	$\bar{x}$ =54.32 s =23.24	$\bar{x}$ =20.52 s =2.51
Sample Screening	$\bar{x}$ =4.82 s =0.61	$\bar{x}$ =2.13 s =0.84	$\bar{x}$ =0.13 s =0.12	$\bar{x}$ =16.56 s =30.60	$\bar{x}$ =2.66 s =0.56
Total	$\bar{x}$ =28.37 s =1.49	$\bar{x}$ =23.29 s =3.67	$\bar{x}$ =8.49 s =0.43	$\bar{x}$ =70.88 s =16.21	$\bar{x}$ =23.17 s =2.00

$\bar{x}$  = average (in hours)  
s = standard deviation

ing steps. The values obtained for these steps are presented in the table, along with the calculated total elapsed time for each test method.

For the methods of detecting *Salmonella*, *Listeria*, and *E. coli* O157, there was a statistically significant difference for total elapsed time. For both *Salmonella* (FDA-BAM) and *Listeria* (USDA-FSIS), the total elapsed time of the standard cultural methods was significantly greater than the total elapsed times of the test kit methods (i.e., it took significantly longer to run the standard cultural methods for *Salmonella* and *Listeria*). The FDA-BAM *E. coli* O157:H7 standard method also required more

“total elapsed” time than the test kit methods; however, the difference was not statistically significant. The total elapsed time of the Neogen REVEAL® method for *E. coli* O157:H7 was significantly less than the other *E. coli* O157 test methods, indicating that the REVEAL® method allowed for faster testing results for *E. coli* O157:H7. Results for the BAX® *Salmonella* and VIDAS® *Listeria* test kits indicated that they required the least amount of total elapsed time to detect their respective analytes; however, the difference from the other test kits for detecting *Salmonella* and *Listeria* was not significant. Figure 2 depicts the average total elapsed time required for the test methods.

Average total cost and associated variation are documented in Table 8 for all three analytes. Costs for the processing steps Sample Receipt and Recording, Results Analysis, and Reporting were determined to be negligible and therefore were not included in the table. As described previously for hands-on labor and total elapsed time, the confirmation step was also eliminated from the table. No significant difference was noted in Sample Preparation, Sample Enrichment, and Sample Screening costs for the various methods that detect *Salmonella*, *Listeria*, and *E. coli* O157. Average costs associated with *Salmonella*, *Listeria*, and *E. coli* O157 testing are de-

**TABLE 8. Average total costs associated with *Salmonella*, *Listeria*, and *E. coli* O157 testing**

<b><i>Salmonella</i></b>					
	BAX	BioControl	Standard	TECRA	VIDAS
Sample Preparation	$\bar{x}$ = \$0.05 <sup>a</sup> s = 0.07	$\bar{x}$ = \$0.35 <sup>b</sup> s = 0.41	$\bar{x}$ = \$0.58 s = 1.15	$\bar{x}$ = \$1.55 s = 2.90	$\bar{x}$ = \$0.05 s = 0.06
Sample Enrichment	$\bar{x}$ = \$0.53 <sup>a</sup> s = 0.04	$\bar{x}$ = \$4.46 <sup>b</sup> s = 3.71	$\bar{x}$ = \$4.09 s = 4.69	$\bar{x}$ = \$3.73 s = 4.97	$\bar{x}$ = \$3.16 s = 0.91
Sample Screening	$\bar{x}$ = \$6.43 <sup>a</sup> s = 3.40	$\bar{x}$ = \$6.53 <sup>b</sup> s = 3.36	$\bar{x}$ = \$6.29 s = 7.01	$\bar{x}$ = \$3.94 s = 1.07	$\bar{x}$ = \$5.59 s = 2.75
Total	$\bar{x}$ = \$7.01 s = 3.51	$\bar{x}$ = \$11.35 s = 5.37	$\bar{x}$ = \$10.96 s = 11.36	$\bar{x}$ = \$9.22 s = 8.68	$\bar{x}$ = \$8.80 s = 3.47
<b><i>Listeria</i></b>					
	BAX	BioControl	Standard	TECRA	VIDAS
Sample Preparation	$\bar{x}$ = \$0.14 <sup>b</sup> s = 0.10	$\bar{x}$ = \$0.13 <sup>b</sup> s = 0.03	$\bar{x}$ = \$0.05 s = 0.06	$\bar{x}$ = \$0.19 s = 0.22	$\bar{x}$ = \$0.17 s = 0.14
Sample Enrichment	$\bar{x}$ = \$0.85 <sup>b</sup> s = 0.52	$\bar{x}$ = \$2.35 <sup>b</sup> s = 2.25	$\bar{x}$ = \$3.03 s = 4.22	$\bar{x}$ = \$1.45 s = 1.07	$\bar{x}$ = \$5.31 s = 4.90
Sample Screening	$\bar{x}$ = \$8.47 <sup>b</sup> s = 0.86	$\bar{x}$ = \$6.18 <sup>b</sup> s = 3.17	$\bar{x}$ = \$9.82 s = 6.12	$\bar{x}$ = \$6.63 s = 2.92	$\bar{x}$ = \$6.48 s = 0.36
Total	$\bar{x}$ = \$9.45 s = 0.46	$\bar{x}$ = \$8.66 s = 5.40	$\bar{x}$ = \$12.90 s = 9.85	$\bar{x}$ = \$8.26 s = 4.18	$\bar{x}$ = \$11.96 s = 4.54
<b><i>E. coli</i> O157</b>					
	BAX	BioControl	Neogen	Standard	TECRA
Sample Preparation	$\bar{x}$ = \$0.13 s = 0.11	$\bar{x}$ = \$0.18 s = 0.06	$\bar{x}$ = \$0.08 s = 0.13	$\bar{x}$ = \$0.18 s = 0.12	$\bar{x}$ = \$1.70 <sup>b</sup> s = 4.26
Sample Enrichment	$\bar{x}$ = \$3.73 s = 2.26	$\bar{x}$ = \$1.21 s = 1.03	$\bar{x}$ = \$0.85 s = 0.71	$\bar{x}$ = \$2.73 s = 1.58	$\bar{x}$ = \$0.92 <sup>b</sup> s = 1.97
Sample Screening	$\bar{x}$ = \$8.29 s = 0.56	$\bar{x}$ = \$4.06 s = 1.65	$\bar{x}$ = \$8.29 s = 1.91	$\bar{x}$ = \$4.20 s = 3.66	$\bar{x}$ = \$5.86 <sup>b</sup> s = 0.76
Total	$\bar{x}$ = \$12.14 s = 2.73	$\bar{x}$ = \$5.45 s = 2.52	$\bar{x}$ = \$9.22 s = 1.71	$\bar{x}$ = \$7.10 s = 4.89	$\bar{x}$ = \$8.47 s = 5.41

$\bar{x}$  = average (in hours)  
s = standard deviation

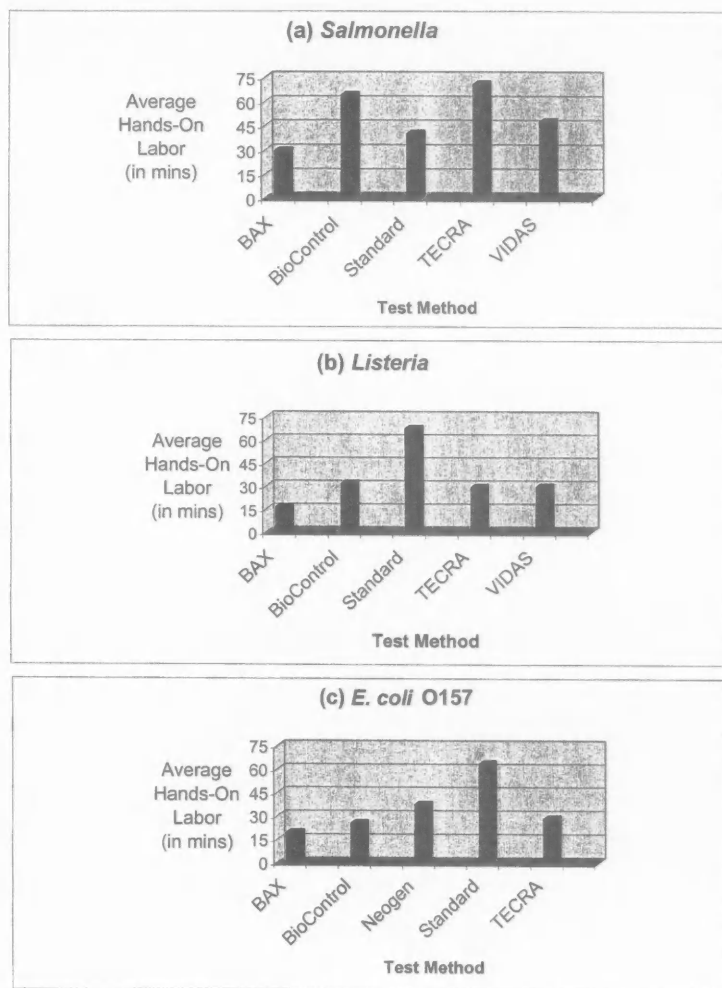
<sup>a</sup>Cost information not provided by 2 laboratories  
<sup>b</sup>Cost information not provided by 1 laboratory

picted in Figure 3. Cost analysis was based on the evaluation of one sample (i.e., costs obtained were converted to a per-sample basis for comparison) and may become more of an influencing factor as sample number increases within the laboratory. Large-volume discounts for test kits or laboratory supplies may directly influence overall cost.

In summary, cost of the test methods appeared to be a less significant factor in differentiating between methods than the amount of labor and total elapsed time required for performing the test, based on evaluation of the test kits for one sample. The standard cultural methods typically required much more

time to perform than the test kit methods (*Listeria* USDA standard method was significantly greater for hands-on and total elapsed time; *Salmonella* FDA-BAM standard method was significantly greater for total elapsed time; *E. coli* O157:H7 FDA-BAM method values were greater for hands-on and total elapsed time, al-

**FIGURE 1.** Average amount of hands-on labor associated with (a) *Salmonella*, (b) *Listeria*, and (c) *E. coli* O157 testing



though not significantly). There were no significant differences in total elapsed time between the test kit methods themselves except for the Neogen REVEAL® *E. coli* O157:H7 method, which was determined to be significantly faster. However, slight differences between the test methods can be observed when comparing the hands-on labor and total elapsed time values, and as the number of samples increases, these differences may become more significant.

It is therefore important to consider the requirement for hands-on

labor and total elapsed time for each assay, as well as the initial evaluation of a test method's specificity and sensitivity performance. Additional labor costs and time to perform the assay are often overlooked and can significantly impact the total testing cost for the laboratory. Using the results from this study as a guide, labor costs to run the test methods can be calculated based on personnel wages specific for the testing laboratory. In addition, material and disposable costs for the number of samples typically tested in a laboratory can be

calculated. A thorough review can then be conducted to determine overall cost, method efficiency and laboratory productivity in order to select the test method most appropriate for a laboratory.

## ACKNOWLEDGMENT

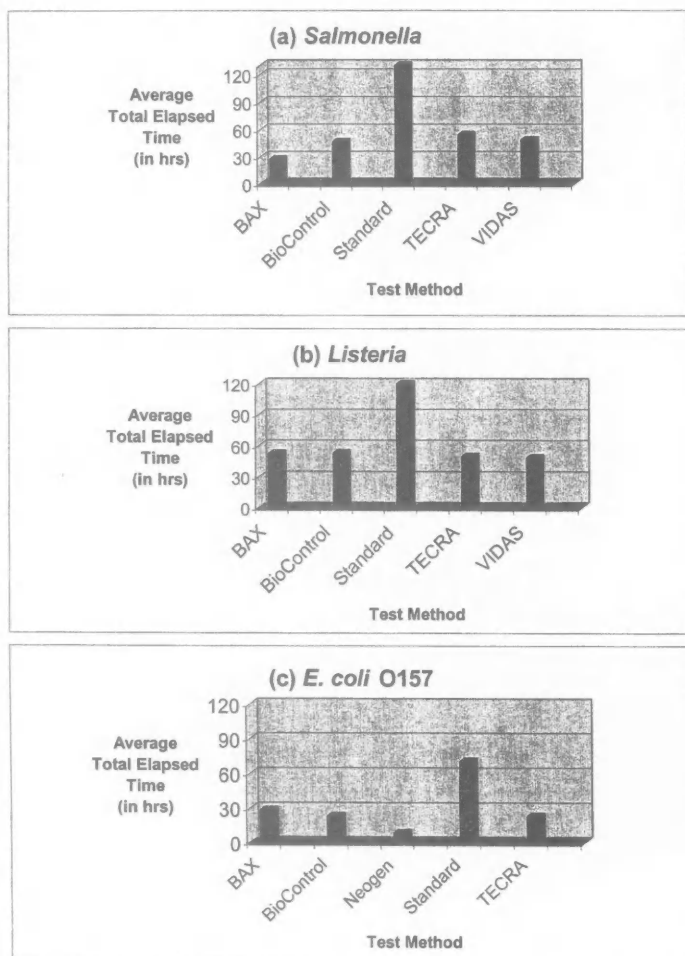
The participation of the following collaborating laboratories is gratefully acknowledged: ABC Research Laboratories, Gainesville, FL; Analytical Laboratories, Boise, ID; BSK Food and Dairy Laboratories, Fresno, CA; Deibel Laboratories, Lincolnwood, IL; Deibel Laboratories, Oconomowoc, WI; Florida Department of Agriculture, Tallahassee, FL; Food Products Laboratory, Portland, OR; Food Safety Net Services, Richardson, TX; Georgia Department of Agriculture, Atlanta, GA; Krueger Food Laboratories, Cambridge, MA; MAK-BEA Laboratories, Blue Earth, MN; Microbe Inotech Laboratories, St. Louis, MO; Minnesota Department of Agriculture, St. Paul, MN; Northland Laboratories, Fort Atkinson, WI; National Food Corporation, Arlington, WA; Nestlé, Dublin, OH; PSI, Arlington, TX; tech laboratories, Arden Hills, MN; Silliker Laboratories, Modesto, CA; Southern Research and Testing, Wilson, SC; Tyson Foods, Springdale, AR; US FDA, Atlanta, GA; US FDA, Denver, CO; US FDA, Jamaica, NY; US FDA, Los Angeles, CA; and Woodson-Tenet Laboratories, Des Moines, IA.

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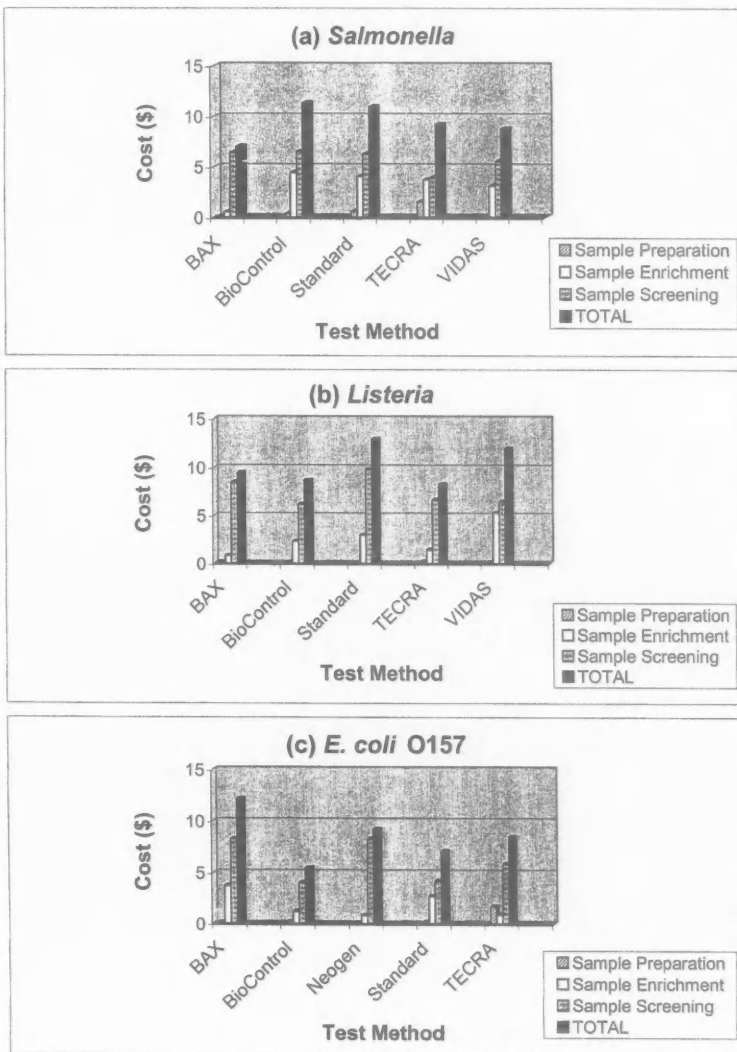
**FIGURE 2.** Average total elapsed time associated with (a) *Salmonella*, (b) *Listeria*, and (c) *E. coli* O157 testing



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**FIGURE 3.** Average materials cost associated with (a) *Salmonella*, (b) *Listeria*, and (c) *E. coli* O157 testing



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# Consumer Attitudes Towards Irradiated Food: 2003 vs. 1993

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## SUMMARY

A survey was conducted to determine current consumer attitudes toward irradiation after consuming irradiated ready-to-eat poultry meat products and evaluate differences in consumer acceptance, if any, over the past ten years. Surveys were completed by 50 consumers in the metro-Atlanta area. Although consumers were exposed to irradiated foods prior to the 2003 survey, consumer awareness was no higher in this study than in 1993, when consumers were not exposed to irradiated foods prior to the survey. The majority (66%) of the respondents were aware of irradiation; among these, 71% "have heard about irradiation, but do not know much about it." Consumers in both studies expressed more concern for pesticide and animal residues, growth hormones, food additives, bacteria and naturally occurring toxins than irradiation. Consumers expressed slight concern regarding irradiation; however, this has decreased significantly over the past ten years. Approximately 76% prefer to buy irradiated pork and 68% prefer to buy irradiated poultry to decrease the probability of illness from *Trichinella* and *Salmonella*, respectively. More consumers are willing to buy irradiated products in 2003 than in 1993 (69% and 29%, respectively).

## INTRODUCTION

Many innovations, even ones with obvious advantages, require a lengthy period of time between when they become available and when they are widely accepted (28). Given that food irradiation is a process that has been proven to be both safe and effective in eliminating microorganisms and making food safer for human consumption, the only barrier to widespread commercial application of food irradiation is the food industry's perception of lack of consumer acceptance (29). Uncertain about the acceptance of irradiated commodities by consumers, the food industry, in general, has made little practical use of the irradiation process (8). Individual meat and poultry companies, although concerned about food safety, are reluctant to be among the first to launch irradiated products for fear of an adverse reaction (17). However, the government's

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**TABLE 1. Demographic characteristics of consumers participating in irradiation survey<sup>a</sup>**

Demographics	% responding	
	1993	2003
Gender		
Female	76	64
Male	24	36
Age		
18-24	2	2
25-34	4	12
35-44	11	18
45-54	30	26
55-64	23	36
65-70	30	6
Race		
White	91	60
Black	7	38
Other	2	2
Marital Status		
Married	74	76
Divorced/separated	8	12
Widowed	14	6
Never Married	4	6
Education		
Some grade school	1	2
Grade school graduate	1	2
Some high school	7	12
High school/technical school graduate	23	35
Some college or vocational school	33	33
College graduate	23	8
Advanced college degree	13	8
Education of spouse		
Some grade school	1	0
Grade school graduate	2	5
Some high school	8	16
High school/technical school graduate	23	38
Some college or vocational school	27	19
College graduate	25	14
Advanced college degree	15	8
Employment		
Full-time	36	46
Part-time	14	10
Retired/Disabled	38	38
Unemployed	12	6

and food industry's interest in irradiation has peaked following approvals to irradiate meat and poultry and the anticipated approval for ready-to-eat foods (2).

For irradiation to be found acceptable, it must offer the consumer an advantage in terms of higher quality, greater safety, longer shelf life, wide product availability and/or lower cost (5). Because most consumers in this country have not been presented with the option to purchase irradiated products, the deliberation about consumer acceptance has centered around the results of several market tests, consumer research polls, and the opinions of various special interest groups (6). A majority of these studies has based consumer acceptance on actual purchases, or intent to purchase, irradiated products. In 1987, a consumer in-store study on irradiated papayas showed that 66% and 80% of participants from Anaheim and Irvine, California, respectively, stated that they would buy irradiated papaya (4). In 1990, an apple marketing study found that 56% of consumers purchased irradiated apples offered at roadside market stands, whereas only 44% purchased non-irradiated apples (33). In 1995, a supermarket simulated test showed that 58% of consumers would purchase irradiated chicken, if available (15). In 1995, a mail survey showed that 45% of consumers would buy irradiated foods (24). In the 1998-1999 FoodNet population telephone survey, 50% of consumers stated that they were willing to buy irradiated meat or poultry (11). In retail trials of irradiated and non-irradiated chicken at the same price conducted in 1995 and 1996, irradiated chicken accounted for 43% of total sales. In 1998, a market experiment on irradiated and non-irradiated chicken showed that 80% of participants purchased irradiated chicken. When irradiated chicken was offered at a 10% discount price, 84% of participants purchased irradiated chicken (9).

**TABLE 1. (continued) Demographic characteristics of consumers participating in irradiation survey<sup>a</sup>**

Demographics	% responding	
	1993	2003
Employment of spouse		
Full-time	52	49
Part-time	6	15
Retired/Disabled	35	36
Unemployed	8	0
Annual household income		
Under \$10,000	4	8
\$10,000 to \$19,999	13	4
\$20,000 to \$29,999	16	18
\$30,000 to \$39,999	18	20
\$40,000 to \$49,999	14	10
\$50,000 to \$59,999	13	18
\$60,000 to \$69,999	8	8
\$70,000 and over	14	14

<sup>a</sup>Consumer participation in survey: 1993 mailed survey (n = 446); 2003 survey of participants in a consumer acceptance sensory test (n = 50)

Consumer acceptance has also been obvious as irradiated products have entered the market. In January 1992, a Florida market sold approximately 600 pints of irradiated strawberries as compared to only 450 pints of non-irradiated strawberries, despite the lower cost for the non-irradiated strawberries (19). In March 1992, irradiated and non-irradiated strawberries, grapefruit and oranges were sold at retail stores in the Chicago area. Approximately 90–95% of 1,200 pints of strawberries, sold in one day, were irradiated. Ninety percent of total sales for grapefruits and oranges, sold over an unspecified time, were for irradiated fruit, and 10% were for unirradiated (23).

This study was conducted to investigate current consumer attitudes toward irradiation after consuming irradiated ready-to-eat poultry meat products and to evaluate differences, if any, in consumer acceptance of irradiation over the past ten years.

## MATERIALS AND METHODS

### Questionnaire

The questionnaire used in this study was a duplicate of the questionnaire used in a previous irradiation study conducted in 1993 by Resurreccion et al. (24). The self-administered, 8-page questionnaire was designed to measure the extent of consumer knowledge, attitudes, concerns and feelings toward food irradiation and some food-safety issues over the ten years since the first irradiation study was conducted. The first page of the questionnaire provided definitions to some of the terms frequently used throughout the questionnaire to make sure that the respondents understood the questions asked. The remaining pages contained questions about respondents' demographic characteristics, eating habits/consumption patterns and

knowledge about irradiation and other food safety issues, using scales suitable for each question.

A total of 50 questionnaires were evaluated by consumers who resided in a total of seven cities in the Metro-Atlanta area. These consumers had previously participated in consumer tests on irradiated ready-to-eat poultry meats at the University of Georgia, Griffin, GA. Most of the consumers (74%) were responsible for the purchasing and/or preparation of food in their household. Criteria for recruitment of participants included that they were between the ages of 18 and 70, that they like and consume poultry products, and that they must not be allergic to poultry. The consumers completed the questionnaire at the Department of Food Science and Technology, University of Georgia, Griffin, GA. Upon panelists' arrival, they were directed to a conference room, asked to sign in and given a brief explanation on how to complete the questionnaire.

In 1993, a total of 918 questionnaires were mailed out to consumers who resided in a total of 18 cities in the Metro-Atlanta area and who had previously participated in consumer tests at the University of Georgia. Consumers were provided with questionnaires that contained a cover letter, a statement of confidentiality, and a telephone number to call if questions arose. A self-addressed postage-paid envelope was included to facilitate mail-back. Reminders, in the form of a letter with a second copy of the questionnaire, were mailed after six weeks to consumers whose responses had not been received. A total of 446 completed questionnaires were received, resulting in a 54% response rate. The consumers were not provided with the option to consume irradiated products prior to the completion of the questionnaire.

FIGURE 1. Percentage of consumers that are informed about irradiation

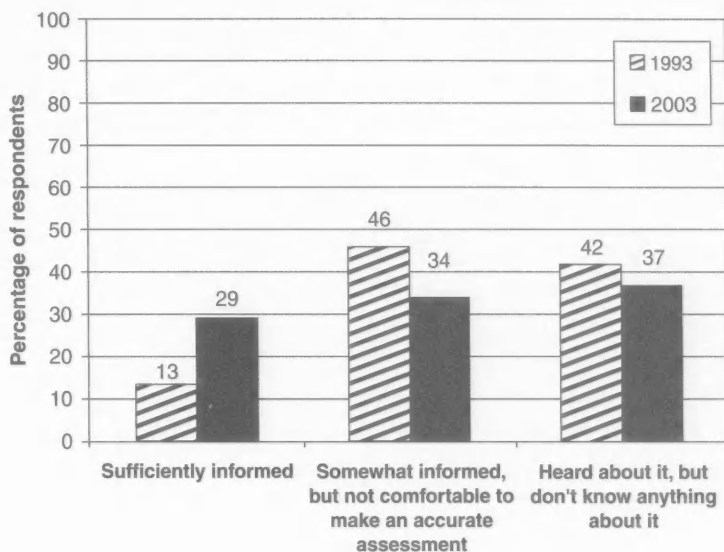
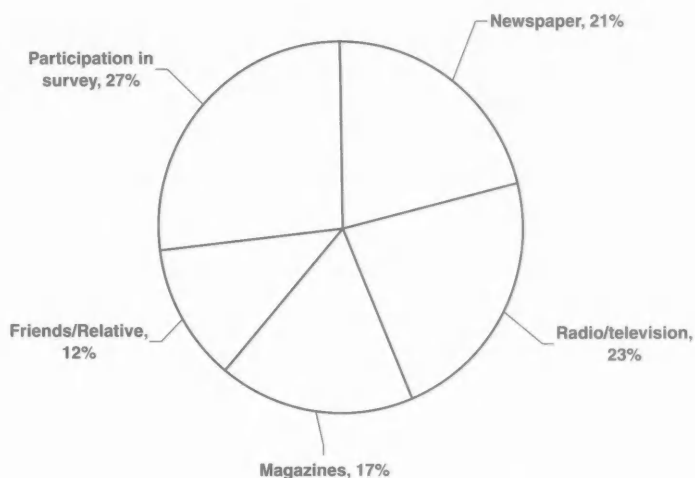


FIGURE 2. Sources of consumer information regarding irradiation in 2003



## Statistical analysis

Statistical Analysis Software System (30) was used to analyze all data. Response frequencies, percentages and means were obtained on responses to all questions from participants. A chi-square test was used to compare the data from this study ( $n = 50$ ) and the previous study ( $n = 446$ ) conducted by Resurreccion et al. (24).

## RESULTS AND DISCUSSION

### Demographics

The demographic characteristics of the consumers who completed the questionnaire are shown in Table 1. The majority of respondents were female. In this study, a wide range of participants from each age group participated, with 94% of respondents under age 65. In the previous study, an older sample resulted from responses to the mailed survey, with 70% under age 65. The median age range of respondents participating in this study was 45–54 years of age. However, the largest age group category represented in this study was 55–64 years of age. The majority of the respondents were white and married. The median household income ranged from \$30,000 to \$40,000 per year. Although 49% of the participants and 40% of their spouses had some college education or higher, less than 50% were employed full time.

### Consumer awareness

Over the past 20 years, surveys and market studies have been conducted to evaluate consumer awareness and their acceptance of irradiation. Nevertheless, the results of surveys on consumer acceptance of irradiation have shown considerable uncertainties and inconsistencies. In 1989, a mailed survey with 1,004 respondents showed that 60% of consumers were aware of the irradiation

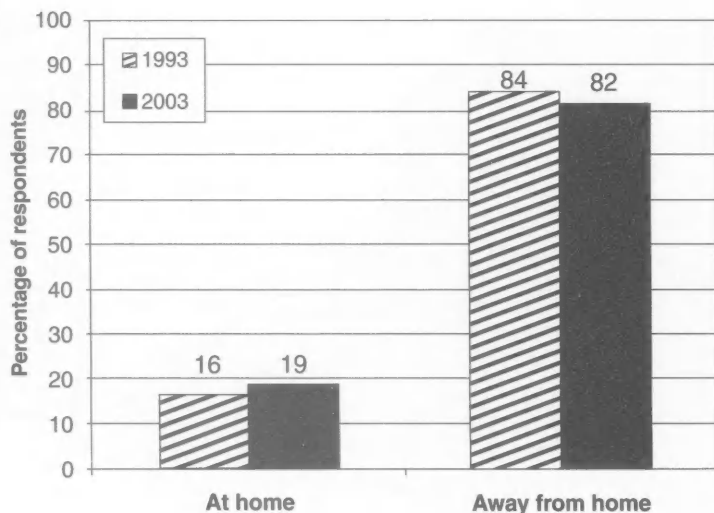
**TABLE 2. Consumer knowledge about irradiation**

Consumer knowledge questions	% Responding <sup>a</sup>						Level of significance <sup>b</sup>
	True		False		Don't know		
	1993	2003	1993	2003	1993	2003	
Irradiated foods contain natural radioactivity	33	15	19	26	49	59	<i>P</i> < 0.05
cannot be recontaminated	7	14	47	35	46	51	NS
retain quality characteristics and are almost indistinguishable from raw	54	57	9	16	37	27	NS
Spoilage cannot be recognized in irradiated foods	8	2	43	47	49	51	NS
It is legal to irradiate foods repeatedly	8	16	21	24	71	60	NS

<sup>a</sup>Consumer participation in survey: 1993 mailed survey (*n* = 446); 2003 survey of participants in a consumer acceptance sensory test (*n* = 50)

<sup>b</sup>Level of significance from chi-square analysis; NS = not significant at  $\alpha = 0.05$

**FIGURE 3.** Percentage of consumers that attributed a foodborne illness to food consumed at home or away from home



process (31). In 1993, a mailed survey with 446 respondents showed that consumer awareness had increased to 72% (24). However, in 1998, another mailed survey with 229 respondents showed that only 55% of consumers were aware of irradiation (9). In the present study, 66% of the 50 consumers were aware of the irradiation process. Although a slight decline in consumer awareness since 1993 was observed, it was not statistically significant.

Seventy-one percent of the consumers in the present study, compared to 88% in 1993, indicated that either they were "somewhat informed" about irradiation or only "heard, but did not know anything about it" (Fig. 1). This percentage reflects a significant decrease in consumers' perception of their lack of knowledge about irradiation, in that more consumers indicated that they were sufficiently informed in this study than in the 1993 survey. Consumers indicated that they had obtained information about irradiation from several sources, shown in Fig. 2. Consumers in this study indicated that they acquired their information about irradiation

**TABLE 3. Concern of consumers about food safety issues<sup>a</sup>**

Problems	Mean Response <sup>b</sup>		Level of significance <sup>c</sup>
	1993	2003	
Pesticide residues	3.7	3.5	NS
Animal drug residues	3.6	3.5	NS
Bacteria	3.6	3.4	NS
Growth hormones	3.6	3.2	NS
Food additives	3.3	2.8	$P < 0.05$
Irradiation	2.8	2.4	$P < 0.05$
Naturally occurring toxins	2.7	2.4	NS

<sup>a</sup>A 5-point scale for concern was used, with 1 = not concerned, 3 = somewhat concerned and 5 = extremely concerned

<sup>b</sup>Consumer participation in survey: 1993 mailed survey ( $n = 446$ ); 2003 survey of participants in a consumer acceptance sensory test ( $n = 50$ )

<sup>c</sup>Level of significance from chi-square analysis; NS = not significant at  $\alpha = 0.05$

**TABLE 4. Concern of consumers regarding irradiation<sup>a</sup>**

Concerns	Mean Response <sup>b</sup>		Level of significance <sup>c</sup>
	1993	2003	
Increased food prices	3.8	3.8	NS
Risk of workers becoming ill	3.8	3.5	NS
Environmental pollution	3.8	3.4	$P < 0.05$
Reduced levels of nutrients	3.7	3.4	NS
Food becoming radioactive	3.5	3.3	NS

<sup>a</sup>A 5-point scale for concern was used, with 1 = not concerned, 3 = somewhat concerned and 5 = extremely concerned

<sup>b</sup>Consumer participation in survey: 1993 mailed survey ( $n = 446$ ); 2003 survey of participants in a consumer acceptance sensory test ( $n = 50$ )

<sup>c</sup>Level of significance from chi-square analysis; NS = not significant at  $\alpha = 0.05$

from their participation in surveys, radio/television, newspapers, magazines, and peers. These results are similar to the findings of Gravani et al. (14) and Resurreccion et al. (24), which indicate that consumers became aware of the irradiation process through radio or television, newspapers and magazines.

#### Consumer knowledge about irradiation

The lifestyles of the American public have changed significantly over the past 20 years, and these changes have influenced food choices and the way food is prepared in the home and/or consumed away from home (36). In this study, 38% of

consumers indicated that either they or a member of their household became ill because of the presence of bacteria in the food. Most consumers who became ill associated this illness with food eaten away from home (Fig. 3) and not to food consumed at home. This difference has prompted decisions by a number of food service companies to use irradiated meat and poultry.

In the 7,219 foodborne disease outbreaks between 1973 and 1987 where the site of mishandling was reported, 79% of the implicated food was prepared in commercial or institutional establishments and 21% was prepared in the home (2). Gravani et al. (14) found that the home was ranked third out of six choices by consumers as the place where food safety risks are most likely to occur.

When consumers are questioned about their knowledge of irradiation, in-depth information and sufficient responses may not be provided. When consumers were asked true or false questions, a larger number of respondents answered in the "don't know" category, indicating that they are still not sufficiently informed about the irradiation process (Table 2). However, we found that more consumers answered the questions correctly in this study than in 1993.

In 1993, one-third of all consumers surveyed believed that irradiated foods were radioactive. This had decreased by half in the present study and was accompanied by an increase in respondents indicating that the statement is false or they did not know enough to answer the question (Table 2). These results are significantly different from those obtained in 1993. The remaining questions on consumer knowledge in 2003 were not significantly different from those in 1993.

From past research, it has been suggested that the acceptance of irradiation will increase by educating consumers and exposing them to irradiated products. Higher rates of

FIGURE 4. FDA-approved labels required for irradiated foods

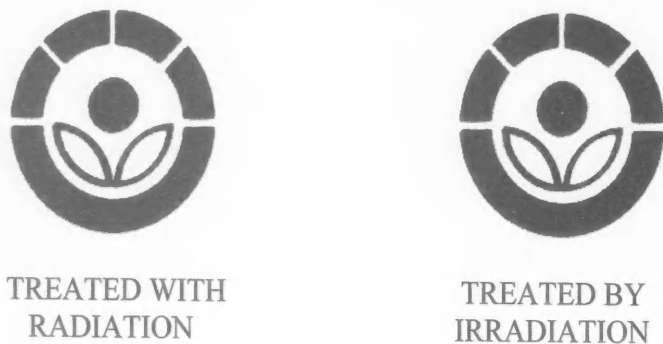
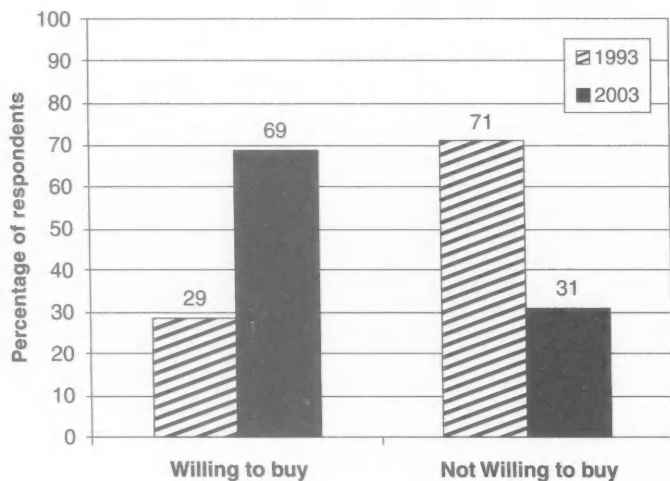


FIGURE 5. Percentage of consumers that are willing to buy irradiated food



acceptability are found in controlled retail studies, where more information can be provided (10). Schutz et al. (31) believed that identifying consumer benefits through label statements or descriptive information would have a definite influence on consumer perceptions. Pohlman et al. (21) reported that audiovisual presentation increased the consumers' knowledge and attitudes toward food irradiation. Loaharanu (18) believed that the opinion of consumers on ir-

radiated food would be quite different if they were given the opportunity to select and purchase the food. Hashim et al. (15) found that a slide program about irradiation and its benefits was more effective than posters and label information in increasing consumer purchase of irradiated poultry. Hashim et al. (16) also suggested that consumers' awareness and acceptance can be increased by education programs, informative irradiation labels and/or posters, television

shows, children interactions, pamphlets or brochures, and in-store sampling.

Although education would inform consumers and make them more aware of the advantages of irradiation, to be successful, it must stress the critical components of food safety, for both new-generation foods and/or traditional food items (26). However, Cramwinckel and van Mazijk-Bokslag (7) found that providing more information to concerned consumers increases their understanding of the goals of irradiation, but does not necessarily lessen their concern toward the technical means of irradiation. This may mean redefining education by finding new and more personal ways to present information, tailoring irradiation to meet the needs of the individual, and considering the psychology or psyche of the consumer (22). In addition to information on irradiation, consumers could also benefit from home food safety education. These programs should be directed more toward consumers under 35 years of age, because many children and young adults may not be learning the basic principles of safe home food preparation (36).

#### Consumer concerns about food safety issues

Food safety is still foremost in the minds of American consumers (20). Although many consumers express concern about food safety, relatively few appear to be changing their food buying behavior in view of their concern (1). In this study, we found that consumers are more concerned with pesticide and animal drug residues, growth hormones, food additives, bacteria and naturally occurring toxins than with irradiation (Table 3). Our findings support the conclusions of previous studies (3, 24, 31, 35). Although consumers expressed only slight concern for food additives and irradiation, this concern has decreased



**TABLE 5. Consumer responses to statements of benefits**

Raw meats and poultry may contain bacteria, such as *Salmonella*, which can cause illness. Irradiation can kill these bacteria. Knowing this, which would you prefer to buy?

	% Responding <sup>a</sup>		Level of significance <sup>b</sup>
	1993	2003	
Irradiated meat and poultry	47	68	$P < 0.05$
Non-irradiated meat and poultry	15	4	NS
Uncertain	34	26	NS
Neither	4	2	NS

Pork may contain a parasite, such as *Trichinella*, which is harmful to people when pork is not thoroughly cooked. Irradiation destroys *Trichinella*. Knowing this, which would you prefer to buy?

	% Responding <sup>a</sup>		Level of significance <sup>b</sup>
	1993	2003	
Irradiated pork	48	76	$P < 0.01$
Non-irradiated pork	18	4	NS
Uncertain	27	18	NS
Neither	6	2	NS

<sup>a</sup>Consumer participation in survey: 1993 mailed survey ( $n = 446$ ); 2003 survey of participants in a consumer acceptance sensory test ( $n = 50$ )

<sup>b</sup>Level of significance from chi-square analysis; NS = not significant at  $\alpha = 0.05$

**TABLE 6. Consumer purchase intent for irradiated foods**

How much of the following would you buy relative to the present amount you buy if they are irradiated and properly labeled?

Food item	% Responding <sup>a</sup>					
	Less		Same		More	
	1993	2003	1993	2003	1993	2003
Produce	12.1	14.3	76.8	73.8	11.0	11.9
Poultry	4.8	5.0	81.3	70.0	13.9	25.0
Pork	7.0	4.9	75.1	70.7	17.8	24.4
Beef	7.6	7.5	78.9	67.5	13.5	25.0
Fish	8.0	9.8	68.6	70.7	23.4	19.5

<sup>a</sup>Consumer participation in survey: 1993 mailed survey ( $n = 446$ ); 2003 survey of participants in a consumer acceptance sensory test ( $n = 50$ )

significantly over the past ten years, from 1993 to 2003.

### Consumers' concern about the irradiation process

In 1989, approximately 25% of the population showed major concern with regard to irradiation (31). From 1993 to 2003 (Table 4), consumers expressed specific concerns that irradiation may cause induced radioactivity in food; result in loss of nutrients; present a risk of workers becoming ill, and increase food prices because of the cost of irradiation processing of food. The level of concern is  $> 3$  or above "somewhat concerned". Although consumers are concerned with environmental pollution, this concern due to the irradiation process is significantly lower in 2003 than in 1993.

### Attitudes toward labeling of irradiated food

In this study, consumers were asked, "How important is it that the irradiated products be clearly labeled?" Only 74% of consumers found the label to be important. This is a slight, but insignificant ( $P < 0.05$ ) decrease compared to 1993, when 81% of consumers found the label to be important. When consumers were also presented with the question, "Do you feel these labels are sufficient to inform consumers that the food in the package is irradiated?", 83% responded yes, whereas in 1993, only 50% of consumers felt that the labels were sufficient. This is a significant increase.

In 1994, Hashim et al. (16) found that in focus group discussions, consumers were not familiar with the irradiation logo (Fig. 4) and that consumers felt that it was not enough to let them know the product had been irradiated. Consumers even stated that "the logo is misleading and that people might assume that the "flower" (radura symbol) is stating

**TABLE 7. Consumer willingness to pay, relative to current prices<sup>a</sup>**

How much of the following would you be willing to pay, relative to current prices for the following potential irradiated food products?

Food item	Willingness to pay more (%)											
	None		1-5		6-10		11-15		16-20		> 20	
	1993	2003	1993	2003	1993	2003	1993	2003	1993	2003	1993	2003
Produce	50	62	38	29	8	7	2	2	1	0	1	0
Poultry	38	41	40	44	15	8	3	3	2	5	2	0
Pork	41	43	38	45	14	10	4	0	1	3	2	0
Beef	41	46	42	41	12	5	3	3	1	5	2	0
Fish	41	51	36	31	16	13	4	3	1	3	2	0

<sup>a</sup>Consumer participation in survey: 1993 mailed survey (n = 446); 2003 survey of participants in a consumer acceptance sensory test (n = 50)

that the food was organically grown or is an all natural product rather than being irradiated." The 1993 survey by Resurreccion et al. (24) also found that the international logo and statement were thought to be insufficient to inform consumers that the food is irradiated.

Because of the negative connotations associated with the words "radiation" and "irradiation," which are mandatory on the label, many in the food industry believe that an alternative wording on the label, such as "electronically pasteurized," would be helpful (10). However, this is an oxymoron when one considers that the definition of pasteurization implies heating (34).

#### Consumer purchase intent for irradiated foods

For the public to benefit fully from irradiation, irradiated foods must be widely available in the market for consumers to exercise their freedom of choice (18). Bruhn et al. (3) found that willingness to buy irradiated food was based on the safety of the process rather than the advantages for any specific food product. As the consumers' perception of safety increased, their willingness to buy increased. Acceptance will be greater

if irradiated food is not much more expensive than nonirradiated food (32). However, purchase of irradiated foods is difficult because of the limited number of supermarkets willing to offer irradiated products for sale. There is reluctance, because supermarkets need to be assured of a steady, adequate supply of a product before introducing it (13). It is now possible to irradiate products in larger volumes due to the increase in food irradiation facilities nationwide.

More consumers were willing to buy irradiated food in 2003 than in 1993 (Fig. 5); the percentage of consumers willing to buy irradiated food has more than doubled. Our findings indicate a considerable increase compared to that reported by Schutz et al. (31) who found in 1989 that 43% of consumers were likely to buy irradiated foods. The number of consumers who would not buy irradiated food has decreased by 56% in 2003. Giamalva et al. (12) in a series of experiments found that 68% of consumers were willing to pay an average amount of \$0.75 for an irradiated meat product.

When consumers were given brief statements about the benefits of irradiation on *Salmonella* and *Trichina*, a small percentage of consumers indicated that they would prefer

to buy non-irradiated meat (Table 5). In this study when presented with the benefit statement, most consumers would prefer to purchase irradiated poultry and pork. In 1993, only 47% and 48% of consumers were willing to purchase irradiated meat, poultry, and pork, respectively.

The amounts of produce, poultry, pork, beef and fish items consumers indicated they were willing to buy, if these foods were irradiated and properly labeled, remained unchanged from 1993 to 2003 (Table 6). Price was a big factor that was considered in decision making. More consumers stated that they would buy irradiated products if the price remained the same or if there was a 1-5% difference (Table 7). Only a few consumers were willing to pay 6-10% more. However, the difference in the percentages that consumers were willing to pay as compared to 1993 was insignificant. Fox and Olson (9) also found that consumers are more willing to buy irradiated products if they are offered at the same price or with a 10% discount than if they are offered at a 10% or 20% premium. Using a supermarket simulated test, a study by Resurreccion and Galvez (25) revealed the following inconsistency on irradiated ground beef: of the 44%

**TABLE 8. Consumer response on the necessity for irradiation in specific food products**

Food item	% Responding <sup>a</sup>						Level of significance <sup>b</sup>
	Very necessary		Somewhat necessary		Not necessary		
	1993	2003	1993	2003	1993	2003	
Fruits	12	44	34	40	54	16	<i>P</i> < 0.05
Vegetables	12	38	36	42	52	20	<i>P</i> < 0.05
Poultry products	41	6	32	35	27	59	<i>P</i> < 0.01
Pork products	40	4	33	38	27	58	<i>P</i> < 0.01
Beef products	32	4	37	45	31	51	<i>P</i> < 0.01
Seafoods	44	12	27	36	28	52	<i>P</i> < 0.05

<sup>a</sup>Consumer participation in survey: 1993 mailed survey (*n* = 446); 2003 survey of participants in a consumer acceptance sensory test (*n* = 50)

<sup>b</sup>Level of significance from chi-square analysis; NS = not significant at  $\alpha = 0.05$

of participants who stated in a survey that they would buy irradiated food, only 27% actually purchased the products. Among 16% who stated they would not purchase irradiated food, 5% did, and of the 41% who were undecided, almost half of them bought irradiated beef. In another supermarket simulation test, Rimal et al. (27) found further evidence of inconsistency between actual and intended purchase behavior.

#### Consumer response on the necessity for irradiation in specific foods

Consumers' opinions on the necessity of irradiation is shown in Table 8. The majority of consumers indicated that irradiation is very necessary for fruits only, somewhat necessary for vegetables and not necessary for meats and seafood. In this study, a total of 94% of consumers indicated that irradiation of poultry was either somewhat necessary or not necessary. This indicates a significant difference in the past years, from 59%. It is possible that educational programs have sufficiently informed consumers

about the benefits of fully cooking poultry, pork and beef to the point that consumers view irradiation as not necessary. Results of this study also showed a slight increase from the 1995 findings of Hashim et al. (15), that 84% of participants considered it somewhat or not necessary to irradiate raw chicken.

In conclusion, as in 1993, consumers are willing to purchase irradiated foods as long as its price does not increase. Consumers in 2003 are still more concerned with food safety issues such as bacteria, food additives and pesticide/animal drug residues than with irradiation. The study indicated consumers were less concerned with food irradiation in 2003 than in 1993, when the previous study was conducted. This also indicates that food irradiation presents a good alternative for maintaining food quality and safety as compared to recommendations for safe food handling such as thoroughly cooking poultry and meat products. Most consumers feel they are uninformed about the advantages of the irradiation process; thus with more education and greater exposure to irradiated products, most concerns should diminish.

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**NEW**

## Attention Students

Mark you calendar to attend the  
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# Improving the Safety of Queso Fresco through Intervention

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## SUMMARY

Raw milk Queso Fresco has been implicated in several foodborne illness outbreaks in the United States. Two styles of intervention, involving consumer and commercial Queso Fresco recipe development and distribution, are described. Such programs have contributed to educating both consumers and artisan cheesemakers about the risks associated with raw milk products and have been effective in helping to reduce the risk of foodborne illness in the state of Washington.

## INTRODUCTION

Although dairy foods are among the most highly regulated products in the United States, cheeses made from raw or improperly pasteurized milk or from milk with post-pasteurization contamination continue to be implicated in foodborne illness outbreaks (1, 5, 10, 21). Between 1973 and 1992, Mexican-style soft cheeses were more frequently associated with foodborne illness in the US than any

other type of cheese (1). Mexican-style cheeses, also called Hispanic-type or Latin-American cheeses, are particularly popular in the south and west, where a significant portion of the population is Hispanic/Latino (7). In 1998, approximately 11% of the US population was Hispanic/Latino (19), but the population had grown to 12.5% by the time of "Census 2000" (18). The Hispanic/Latino population in most states is growing. For instance, in 2000, 7.5% of the popula-

tion in Washington state was Hispanic/Latino, up from 6.2% in 1998, 6.0% in 1997 and 5.8% in 1996 (18, 19). For ten states, over 10% of the population is Hispanic/Latino, with the highest percentages in NM (42%), CA (32%), TX (32%), AZ (25%), NV (20%), CO (17%), FL (17%), NY (15%), NJ (13%), and IL (12%) (18).

The names of Latin-American cheeses are numerous and often depend on the place of origin. Latin-American cheeses most commonly found in the US include Queso Fresco ("fresh cheese") and Cotija (which ranges from soft like Feta to firm like Parmesan). Cheeses less commonly found in the US include Queso Blanco ("white cheese"), Queso Anejado ("aged cheese"), Queso de Crema ("cream cheese"), Queso de Presna ("pressed cheese"), Requeson (similar to ricotta), Queso de Puna (fresh skim milk cottage-type cheese), Queso de Bagaces (grating cheese), Queso Para Freir ("cheese for frying"),

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Queso Oaxaca, Queso Criollo, Queso de La Tierra, Queso de Estera, Queso del Pais, Queso de Maracay, Queso de Perija, Queso Descremado, Queso Llanero, Queso Huloso, Ranchero and Panela (13, 17).

Because of the high moisture content and high pH of most fresh Latin-American cheeses, pathogenic bacteria, if introduced into the cheese-milk or the cheese itself, can proliferate to high numbers (10, 14, 21). Experiments replicating the cheese manufacturing conditions have shown raw-milk Latin-American cheeses to be particularly risky because pathogens such as *Salmonella*, *E. coli* O157:H7 and *Listeria monocytogenes* may survive the curing process (1, 11). Genigeorgis et al. (11) reported that *L. monocytogenes* survived and proliferated in soft Queso Fresco, Panela, and Ranchero cheeses (brine 2.5–6.6%, pH 6.2–6.6) held at refrigeration temperature. In contrast, *L. monocytogenes* was unable to survive and proliferate in Cotija because of the combination of high brine (9.6–12%), low pH (5.5–5.6) and competitive starter microorganisms.

Pathogens including *Brucella melitensis*, *Streptococcus zooepidemicus*, *Salmonella* Typhimurium and *L. monocytogenes* have all been implicated in foodborne illness outbreaks associated with Mexican-style soft cheeses (1, 3, 8, 14, 21). In 1997, two outbreaks in California were linked to consumption of raw milk Mexican-style cheese contaminated with multidrug-resistant *Salmonella* Typhimurium DT104 (8). Illnesses of more than 100 people was attributed to *Salmonella* in Queso Fresco or Cotija cheese by unlicensed cheese makers in Gilroy and San Jose, CA (3). In an investigation of microbial populations in 100 soft Hispanic-style cheeses acquired by undercover agents from illegal vendors throughout California, the authors concluded that most of the cheeses presented a serious threat to public health due to

high aerobic plate counts and the presence of *Listeria* spp., reflecting unhygienic conditions during the processing and handling of the cheeses (12). In 1988, the Dairy Institute of California estimated that 40% of the soft Hispanic cheeses in California were manufactured and sold illegally (14).

## METHODS

In 1997, 89 cases of illness caused by *Salmonella* Typhimurium in Yakima County, WA, were linked to Queso Fresco made from raw milk (5, 6). An investigation was initiated by the Centers for Disease Control and Prevention on the basis of the rapidly increasing rates of salmonellosis in the county. For comparison, between 1990 and 1992 the mean incidence of human *Salmonella* Typhimurium infections in Yakima County, WA, was 5.4 cases per 100,000 person-years (21). In 1996 the number of cases increased to 29.7, and in 1997 to 64.8 cases per 100,000 person-years (21). During the same period of time, the incidence of culture-confirmed salmonellosis for the rest of Washington remained at 3.5 cases per 100,000 person-years (21). In a case-controlled investigation, infections with *Salmonella* Typhimurium in Yakima County were primarily (77%) associated with eating raw-milk Mexican-style soft cheese purchased from unknown street vendors, friends or relatives (21).

The alarming increase in the rate of foodborne illnesses motivated organization of the "Abuela Project" by Washington State University (WSU) Extension (5). The Abuela Project involved development of an acceptable recipe for making Queso Fresco with pasteurized milk, followed by recruitment and training of older Hispanic women to conduct safe cheese workshops. The safe cheese workshops targeted persons who made Queso Fresco at home with raw milk but also involved those who had never made the cheese at home. A

pamphlet, with words and pictures describing sanitation steps and how to prepare the Queso Fresco, was developed and translated into Spanish. The intervention objectives were to reduce illnesses resulting from the consumption of raw milk Queso Fresco while retaining the traditional, nutritious cheese in the diet. Abuelas (grandmothers) along with other educators have successfully introduced the pasteurized milk recipe to more than 1,000 Latin-Americans in Yakima County, WA, and neighboring counties. A beneficial outcome of the intervention is that *Salmonella* Typhimurium infections in Yakima County returned to pre-1992 levels following the intervention (21).

Skagit County, WA, Extension Faculty utilized the successful Abuela Project model to respond to a foodborne illness outbreak in Skagit County in December 2002. Eight confirmed cases of campylobacteriosis resulted from Queso Fresco made from unpasteurized milk. In March 2003, two nutrition educators from Yakima taught ten Skagit County volunteers (five of whom spoke Spanish) how to make Queso Fresco so that they could teach others in the community the safe method of making this cheese. By December 2003, 161 individuals had participated in classes (52% Hispanic). Only 11% of the class participants had previously made Queso Fresco, yet among Hispanic participants most had eaten Queso Fresco and knew people who made it.

Since June 2003, classes have been offered monthly to Hispanic WIC (Women, Infant, and Children nutrition education program) clients in Skagit County, where there are 2350 WIC clients, 1,640 of whom are Hispanic. Milk is a product received in the WIC program, even though it is not typically served as a beverage within the Hispanic population. Cheese making provides a useful alternative for utilizing the milk. In addition to the classes, a Queso Fresco educational display has been

presented at several community events such as Fiestas Patrias, farmers' markets, and health fairs. To date, 767 people have visited the display and tasted the Queso Fresco samples.

The Queso Fresco recipe that has been developed requires the use of a thermometer. This is not a common piece of equipment in most kitchens. In addition, many of the class participants are low income and are not inclined to purchase a thermometer. A donation from the Washington Dairy Products Commission provided funding to donate thermometers to all class participants.

The program has been received enthusiastically by women and children in Skagit County, confirming positive implications of the intervention. In addition to the classes for WIC clients, monthly programs are also offered to the public. The potential far-reaching effectiveness of this program should be stressed. Research at FoodNet sites from 1996 to 2000 showed that the incidence of listeriosis, often associated with consumption of raw dairy products, was higher among Hispanics than among non-Hispanics, particularly in infants and women of childbearing age (15). Lay and collaborators stressed the need for prevention strategies and educational campaigns that focus on protecting infants and women of childbearing age in the Hispanic community (15). The Skagit County WIC example is a good illustration of an effective strategy to reach this population.

The pasteurized milk Queso Fresco recipe created for home production has been widely accepted within Washington state. The printed materials and video (available at [www.pubs.wsu.edu](http://www.pubs.wsu.edu)) have been shared widely within the US and internationally.

An additional aspect of the intervention was targeted toward entrepreneurs interested in commercializing a safe and authentic Queso Fresco. Development of an authentic

commercial Queso Fresco is important not only because of the cheese's versatility and growing popularity, but also because increased availability of an acceptable commercial product may reduce the number of people who make the product at home with raw milk. However, when production of a home-cooked product is scaled up to the commercial scale, the home-style quality can be lost. Thus, a project was designed at WSU to determine the formulation and processing conditions necessary to produce a Queso Fresco acceptable to both traditional and non-traditional consumers (7).

Four batches of Queso Fresco cheeses were made in duplicate to compare consumer preferences (7). Untrained consumers (n = 395) at three Washington state locations noted how much they liked or disliked the cheeses. Thirty-three percent (33%) of the surveyed population was Hispanic and 45% of all those surveyed were familiar with Queso Fresco. Traditional consumers (either Hispanic or familiar with Queso Fresco) preferred high-salt/high pH cheeses more than non-traditional consumers did, while non-traditional consumers preferred low salt/low pH cheeses. Queso Fresco with 1.4–2.4% salt and a pH between 5.4 and 6.1 was acceptable to a wide range of consumers. Since the investigation, the commercial recipe has been modified to improve the texture of the final product. Additionally, the commercial recipe has been shared upon request and in two hands-on cheesemaking training sessions with Hispanic entrepreneurs prior to licensing and full-scale production.

## IMPACTS, INSIGHTS AND RECOMMENDATIONS

Bacterial proliferation is particularly likely in fresh, high-moisture, low acid Latin-American cheeses such as Queso Fresco. Thus, appropriate sanitation practices and pasteurization of milk are critical to minimize the

potential for foodborne illness. Not only should processing and marketing of high-risk cheeses be monitored to prevent threats to public health (12), but consumers should be educated about the risks associated with raw-milk cheeses. Banerjee and collaborators (2002) reported that Hispanics have a higher incidence of several foodborne diseases, including campylobacteriosis, listeriosis and salmonellosis, than other racial/ethnic groups. Investigations of outbreaks of the diseases revealed that several high-risk foods, including unpasteurized dairy products, were eaten more commonly by Hispanics than by other populations (4).

Diaz-Knauf et al. studied the effect of Hispanic consumer acculturation on concerns about food safety through the use of videos, questionnaires and focus groups (9). The authors concluded that there is a substantial lack of information by Hispanic consumers, regardless of acculturation, and suggested that bilingual educational programs on food safety would be appropriate for Hispanic consumers. The Abuela Project application in Yakima and Skagit counties demonstrated that the Hispanic population is interested in food safety education and that traditional practices can be modified through well-coordinated educational workshops.

In September 2003, "Quantitative Assessment of the Relative Risk to Public Health from Foodborne *Listeria monocytogenes* Among Selected Categories of Ready-to-Eat Foods" was released by the USDA and FDA (2, 20). The risk assessment documented that soft cheeses, previously classified as high-risk foods, are not in the high-risk category unless made from raw milk (2, 20). The report cites strong epidemiological evidence correlating Hispanic-style fresh soft cheese (Queso Fresco) with listeriosis (20). The relative risk classification was changed to reflect how relative risk can be reduced with effective food safety control programs to

reduce manufacture of cheese with raw milk (2). The revised recommendations to pregnant women, older adults, and people with weakened immune systems state that soft cheeses should not be eaten unless they are labeled as being made from pasteurized milk (2, 16).

## CONCLUSION

Because of their nutritional value and ease of production, cheeses like Queso Fresco have long been a regular part of the Latin-American diet. The growing Hispanic/Latino population in the US will likely increase the demand for such cheeses. Although Latin-American soft cheeses have been associated with foodborne illnesses, the potential to reduce the incidence of such illnesses through intervention and education is promising. Through research and development, effective interventions and food safety education programs, we can not only communicate the risks of consuming Latin-American soft cheeses made from raw milk, but also provide safe, tasty options to consumers. Hispanic cheeses can be made safely with pasteurized milk; thus there is no reason for anyone to suffer foodborne illnesses from cheese. Continued technical assistance to home and commercial cheese makers, as well as food safety education for cheese makers and consumers, is encouraged.

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# Comparison of the Bimetallic Coil Thermometer and Thermocouple for Validating Food Cooling

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## SUMMARY

An important food safety control procedure in retail food operations is safe cooling of food. Safe cooling, also called "food stabilization," has been defined by the USDA 9 CFR 318.17 as being < 1 log increase of *Clostridium perfringens* and no growth of *Clostridium botulinum* during cooling. The FDA Food Code requires that food be cooled from 140 to 70°F in 2 hours and 70 to 41°F in 4 more hours. The "official" thermometer that cooks use to monitor correct compliance with the Food Code is the bimetallic coil thermometer. Because there are no procedures in the Food Code, and no regulatory official has demonstrated a procedure for pans and pots of food, the purpose of this study is to determine if a bimetallic coil thermometer could be used with a pan of food 2 inches deep or a 1-gallon bucket of food to verify safe cooling.

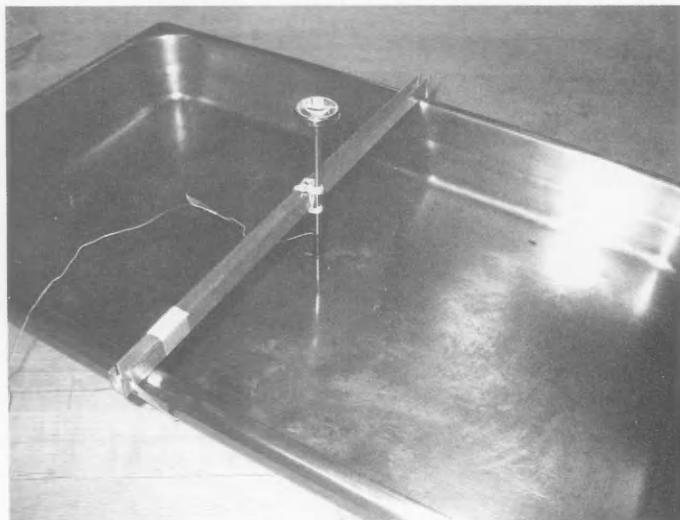
## INTRODUCTION

An important food safety control procedure in retail food operations is safe cooling of food. Safe cooling, also called "food stabilization," has been defined by the USDA 9 CFR 318.17 (1) as being < 1 log increase of *Clostridium perfringens* and no growth of *Clostridium botulinum* during cooling. These process standards are based on the work of Juneja et al. (3). In this study, hamburger was inoculated with *C. perfringens* and then cooled at various rates from 130 to 45°F. At the 15-hour rate, there was < 1 log growth of *C. perfringens*. The USDA has accepted this as verification that cooling from 130 to 45°F in 15 hours is safe. Note that from 130 to 40°F, if the temperature is extended to 40°F, the cooling takes about 22 hours in a 38°F refrigerator. Of course, *C. perfringens* does not multiply at temperatures below 50°F, and proteolytic *C. botulinum* does not multiply at temperatures below 50°F.

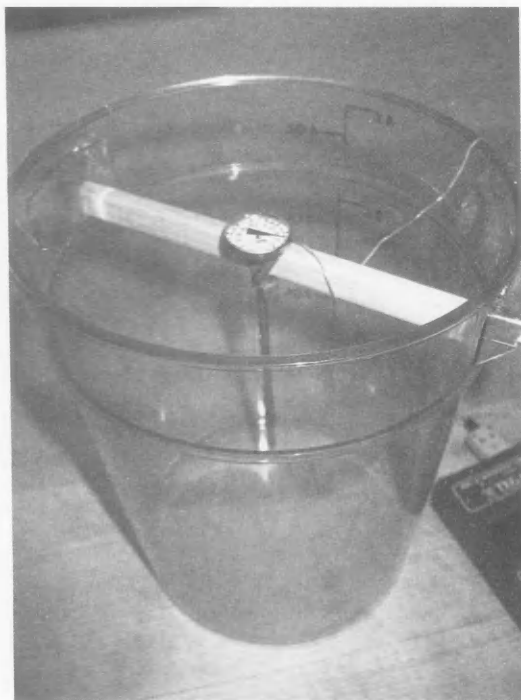
A peer-reviewed article

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**FIGURE 1.** Bimetallic coli thermometer in 2 1/2-inch pan



**FIGURE 2.** Bimetallic coli thermometer in 1-gallon bucket



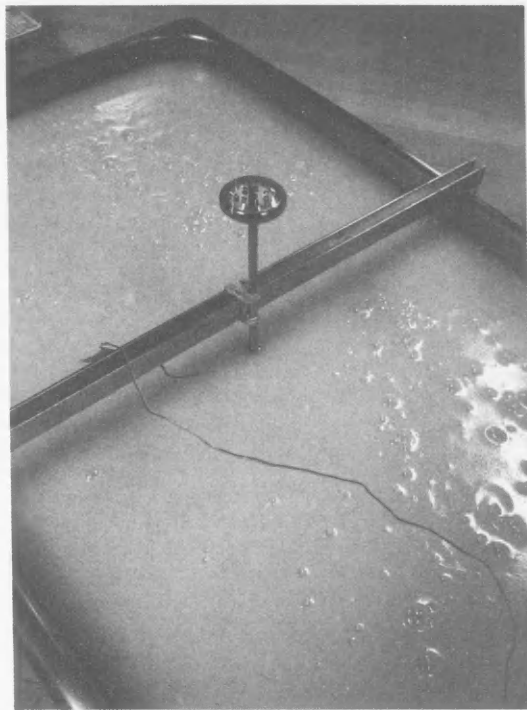
The FDA Food Code (2) requires that food be cooled from 140 to 70°F in 2 hours and from 70 to 41°F in 4 more hours. This is actually a straight-line cooling process when plotted exponentially, according to Pflug and Blaisdell (4), whereby log T center-T air is plotted vs. time. This 6-hour cooling time is a very difficult process standard to meet in typical NSF refrigerators, in which air flow is only 40 to 50 feet per minute. Studies have shown that, in a typical NSF walk-in or reach-in refrigerator, viscous foods cannot be more than 1 inch deep in a pan or be cooled in containers larger than 1 quart to meet this standard. A review of the scientific literature and inspection reports shows no evidence that health departments are actually performing cooling studies to verify 6-hour cooling in retail food operations. It is common to see food 2 inches deep or more in pans as well as food in 1-gallon or larger pots. A major reason for this lack of verification is that there is no specified monitoring procedure in the Food Code as to how restaurant operators or inspectors should measure / verify cooling in order to determine compliance, especially if the cooling is done in a pan or pot.

The "official" thermometer that cooks use to monitor compliance with the Food Code is the bimetallic coil thermometer. Since there are no procedures in the Food Code, and no regulatory official has demonstrated a procedure for pans and pots of food, the purpose of this study is to determine if a bimetallic coil thermometer could be used with a pan of food 2 inches deep or a 1-gallon bucket of food to verify safe cooling.

## **METHOD**

The research was conducted in a retail restaurant setting with an 8-foot-by-16-foot standard walk-in refrigerator. The food used was unflavored gravy, that is, water thick-

**FIGURE 3.** Unflavored gravy 2 inches deep in pan



**FIGURE 4.** Unflavored gravy at 4 quarts in bucket



ened with 7%-by-weight flour. This model food is inexpensive, is easy to use, and has the greatest specific heat of any food. This makes it an excellent food for doing cooling studies, because it simulates a maximum load for the refrigerator.

The bimetallic coil thermometers were purchased at a local grocery store. They were calibrated in ice water and at 160°F.

A 30-gauge chromal-aluminal thermocouple was taped to the stems of the bimetallic coil thermometers so that the sensing junction would be directly in the middle of the bimetallic coil, which stretches 2 inches up the stem. Therefore, the thermocouple wire junction was placed 1 inch from the tip of the bimetallic coil.

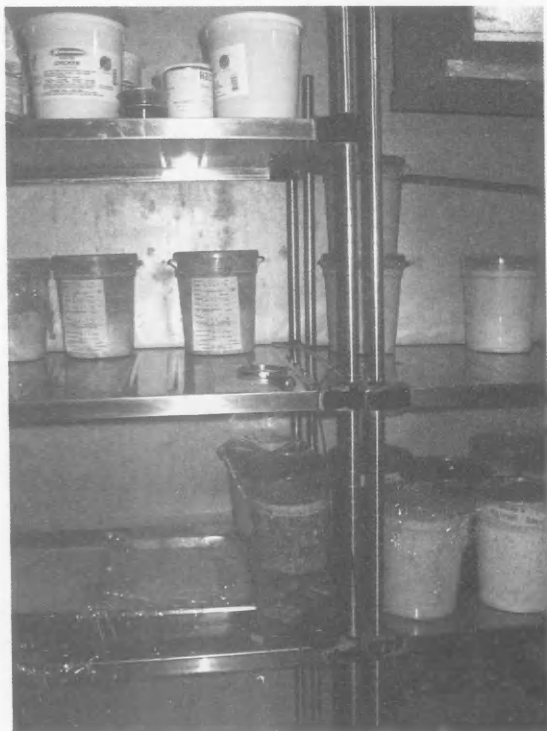
These devices were then placed in the 2½-inch pan and in the 1-gallon bucket, using brackets to hold the temperature-measuring units in the center of the food (see Figures 1 and 2).

In the pan, one end of the bimetallic coil was close to the bottom of the pan, and the other was at the top of the unflavored gravy. In the bucket, the unflavored gravy was 7¼ inches deep and 6½ inches in diameter at the half-depth. The bimetallic coil spanned from about 2⅞ inches from the bottom to 4⅝ inches from the bottom of the pot, in the geometric center.

The unflavored gravy was prepared by reserving 1 gallon of water to mix with the flour; then, to 3 gallons of boiling water was added the 1 gallon of water-flour slurry, to thicken it. The unflavored gravy was poured into the pan and into the bucket so that the gravy was 2 inches deep in the 2½-inch pan (Fig. 3) and came up to the 4-quart mark on the 1-gallon bucket (Fig. 4). The gravy in the bucket covered the entire stem of the thermometer so that the only part of the thermometer that showed was the very top of the dial.

The pan and bucket were covered with plastic food film and moved

**FIGURE 5.** Placement of pan and bucket in the walk-in refrigerator



**FIGURE 6.** Close-up view of bucket in the walk-in refrigerator



to the walk-in refrigerator. Figure 5 shows the placement of the pan and bucket in the walk-in refrigerator, underneath the refrigerator's fan and evaporator coil. Air flow was 40 to 50 feet per minute. Figures 6 and 7 are close-up views of the bucket and pan being cooled in the refrigerator.

The chef monitored the temperature by using a magnifying glass to read the dial thermometer and reading the display on the 2-channel digital thermocouple thermometer (Tegam, Model 821; Geneva, OH).

## RESULTS

Table 1 and Figure 8 show the results of the cooling study. The food in the pan, which started at the initial temperature of 137°F thermocouple temperature and 135°F bimetallic coil thermometer temperature, cooled to 41.6°F in 21.3 hours. In the same time, the food in the bucket cooled from 182°F thermocouple temperature to 43.8°F. The  $f_c$  or cooling rate, the time for 1 log reduction in temperature, was a safe 10 hours for the pan and 12.2 hours for the bucket. These times are shorter than the 13.2 hours corresponding to the  $f_c$  cooling rate of the 130-to-45°F safe cooling time (3). The refrigerator temperature averaged 41°F at the end of cooling, so it would not be possible to get to 41°F. These results are typical and similar to previous cooling studies in this refrigerator (5, 6, 7, 8).

The regression line of the cooling data showed a correlation of 0.99. The overall deviation of the thermocouple reading vs. the bimetallic coil thermometer was quite small, in spite of the fact that the bimetallic coil thermometer measures average temperature over the 2 inches of the sensor. The mean deviation for the bimetallic coil thermometer vs. the thermocouple in the pan was 0.11°F, with a standard deviation of about 4°F. In the bucket, the mean deviation between the two readings was 1.16°F, and the standard deviation was 2.24°F.

**TABLE 1. Dial Thermometer Cooling Study (Cooling air temperature = 41°F)**

Time (hours)	Pan Food depth = 2 inches			Bucket Food in 1 gallon bucket		
	Dial		Deviation	Dial		Deviation
	Thermometer	Thermocouple		Thermometer	Thermocouple	
	Temp. (°F)	Temp. (°F)	Temp. (°F)	Temp. (°F)	Temp. (°F)	
0.00	135	137.0	2.0	183	182.0	-1.0
1.00	116	121.2	5.2	169	168.0	-1.0
2.25	90	98.0	8.0	140	140.0	0.0
3.00	82	88.7	6.7	125	126.2	1.2
4.00	75	77.7	2.7	110	108.6	-1.4
6.00	68	65.3	-2.7	86	87.8	1.8
7.17	59	58.6	-0.4	80	76.4	-3.6
8.08	58	55.4	-2.6	68	71.0	3.0
9.08	56	52.9	-3.1	62	66.8	4.8
10.08	56	50.3	-5.7	61	61.5	0.5
11.08	50	48.7	-1.3	56	58.3	2.3
12.08	48	46.6	-1.4	52	55.0	3.0
13.25	48	45.7	-2.3	50	52.0	2.0
14.75	46	44.0	-2	47	49.0	2.0
21.33	43	41.6	-1.4	40	43.8	3.8
<b>Av. = 0.11</b>			<b>Av. = 1.16</b>			
<b>St. Dev.</b>			<b>St. Dev.</b>			
<b>3.95</b>			<b>2.24</b>			

This shows that, with these particular container geometries, one can use a bimetallic coil thermometer to measure average temperature of a viscous food, and this will provide accurate cooling measurement.

**DISCUSSION**

The minimum volume of food that can be tested with the bimetallic coil thermometer is food 2 inches deep, because this is the length of the bimetallic coil sensor. In this particular study, 2-inch-deep food in a

pan took 21 hours to approach 41°F. This is far in excess of the Food-Code-allowed 6 hours. Previous studies, using thermocouples in the center of food to measure cooling, have shown that cooling within 6 hours is achievable in an NSF refrigerator with 40-to-50-feet-per-minute air flow when the food is no more than 1 inch deep in the pan.

A smaller volume of food could be cooled in the bucket within 6 hours, but this volume, which has not been determined, would likely be very small.

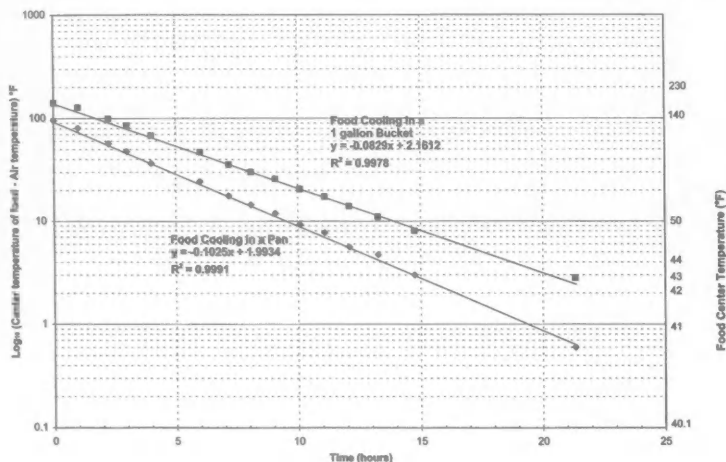
**CONCLUSIONS**

This study has shown that an accurate cooling curve can be plotted for pans of viscous food (e.g., sauces, gravies) with the food 2 inches deep or for 1-gallon buckets of food in the refrigerator, using a bimetallic coil thermometer. The actual cooling times for these two containers far exceeded the Food Code allowance of 6 hours but met the USDA standard for cooling from 130 to 45°F in 15 hours. This unflavored gravy "cooled safe."

**FIGURE 7.** Close-up view of pan in the walk-in refrigerator



**FIGURE 8.** Food cooling in a pan and a 1-gallon bucket



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# Gary R. Acuff

## Elected IAFP Secretary



The International Association for Food Protection welcomes Gary R. Acuff to the Executive Board as Secretary. Dr. Acuff will take office at the conclusion of the Awards Banquet at IAFP 2004, the Association's 91st Annual Meeting in Phoenix, Arizona. By accepting this position, he made a five-year commitment to the Association and will begin his term as President in 2007.

Dr. Acuff currently holds the title of Professor of Food Microbiology and serves as the Section Leader for Food Science in the Department of Animal Science at Texas A&M University. He has been a member of the faculty for 18 years, and in 2001 was designated a Faculty Fellow for research leadership in the Texas Agricultural Experiment Station.

Dr. Acuff's research has focused on improving the microbiological quality and safety of beef in all areas of production and utilization, including cattle feeding and holding, slaughter/processing, fabrication, cooking, packaging, retail distribution, and consumer handling.

Additional research interests have included characterizing the presence of *Campylobacter jejuni* in turkey processing, improving shelf life of Texas Gulf shrimp, evaluating the heat resistance of *Escherichia coli* O157:H7 in hamburger patties, determining the significance of *Helicobacter pylori* in food and, recently, several research projects have investigated microbiological hazards associated with fresh produce in Texas and Mexico. Dr. Acuff has authored or co-authored over 80 research publications in refereed scientific journals and 10 chapters in various references and textbooks. He recently served on the Editorial Committee of the 4th edition of the *Compendium of Methods for the Microbiological Examination of Foods*.

Since joining the food science teaching faculty at Texas A&M University, Dr. Acuff has taught graduate and undergraduate food microbiology courses and has participated as a team instructor in courses on the Hazard Analysis Critical Control Point (HACCP) system. He served as Chair of the Intercollegiate Faculty of Food Science from 1994 to 1997. In the 13 years that he has been teaching undergraduate food bacteriology, over 3,500 students have taken his class (and most have passed!). Dr. Acuff currently supervises several graduate students, and over his career has served as major professor for 20 students seeking a Master of Science and 8 students pursuing a Doctor of Philosophy.

Dr. Acuff was appointed to the National Advisory Committee on Microbiological Criteria for Food (NACMCF) in 1992 and continued to serve as a member for six years. He is an active member of the American Society for Microbiology and was elected to chair the Food Microbiology Division (Division P) in 1999. Dr. Acuff is also a member of the Institute of Food Technologists and the Society for Applied Microbiology. He has been a member of IAFP since 1982, has served on the Program Committee since 2001, and is currently the Program Committee Chair for the 2004 Annual Meeting in Phoenix, Arizona. He also is a member of the Meat and Poultry Safety and Quality Professional Development Group (PDG). Dr. Acuff has participated as a member of the Editorial Board of the *Journal of Food Protection* since 1994.

Dr. Acuff obtained his B.S. in Biology from Abilene Christian University in 1980 and his M.S. and Ph.D. in Food Science and Technology, specializing in Food Microbiology, from Texas A&M University in 1982 and 1985, respectively.

## Congratulations!



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*The education provider for National Food Processors Association*

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# Highlights of the Executive Board Meeting

April 28–30, 2004

Following is an unofficial summary of actions from the Executive Board Meeting held at the IAFP Conference Room and Four Points Hotel in Des Moines, Iowa on April 28–30, 2004:

## Approved the following:

- Minutes of January 18–19, 2004 Executive Board Meeting
- Minutes of January 19, 2004 Executive Board Executive Session
- Appointment of Edmund Zottola as *FPT* Scientific Editor
- Budget for Fiscal Year Ending August 31, 2005
- Appointment of Jon Lauer to the 3-A Steering Committee
- Honorary Life Membership for Harold Wainess

## Discussed the following:

- E-mail votes taken since the last meeting
- Publication of papers from ILSI symposia at IAFP 2002 and IAFP 2003
- Publication of a paper from the ILSI symposium on immunocompromised populations
- OFAC ban on publication of manuscripts from trade embargoed nations
- Nonprofit journals group-marketing of journals
- Financial statements for period ending February 29, 2004
- Affiliate award recipients selected
- Affiliate educational session and sponsorship
- New Affiliates in progress – Arizona and Japan
- Committee appointments
- Awards Committee report
- International Leadership Award judging criteria
- Developing Scientist Oral Award to be given in honor of Carl Vanderzant at IAFP 2004
- IAFP 2004 planning and program. Organize session on BSE
- IAFP 2004 recording of sessions. Defer until IAFP 2005 if survey results support recording of sessions
- Add badge scanning capabilities for exhibitors at IAFP 2004
- Move forward with contract negotiations for IAFP 2007

- Co-sponsorship results of Michigan State University's First World Congress on the Safety of Organic Food
- Results of exhibiting at Food Safety Summit
- Results of sponsoring a session at Food Safety Summit
- Pass participation in fall 2004 Food Safety Summit
- Future exhibit at AOAC International
- 3-A Sanitary Standards, Inc.
- World Health Organization, Non-Governmental Organization status
- European Meeting
- Fi Food Safety and Hygiene, Amsterdam, November 2004
- Foundation permanently restricted contribution
- Established the Food Safety Innovation Award to begin at IAFP 2005
- Code of Ethics
- Annual Meeting negotiation and pricing strategies
- NSF Food Safety Leadership Awards program
- 2006 Conference for Food Protection-cosponsor pre-meeting workshop
- IAFP representative to AMHIC
- New materials for IAFP prospective and new Member packages
- European meeting

## Received the Following Reports:

- *FPT* and *JFP* status reports
- Membership update
- Advertising update
- Past and scheduled attendance by Board Members at Affiliate meetings
- Spring Affiliate Newsletter

In addition, the Executive Board and IAFP staff held a daylong, future planning session on April 29, 2004.

Next Executive Board meeting: August 6, 2004.



# Call for Symposia

## IAFP 2005

August 14-17, 2005

Baltimore, Maryland

The Program Committee invites International Association for Food Protection Members and other interested individuals to submit a symposium proposal for presentation during IAFP 2005, August 14-17, 2005 in Baltimore, Maryland.

### WHAT IS A SYMPOSIUM?

A symposium is an organized, 3 1/2 hour session emphasizing a central theme relating to food safety and usually consists of six 30-minute presentations by each presenter and a 30-minute break. It may be a discussion emphasizing a scientific aspect of a common food safety and quality topic, issues of general interest relating to food safety and quality, a report of recent developments, an update of state-of-the-art materials, or a discussion of results of basic research in a given area. The material covered should include current work and the newest findings. Symposia will be evaluated by the Program Committee for relevance to current science and to Association Members. Proposals may be prepared by individuals, committees, or professional development groups.

### SUBMISSION GUIDELINES

To submit a symposium, complete the Symposium Proposal form in its entirety. When submitting a proposal, the presenters do not need to be confirmed, only identified. Confirmation of presenters takes place after acceptance of your symposium.

### SYMPOSIUM PROPOSAL DEADLINE

Proposals may be sent to the Association office no later than August 2, 2004 or be presented to the Program Committee at its meeting on Sunday, August 8, 2004 in Phoenix, Arizona.

The Program Committee will review submitted symposia. Organizers will be notified as to the status of their proposal by September 2004. Symposia will be accepted for further development or rejected. Accepted symposia are required to be finalized and sent to the IAFP office by January 11, 2005. The Program Committee has the final decision whether the finalized symposia will be accepted for presentation at IAFP 2005. The organizer will be notified of the final results by February 2005.

### PRESENTERS WHO ARE NOT MEMBERS

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

### ASSOCIATION FOUNDATION SPONSORSHIP

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

### HAVE AN IDEA BUT YOU ARE UNABLE TO ORGANIZE IT?

Many Association Members have excellent suggestions for symposia topics, but are unable to organize the session. Such ideas are extremely valuable and are welcome. If you have an idea for a symposium topic, please contact Bev Brannen. Symposia topics are among the most valuable contribution an Association Member can make to enhance the quality of our Annual Meeting.

### WHO TO CONTACT:

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



# Symposium Proposal

## IAFP 2005

August 14-17, 2005

Baltimore, Maryland

Title: \_\_\_\_\_

Organizer's Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ E-mail: \_\_\_\_\_

Topic – Suggested Presenter, Affiliation

(Example: 1. HACCP Implementation – John Smith, University of Georgia)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_

Suggested Convenors: \_\_\_\_\_

Description of Audience: \_\_\_\_\_

Signature of Organizer: \_\_\_\_\_

**Submit by August 2, 2004 to:**

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

**Submit in person on August 8, 2004 to:**

Program Committee – IAFP 2004  
Phoenix, Arizona

**or Contact:**

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



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# NEW MEMBERS

## AUSTRALIA

**Maggie H. Rikard-Bell**  
Radiometer Pacific Pty. Ltd.  
Maroubra, Sydney

## CANADA

**Monique Lacroix**  
INRS  
Laval, Quebec

**Ron W. Pillidge**  
Aspen Health Services  
Westlock, Alberta

## NEW ZEALAND

**Andrew Prest**  
Frucor Beverages  
Manukau City

## SOUTH KOREA

**Hyung H. Hyun**  
Hankuk University of Foreign Studies  
Yongin City, Kyungki-Do

## UNITED KINGDOM

**Stephen J. Forsythe**  
Nottingham Trent University  
Nottingham, Nottinghamshire

## UNITED STATES

### CALIFORNIA

**Philip Chang**  
Columbus Salame  
South San Francisco

**Dennis D. Crenwelge**  
Foster Farms  
Turlock

**Tracey Nie**  
Nasser Company, Inc.  
Yorba Linda

**Maria T. Pelt**  
Family Health Services  
San Diego

**Byoung W. Yoo**  
Premier Food Safety  
Los Angeles

### FLORIDA

**Albert R. Green**  
Six L's Packing Co., Inc.  
Immokalee

### GEORGIA

**C. Harold King**  
Chick-fil-A, Inc.  
Atlanta

### MISSISSIPPI

**Stan R. Welch**  
Mississippi State Dept. of Health  
Jackson

### NEW YORK

**Edmund Maguire**  
LiDestri Foods, Inc.  
Fairport

### OHIO

**Elizabeth A. Hoffman**  
Columbus Health Dept.  
Columbus

### TENNESSEE

**Omaira Ahmed**  
The University of Tennessee-Knoxville  
Knoxville

**Dave Higgins**  
Sanford Group  
Nashville

**David Rasmussen**  
University of Tennessee  
Knoxville

### WISCONSIN

**Glenn A. Goldschmidt**  
Wisconsin Dept. of Agriculture  
Madison

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# NEW SUSTAINING MEMBERS

## SILVER

**Luc Lavigne**  
Warnex Diagnostics Inc.  
Laval, Quebec, Canada

**Suzanne Y. Barris**  
Wilshire Technologies  
Carlsbad, California

# UPDATES

## Moran Becomes Chair of IAFIS Board of Directors—New Officers and Directors Elected

Jean Moran, CEO and chair of the Board, Label Makers, Inc., Pleasant Prairie, WI, presided over her first annual conference as chair of the International Association of Food Industry Suppliers (IAFIS) Board of Directors March 25–28. Moran, the first woman to serve as IAFIS Board chair, will fulfill a two-year term as leader of the 22-member board.

Ms. Moran was first elected to the IAFIS Board in 1999 as an at-large member, and has served on a number of committees including the Executive, Strategic Planning, Compensation & Benefits, Audit, Nominating and Investment Advisory Committees. Ms. Moran also chaired IAFIS' recent Presidential Search Committee. For the past four years, Ms. Moran has chaired the Finance and Investment Committee, tapping into her experience as a certified public accountant. Ms. Moran also chaired the Awards and Recognition Committee. Additionally, Ms. Moran is a member of the IAFIS Foundation Board of Directors.

Along with Moran, the IAFIS Board chose Viggo Nielsen, Tampa, FL, as chair-elect, and Ivan Larsh, Charlotte, NC, as treasurer. Each will serve a two-year term in these Board leadership roles.

IAFIS members elected two new directors and reelected four directors to the Board during the IAFIS 2004 Annual Conference in Scottsdale, AZ.

Of the six seats available this year on the IAFIS Board of Directors, two were industry segment director seats and four were at-large seats.

Each of the following directors will serve a three-year term:

Lou Beaudette, Manchester, NH, was re-elected as the processing segment director; David Bryant, Roswell, GA, was re-elected as the support services segment director; Gunther Brinkman, Columbus, OH, was elected as an at-large director; Bill Wilson, Fultonville, NY, was elected as an at-large director; Tom Riggins, Davenport, IA, was re-elected as an at-large director; and John Rooney, Cedar Rapids, IA, was re-elected as an at-large director.

## Earth Tech Announces New Executives Appointed to Senior Management Team

Earth Tech Inc., has announced new appointments to its senior management team.

Alan P. Krusi, who joined Earth Tech as president last fall, has appointed Jeffrey Kissel, chief financial officer; Gary Beswick, vice president, safety, health and environment; and Frank Pollare, vice president, corporate communications. All three executives report to Krusi.

Prior to joining Earth Tech, Kissel held a variety of senior finance executive positions, including chief financial officer and strategic planner at several Fortune 500 companies.

Beswick brings more than 20 years safety and health experience to Earth Tech. Previously, he was director of safety and health for URS Corporation's Construction Services Division. Prior to that, he held senior level positions with Dow Environmental Inc. in the company's Capital Assets, Health & Safety and Remediation operations, and with Tetra Tech-NUS (formerly NUS Corporation) in similar roles.

Pollare has more than 25 years experience in a variety of communications positions. He was corporate director of public relations for Computer Sciences Corporation, a global technology services company, and before that he held management positions with Shandwick International.

## Rod Wheeler Named Director of Food Security Programs for NFPA

The National Food Processors Association (NFPA) has announced that Rod Wheeler has been named director of Food Security Programs for the Association.

In this newly created position, Wheeler will oversee NFPA's security activities (including but not limited to food security and other issues related to personnel, property and product security), and will serve as staff liaison to NFPA's Security Council.

Before joining NFPA's staff, Wheeler served as manager of corporate security and safety with Boston Market, brand partner of McDonalds Corporation. He served previously as a fraud investigator for the attorney general for the State of Ohio, and as a homicide and death investigator in the Washington, D.C. Police Department.

Wheeler received a Key Executive Master's degree in public administration from American University, and a B.A. from Ohio State. He is an active member of the American Society of Criminal Justice, the American Society of Law Enforcement Trainers, and the American Society of Industrial Security.

# UPDATES

## **Chr. Hansen Names New Appointments**

**L**inda Sweek joins Chr. Hansen, Inc., as manager, communications and PR, and will develop and implement public relations, advertising and promotional programs, as well as manage all communication activities for the company in North America. Her responsibilities will include strategic planning, managing publication advertisements in support of all product lines, and building and strengthening relationships with the media. She holds a BA in professional communication from Alverno College in Milwaukee, WI.

Luc Monbourquette joins Chr. Hansen, Inc., as territory manager for the company's food and beverage, meat and prepared foods, and human health and nutrition business areas. Mr. Monbourquette will provide sales service and support to customers in Ontario, Canada.

Mr. Monbourquette has spent nearly ten years in the food, pharmaceutical, human nutrition and animal nutrition industries. He holds a BS in biochemistry from the University of Laurentian, Sudbury, Ontario.

Marcel Veilleux joins Chr. Hansen, Inc., as territory manager for the company's animal health and nutrition business. Mr. Veilleux will provide sales service and support for silage inoculants and direct fed microbials to customers in Quebec and eastern Canada.

Mr. Veilleux has spent over 28 years within the agricultural industry, and has extensive experience in animal health and nutrition sales.

## **Fearn Named Chair of IAFIS Foundation Board — Three New Directors Appointed, One Reappointed**

**T**he Foundation of the International Association of Food Industry Suppliers' (IAFIS) Board of Directors named John Fearn, New Lisbon, WI, as its new chairman at its March 24 meeting in Scottsdale, AZ.

As chairman, Fearn will preside over the Foundation's 11-member Board of Directors. Fearn has been active in IAFIS since 1996, serving as Annual Conference Committee chair from 2001–2004. He is a former member of the IAFIS Board of Directors, and has served on the Foundation Board since 2001. Fearn was a member of the Foundation Board's Scholarship and Special Projects Committees, and served on the IAFIS Education and International Marketing and Trade Committees.

Along with Fearn, the Foundation Board appointed Bob Sprinkman, Franksville, WI, as its new treasurer. Sprinkman, now serving his second term on the Foundation Board, is actively involved in many aspects of the industry. He is a member of the 3-A Technical Committee for HTST, HHST, UHT and Cleanability, and served on the Foundation Board's Collegiate Contest Committee. Sprinkman is a former member of the IAFIS Board of Directors (1998–2001), and chaired the IAFIS Membership Committee.

Three new directors were appointed to the Foundation Board: Larry Korf, St. Cloud, MN; John Miller, Dublin, OH; and Kirk Spitzer, Richmond, VA. Jack Luechtefeld, president, St. Louis, MO, was reappointed to the Board. All will serve three-year terms.

## **Jonathan Davis Joins Bell Laboratories, Inc. as Technical Sales Representative for Mid-Atlantic**

**J**onathan Davis recently joined Bell Laboratories, an exclusive manufacturer of rodent control products, as the technical sales representative for the Mid-Atlantic. His territory consists of Pennsylvania, Virginia, New Jersey, Maryland, West Virginia and Delaware.

As technical sales representative, Davis attends trade shows and consults with distributors and pest management professionals. He also provides technical assistance by visiting rodent infestation sites with PMPs. Based out of Norristown, PA, Davis has over eight years of sales and management experience, involved in such tasks as calling on end users, conducting hands-on product training, and performing site inspections. Davis previously worked as account executive for Johnson Wax, and as district manager for Unisource.

Davis earned an MBA from Widener University, Chester, PA, and a BS in business administration from Pennsylvania University, Philadelphia, PA.

**Visit our Web site  
[www.foodprotection.org](http://www.foodprotection.org)**

## City of Fort Worth Selected 2004 Crumbine Award Winner

The City of Fort Worth, Texas, Public Health Department has been selected as the recipient of the 2004 Samuel J. Crumbine Consumer Protection Award for Excellence in Food Protection.

The Crumbine Award, named for one of the United States most renowned public health sanitarians, is presented to a local public agency by a jury of leading environmental health officials and public health sanitarians. The Crumbine Award is the most prestigious recognition that a public health agency can receive. Agencies that win the Crumbine serve as models for other public health and safety programs across the nation.

"The jury was very impressed with Fort Worth's ability to identify the challenges for their program and to come up with innovative ways in which to meet them — particularly under the budget constraints that many departments are faced with today," explained Pete Giesen of the Olmsted County, Minnesota Public Health Services and chair of the 2004 jury.

Fort Worth will receive the Crumbine Award at the Annual Conference of the National Environmental Health Association, May 9–12 in Anchorage. Award presentations will also be made at the annual meetings of the National Association of County and City Health Officials, July 14–16 in St. Paul and the International Association for Food Protection, August 8–11 in Phoenix.

The Crumbine Award is supported by the Conference of Food Protection, in cooperation

with the American Academy of Sanitarians, American Public Health Association, Association for Food and Drug Officials, Foodservice and Packaging Institute, Inc., International Association for Food Protection, International Food Safety Council, National Association of County and City Health Officials, National Environmental Health Association, National Sanitarian Foundation International, and Underwriters Laboratories Inc.

## Contaminated Produce Tops Food Poisoning Culprit: More Food- Safety Measures Needed on Farms, Says CSPI

An analysis of more than 3,500 food-poisoning outbreaks shows that contaminated produce is responsible for the greatest number of individual foodborne illnesses. The Center for Science in the Public Interest (CSPI) still enthusiastically recommends eating more fresh fruits and veggies, not less. But it also recommends instituting better food-safety practices on farms in America and abroad to help reduce the risk to consumers.

"Dirty irrigation water and the use of untreated manure can help spread animal pathogens to fruits and vegetables. While consumers can help minimize risk by careful washing, much of the responsibility for food safety must begin right on the farm," said CSPI food safety director Caroline Smith DeWaal.

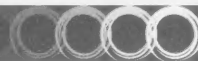
In November 2003, an outbreak of Hepatitis A was traced back to green onions imported from Mexico. The outbreak resulted in 555 illnesses and 3 deaths — many of which CSPI says could have been prevented with better practices on

the farm and a more responsive surveillance system.

Although produce was responsible for the most individual cases of foodborne illness, seafood was responsible for the largest number of outbreaks. Fish can harbor naturally occurring toxins, such as scombrototoxin or ciguatoxin, while shellfish can play host to microbial hazards such as *Vibrio* bacteria or Noroviruses. CSPI has long urged the Food and Drug Administration (FDA) to increase its inspections of seafood processors, to implement testing programs, and to ban the sale of untreated Gulf Coast oysters during the summer months.

Poultry, beef, and eggs caused roughly the same number of outbreaks and illnesses. As with produce, CSPI says much of the problem can be traced back to the farm. For instance with poultry and eggs, reducing crowding and increasing testing of flocks can help control *Salmonella*. "The Bush administration should quickly take action to mandate on-farm controls that could virtually eliminate the risk of *Salmonella* in eggs. No federal agency with food-safety responsibilities focuses on farms," DeWaal said. "A single food safety agency, with new emphasis on improving on-farm practices, could help reduce many foodborne hazards and eliminate others altogether."

From 1990 to 2003, CSPI's Outbreak Alert! found that: Seafood caused 723 outbreaks and 8,071 cases of illness. Produce caused 432 outbreaks and 25,823 illnesses. Poultry caused 354 outbreaks and 11,894 illnesses. Beef caused 343 outbreaks and 10,872 illnesses. Eggs caused 309 outbreaks and 10,750 illnesses. Multi-ingredient foods, where the contaminated ingredient was not identified, were linked to 601 outbreaks and 18,006 illnesses.



Besides pushing for a single food-safety agency and on-farm improvements, CSPI recommends that the Centers for Disease Control and Prevention (CDC) continue to improve its reporting and surveillance of foodborne illness outbreaks.

### Diagnosis and Management of Foodborne Illnesses: A Primer for Physicians and Other Health Care Professionals

Foodborne illness is a serious public health problem. CDC estimates that each year 76 million people get sick, more than 300,000 are hospitalized, and 5,000 die as a result of foodborne illnesses. Primarily the very young, the elderly, and the immunocompromised are affected. Recent changes in human demographics and food preferences, changes in food production and distribution systems, microbial adaptation, and lack of support for public health resources and infrastructure have led to the emergence of novel as well as traditional foodborne diseases. With increasing travel and trade opportunities, it is not surprising that now there is a greater risk of contracting and spreading a foodborne illness locally, regionally, and even globally.

Physicians and other health care professionals have a critical role in the prevention and control of food-related disease outbreaks. This primer is intended to provide practical and concise information on the diagnosis, treatment, and reporting of foodborne illnesses.

### AAFC Supports On-Farm Food Safety Implementation

Agriculture and Agri-Food Canada (AAFC) is investing \$80 million over four years

to help producers implement food-safety systems under the Canadian Food Safety and Quality Program (CFSQP).

"This program will help Canadian producers meet or exceed market demands for food safety and quality. From the field to the fork, the Canadian food safety system is, and continues to be, second to none," said Agriculture and Agri-Food Minister Bob Speller.

This part of the program has two main components — the first will provide \$8.2 million to national producer organizations to deliver workshops to help producers better understand on-farm food safety systems, and the second will provide \$61.5 million to producers to help them implement these systems. The remainder of the funds will support administration of these components by national producer organizations and AAFC.

"The industry has shown leadership in the area of on-farm food safety. Nineteen national producers organizations are developing on-farm food safety programs. We can be proud of the work they have accomplished," added Mr. Denis Paradis, Minister of State (Financial Institutions).

This initiative expands on the \$62 million for the first component of the CFSQP announced on December 10, 2003 which provided industry with funding to develop on-farm food safety systems specific to their commodity, such as traceability and Hazard Analysis Critical Control Point (HACCP). This new initiative further strengthens the rigor and consistency in Canada's application of food safety, quality and traceability measures by implementing these systems on individual farms.

Under this program, producers will receive benefits of workshops valued at \$100 per producer. In addition, under the direct support to producers, up to \$750 per producer will be available for

technical support to adapt and implement food safety systems and/or purchase specialized equipment.

Producers will be able to access these funds and participate in the workshops through their national producer organizations.

"This on-farm component of the CFSQP will enhance the reputation of Canadian producers, at home and abroad, as important contributors to our seamless food safety systems," added Mr. Speller.

Under the Agricultural Policy Framework, federal, provincial, and territorial governments agreed to support industry-led development and implementation of food safety, quality and traceability systems.

### Poultry Probiotics — Discovery for UK Chicks

UK scientists have discovered a new way to combat food poisoning, by targeting it in living animals using beneficial bacteria. Probiotics provide fresh hope for destroying food poisoning bacteria in poultry before it enters the food chain.

Scientists at the Institute of Food Research (IFR) have discovered that the probiotic *Lactobacillus johnsonii* clears the pathogenic bacterium *Clostridium perfringens* from the gut of chicks. This bacterium can cause lesions in chicks as well as causing food poisoning in humans.

"Some poultry feed already contains probiotic bacteria, but an undefined mixture that gives inconsistent results. This research is exciting because we have used a single strain and shown that it can be targeted to eliminate a specific pathogen," said Dr. Arjan Narbad, research scientist at the Institute of Food Research (IFR). The probiotic also reduced colonization of the small intestine by *E. coli*, but did not clear it completely.





The scientists screened thousands of "commensal" bacteria from the adult chicken gut to identify strains that might competitively exclude "bad" bacteria. *Lactobacillus johnsonii* showed particular promise, and the IFR teamed up with the Veterinary Laboratories Agency to test its potential.

"For decades we have known that naturally-occurring bacteria in adult chickens can prevent pathogens from colonizing in younger birds, whose gut flora is not yet well developed. But we have not known which bacteria are most effective," said Dr. Narbad. "We are particularly pleased to have identified a strain to combat *Clostridium perfringens* because it can not only cause food poisoning in humans, but can cause illness in chicks."

*Clostridium perfringens* is naturally present in the chicken gut, normally without causing disease. Sometimes the bacteria produce toxins, and scientists believe these are what cause the disease necrotic enteritis.

Necrotic enteritis has a number of symptoms in poultry, including poor weight gain and ulcers. In humans it causes intense abdominal cramps and diarrhea, sometimes accompanied by vomiting.

British and European farmers are being encouraged to reduce their use of antibiotics in animal feed, and this research provides one viable alternative. Probiotic bacteria could have additional health benefits for poultry, such as stimulating the immune system and improving the rate of growth.

### **Bottled Water: Stringent Federal, State and Industry Standards Help Ensure Safety, Quality and Good Taste**

**N**ewly released statistics by Beverage Marketing Corporation show US

bottled water sales and consumption continuing to rise as consumers increasingly choose bottled water over other commercial beverages. This upward trend was reflected in 2003 category volume of nearly 6.4 billion gallons, a 7.5 percent increase over 2002, and a 2003 bottled water consumption level of 22.6 gallons-per-capita, compared to 21.2 gallons-per-capita the previous year. These statistics demonstrate continued consumer demand and appreciation for the convenience and good taste of bottled water brands consumed on-the-go, during exercise, at restaurants or meetings, and at home or the office. However, consumers should also know that bottled water safety and quality result from multiple layers of regulation and standards at the federal, state and industry levels.

The US Food and Drug Administration (FDA) fully regulates bottled water as a packaged food product with stringent standards for safety, quality, production, labeling, and identity. State governments also regulate bottled water and, for members of the International Bottled Water Association (IBWA), the industry upholds additional standards through the IBWA Model Code, which are verified through annual, unannounced plant inspections by an independent, third-party organization.

Along with FDA's Good Manufacturing Practices (GMPs) required of all foods, bottled water has several other applicable regulations including Standards of Identity, Standards of Quality and additional, specific bottled water GMPs. Being a packaged food product, bottled water is also bound by the Nutrition Labeling Education Act (NLEA) and the full range of FDA protective measures designed to enforce product safety and protect consumers. States may also mandate additional bottled water standards and also serve to inspect, sample, analyze and approve bottled water

sources. Testing laboratory certification is another area where states may regulate bottled water. As part of the IBWA Model Code, IBWA members voluntarily utilize the principles of HACCP (Hazard Analysis Critical Control Point) for a science-based approach to bottled water production and safety. FDA recognizes HACCP as a key component of food safety and consumer protection.

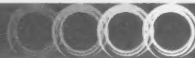
"While all beverages have their place in a marketplace with an abundance of drink choices," says Stephen R. Kay, IBWA vice president of communications, "consumers are choosing bottled water as a refreshing, hydrating beverage and as an alternative to other drinks that may contain calories, caffeine, sugar, artificial colors, alcohol or other ingredients."

For an overview of bottled water regulations and standards and other bottled water information, visit the IBWA Web site at [www.bottledwater.org](http://www.bottledwater.org).

### **Beware the En Route Smorgasbord: Survey by American Dietetic Association and ConAgra Foods Foundation Finds Many Travelers Risk Food Poisoning**

**C**ompared with a year ago, a third more Americans will be "carrying on" meals and snacks from home this summer when traveling via plane, train or automobile. Yet most families take detours around simple home food safety precautions that can keep travel treats from spoiling even the best-laid family vacation plans.

A new survey from the American Dietetic Association and ConAgra Foods Foundation shows that of the more than 60 percent of



people who say they plan to take one or more vacations this season: (b) 52 percent are traveling by plane. Nearly 40 percent plan to bring food with their carry-on bags, and more than 60 percent plan to bring food if the airline does not provide it. 90 percent are traveling by car, and 97 percent of them will bring food. 22 percent of those traveling by bus and 19 percent of train travelers plan to pack food to eat en route.

"More than ever, families are toting food from home when they set out for vacation. This could be a reflection of the continual tightening of family pocketbooks; the availability of new convenient car-friendly foods; or even airlines' elimination of in-flight meals," says Carolyn O'Neil, registered dietitian and national spokesperson for the ADA/ConAgra Foods Home Food Safety program.

"Our kitchens and dining rooms have extended beyond the confines of our home. So we need to remember to apply the same home food safety 'road rules' when preparing meals eaten away from home. Following some easy steps can help you save the adventure for vacation, not your back-seat picnic."

According to the survey, travelers who pack food to eat on the way to their destination typically bring sandwiches (67 percent), chips and dips (66 percent), fresh fruit or vegetables (65 percent) and pre-packaged lunches with meat and cheese (28 percent), all of which can spoil if not kept at proper temperatures.

The survey also reveals 30 percent leave the food they bring unrefrigerated for three to four hours, and 15 percent leave it out for more than four hours. "This can create a food safety hazard for travelers and their companions," O'Neil says. "Perishable foods should never be left out and unrefrigerated for more than two hours, the point at which harmful bacteria begin to multiply rapidly." In hot weather (above 90°F), she

says, reduce the time to one hour. Make sure your family doesn't squeeze a case of food poisoning into those already-stuffed suitcases by following a few easy pre-travel food preparation tips from ADA/ConAgra Foods Foundation: Wash hands with soap and water before preparing foods and after switching tasks, such as handling raw meat and then cutting vegetables. Sing the chorus of your favorite vacation-themed song while you wash for 20 seconds.

Also, make sure food preparation surfaces are clean. Keep raw meats and ready-to-eat foods separate. This includes placing raw meat, poultry and seafood on the bottom shelf of the refrigerator so juices don't drip onto other foods. Be sure to pack moist towelettes to clean up before digging in.

In hot weather, transport perishable food in a cooler (packed with ice or ice packs) in the back seat of an air-conditioned car instead of the trunk. Remember to drop in a refrigerator thermometer to ensure the temperature remains below 40°F.

If traveling by plane or train where space is tight, freeze a juice box or yogurt for a chilly treat that will also help keep other foods cool. Pack foods in a small, soft-cover travel cooler that will conveniently slip under the seat. Or, give each family member his or her own insulated lunch bag full of favorites.

If stopping roadside for a mid-trip cook-out, remember to grill foods to proper and safe temperatures: hamburgers (at least 160°F), hot dogs (reheat to 160°F), and chicken (170°F). Pack raw meats for the trip in a cooler, placing them in a well-sealed container or wrapping tightly in saran. Be sure to keep them separate from other packed foods as raw juices from the meat can easily contaminate ready-to-eat foods.

Don't forget that carry-out and fast food are also susceptible to food poisoning if not properly handled. If not eaten or refrigerated within two hours, toss it.

The ADA/ConAgra Foods Home Food Safety...It's in Your Hands® program educates consumers that home food safety is a serious issue and provides solutions so Americans can easily and safely handle food in their own kitchens. This program complements government-sponsored food safety initiatives that speak to the leading critical food-handling violations by emphasizing the following four key messages: (1) Wash hands often; (2) Keep raw meats and ready-to-eat foods separate; (3) Cook to proper temperatures; (4) Refrigerate promptly below 40°F.

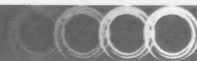
For more information, visit [www.homefoodsafety.org](http://www.homefoodsafety.org) or call the ADA's Consumer Nutrition Information Line at 800.366.1655, where recorded messages (in both English and Spanish) are available 24 hours a day.

With nearly 70,000 members, the American Dietetic Association is the nation's largest organization of food and nutrition professionals.

The Chicago-based ADA serves the public by promoting optimal nutrition, health and well-being. Visit ADA at [www.eatright.org](http://www.eatright.org).

ConAgra Foods, Inc. (NYSE:CAG) is one of North America's largest packaged food companies, serving consumer grocery as well as restaurant and foodservice establishments. This program is funded by the ConAgra Foods Foundation, the philanthropic arm of ConAgra Foods, which works to improve the quality of life in communities across the US.

- (a) Impulse Research Corporation conducted the home food safety survey in April 2003 for the American Dietetic Association and the ConAgra Foods Foundation through an online survey of a random sample of 1,036 adults ages 18 and above who plan to take at least one trip this spring or summer. The sample was chosen to closely match US population demographics.



- (b) Percentages do not add up to 100 percent as many travelers plan to take more than one vacation this summer via different modes of transportation.

## First Infectious Disease Report Shows Decline in Food Poisoning

The Food Safety Authority of Ireland (FSAI) published the first national zoonosis report, which outlines the incidence of infections and diseases transmissible from animals to humans. The report on zoonoses in Ireland 2000 and 2001 is the first coordinated report gathering results from all national agencies involved in monitoring zoonosis data. It details the occurrence of zoonoses infections that pose a considerable health risk including *Salmonella*, *E. coli* O157:H7, Tuberculosis and Weil's disease. The report shows that there has been a decrease in the occurrence of some diseases, in particular, a marked decline in the occurrence of *Salmonella* in 2000 and 2001. Latest figures from the FSAI show that this trend is still decreasing with just 363 cases reported in 2002, compared with 428 in 2001 and 640 in 2000.

According to Dr. Wayne Anderson, chief specialist, food science, FSAI, this, and future reports will be an important tool in the management and control of these diseases in Ireland. The report highlights zoonoses trends from their occurrence in animals through to resulting human infections. It gives a national overview of potential problems, which then allows for preventative as well as remedial actions to be undertaken in the interest of consumer protection.

The study which details Salmonellosis, Campylobacteriosis, Listeriosis, *E. coli* O157:H7, Tuberculosis and Brucellosis will become

an annual zoonoses report to serve as an information resource for consumer protection, public health and regulatory bodies involved with food safety.

"Already from this first report we can see that there are improvements in certain areas. In particular, the reduction in the incidence of human infection with *Salmonella* Typhimurium in 2001 is very welcome. This bacterium is a particular concern as it is also associated with the development of multiple drug resistance — a scenario with potentially serious human health implications," said Dr. Wayne Anderson.

"While there are positive findings in the report, worrying features include the evolution of *E. coli* O157 which showed an increase with 42 human cases observed in 2000 compared to 52 in 2001. We also know that preliminary results for 2002 show some 69 confirmed cases. *Campylobacter* is also a concern, although like *E. coli* O157 it was not a notifiable disease in 2000 and 2001, however, laboratories and public health doctors were urged to provide information on its occurrence. In 2001, there were 1,286 reports of food poisoning cases due to *Campylobacter* compared to 1,613 in 2000. This slow level of decrease is concerning.

"The incidence rates of human infections were highest in the summer months coinciding with higher ambient temperatures, outdoor cooking and increased use of pre-prepared food. This trend suggests that individuals and the food industry alike need to be far more cautious and vigilant during these months when cooking and preparing food," said Dr. Anderson.

The report was a joint collaboration coordinated by the FSAI and involved the National Disease Surveillance Centre (NDSC) which collects information on human infections; the Department of Agriculture and Food (DAF) which provides data on zoonotic agents

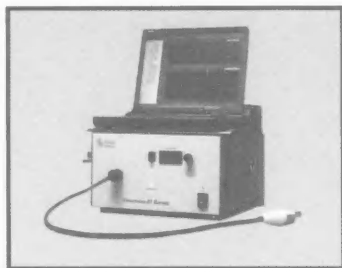
in animals and feed materials while the FSAI, through its enforcement agents and government departments, laboratories, agencies and local authorities, coordinates the collection of data on the occurrence of zoonotic agents in food.

The FSAI raised its concerns in relation to the age demographics of people who suffered from these infections suggesting that where data was available for distinct age groups, children up to four years of age appeared to be more susceptible to infection by zoonotic diseases relative to other age groups. This can either mean that children were infected more frequently or severely than other age groups or that they were simply more likely to be taken to a physician. As research shows, individuals in this age group are more vulnerable to harmful bacteria, which results in more severe health consequences than in the general adult population, the FSAI called on consumers to be particularly careful with preparation of foods for infants.

"We would urge people to visit their doctor when they believe they might be suffering from food poisoning, it is in the best interest of their health and will also assist ensure that the best available data on the occurrence of food poisoning in Ireland is recorded. Only in this way can appropriate industry-wide measures be put in place to best safeguard public health for the ultimate protection of consumers. Recent studies suggest that only 29% of people suffering from gastroenteritis actually attend the doctor so what we have in our report is possibly only the tip of the iceberg," concluded Dr. Anderson.

The full publication Report on Zoonoses in Ireland 2000 & 2001 is available from the Food Safety Authority of Ireland at 1890.33.66.77 or [www.fsai.ie](http://www.fsai.ie).

# INDUSTRY PRODUCTS



Lambda Solutions, Inc.

## Lambda Solutions, Inc. Introduces Its New Dimension-PI Raman Systems

Lambda Solutions has introduced its high performance Raman System of unsurpassed value. These systems are equipped with the Lambda Solutions high efficiency Vector Raman fiber probe and other accessories making these products suitable for a range of quality control and analytical applications. They are also available on an OEM basis. The Dimension-PI incorporates frequency stabilized, narrow-line width (0.15 nm), power adjustable laser.

The lens-based  $f/1.8$  spectrograph and a choice of sensitive spectroscopy grade CCD cameras provide wide spectral coverage and exceptional resolution as high as 3 to 4 cm<sup>-1</sup>.

The Dimension-PI comes with Lambda user-friendly RamanSoft software with integrating data collection, database interface and data analysis. RamanSoft provides traditional background subtraction along with a proprietary background removal algorithm to speed data acquisition.

The software provides flexible report output and the fiber probe accessories allow for effective data collection even from difficult samples including pharmaceutical products, bottled chemicals and solvents.

**Lambda Solutions, Inc.**

781.478.0170

[www.LambdaSolutions.com](http://www.LambdaSolutions.com)

Waltham, MA

## DuPont Qualicon BAX<sup>®</sup> System for Detecting *E. coli* O157:H7 Certified as AOAC-RI Performance Tested Method

The BAX<sup>®</sup> system, a genetics-based diagnostic tool developed by DuPont Qualicon, has been validated by the AOAC Research Institute as a Performance Tested method for detecting *Escherichia coli* O157:H7.

The AOAC Research Institute is a non-profit, international, scientific organization that administers the Performance Tested Methods<sup>SM</sup> program, which provides an independent, third-party assessment of proprietary analytical methods to ensure that products perform as claimed.

*E. coli* O157:H7 is a foodborne pathogen, often found in raw ground beef and unpasteurized juice, that can cause serious, sometimes fatal, illness at a very low infectious dose (as few as 10 organisms). These very low levels are often difficult to detect with traditional culture methods, especially where *E. coli* O157:H7 must be distinguished from a high level of competing bacteria. The AOAC-RI comparison studies validated that the DNA-

based BAX<sup>®</sup> system performed as well or better than culture methods on juice, cider and raw ground beef samples. Further, the time-to-result was reduced by half on ground beef enriched with proprietary BAX<sup>®</sup> system media.

"As food safety concerns continue to grow around the world, customers are asking for the most efficient and effective science-based tools to protect their products and their brands, and DuPont Qualicon delivers. The BAX<sup>®</sup> system allows any quality assurance laboratory to work with sophisticated technology that transforms the most advanced molecular biology concepts into the simplest, fastest food analysis method available," said Kevin Huttman, president of DuPont Qualicon.

The DNA-based BAX<sup>®</sup> system detects target bacteria in raw ingredients, finished food products and environmental samples. In addition to *E. coli* O157:H7, assays are also available for detecting *Salmonella*, *Enterobacter sakazakii*, *Listeria* and *L. monocytogenes*. The automated system is user-friendly and fits easily onto a laboratory bench top. Available since November 2000, hundreds of BAX<sup>®</sup> systems are already in use by governments, food companies and laboratories around the world.

In addition to the BAX<sup>®</sup> system, DuPont Qualicon markets the patented RiboPrinter<sup>®</sup> system, the world's only automated DNA fingerprinting instrument to track and trend bacterial contamination in pharmaceuticals, personal care products and food.

**DuPont Qualicon**

800.863.6842

[www.qualicon.com](http://www.qualicon.com)

Wilmington, DE

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Venmark International

### Venmark International Vacuum Suction Cups Handle Eggs and Other Round Objects

A full line of vacuum suction cups that are designed with bellows for gently handling eggs and other fragile round objects is available from Anver Corporation of Hudson, MA.

Anver Vacuum Suction Cups feature bellows and contoured holding surfaces that are designed for securely, but gently, handling eggs and other round objects. They are available in food-grade white or red silicone and in black-nitrile rubber with a wide range of compatible push-over fittings.

Suitable for use with a variety of fragile round objects, Anver Vacuum Suction Cups with bellows provide inherent cushioning. They are offered in three popular sizes: 1.30" dia. x 1.80" H bellows, 1.34" dia. x 3.00" H bellows, and 1.38" dia. x 1.70" H bellows.

**Venmark International**  
781.237.5860  
www.venmark@msn.com  
Wellesley, MA

### Nutreco Agriculture Introduces a Rapid Analysis Method for Pathogens

Nutreco Agriculture has made a new development in the management program for the main pathogens. Together with the UK firm Matrix MicroScience Ltd., Nutreco Agriculture has developed a fast technique for measuring pathogens in the meat production chain. The method is called Pathatrix®/Colortrix™. Masterlab, part of Nutreco, worked closely with the Nutreco companies in the feed, poultry and pork production chains during this development. Nutreco Agriculture will launch the rapid analysis method for *Salmonella* in March 2004. *Campylobacter* spp. and *Listeria* spp. will be introduced into the program over the next 2 years. The new rapid analysis method represents a significant enhancement of the existing NuTrace® monitoring program. Faster data availability facilitates better management of the entire production chain from feed to meat.

The Pathatrix®/Colortrix™ fast analysis method was created by the UK company Matrix MicroScience. Nutreco Agriculture began working with Matrix MicroScience to adapt an existing rapid method so it could be used for the main pathogens in the production chain from feed to meat. The goal of the project was to substantially reduce the time spent tracing the main pathogens at comparable cost and the same level of accuracy.

The Pathatrix®/Colortrix™ method enables analysis results to be made available within 8 hours. The time currently required is 3 to 5 days. This is an enormous time savings. The Pathatrix® method proved to be very efficient and accurate at revealing *Salmonella* spp. during the successful

test phase. So Nutreco Agriculture is launching the first routine application of Pathatrix®/Colortrix™ for *Salmonella* spp. Nutreco Masterlab will collect additional data over the coming days and weeks to finally validate and certify this rapid method.

All Nutreco companies in the feed, poultry and pork production chains will be working closely together in the further development of this method. Manfred Hessing, food safety and quality manager, food and feed says, "We are including the rapid analysis technique for pathogens in our NuTrace® monitoring program. The technique does not prevent pathogens per se, but this fast method means we can take action quickly. This gives us a better and more effective approach to pathogens throughout the production chain from feed to meat. We are therefore implementing this rapid technique throughout the entire production chain."

The 8-hour rapid analysis method for *Salmonella* spp. will be available, with full validation and certification by the end of 2004. The plan is to implement it for *Campylobacter* spp. and *Listeria* spp. in 2006.

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

### New Orion Ion Specific Test Kits are Now Available from Thermo Electron Corporation

Thermo Electron Corporation introduces the Orion Ion Test Kits, complete with all products needed for drinking water and food and beverage applications.

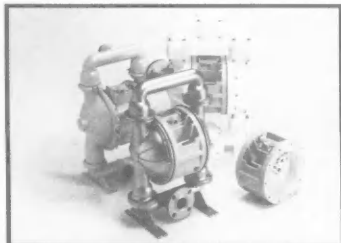
All-in-one test kits are now available for popular ISE measurements of fluoride, chloride and sodium.

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Fluoride, being a very important measurement in drinking water, the new fluoride test kit provides all the equipment necessary to test fluoride in accordance with Standard Methods 4500-F. Sodium and chloride test kits are available specifically for salt analysis in food and beverage applications. With a single order number, you will receive an Orion 720A plus pH/ISE meter, either an ionplus® fluoride, an ionplus chloride, or a ROSS™ sodium combination electrode, corresponding filling solution, ISA or NISS, standards, swing arm stand, stirring accessory and power adapter. Complete pH meter packages are also available.

**Thermo Electron Corporation**  
978.232.6057  
www.thermo.com  
Waltham, MA



Versa-Matic Pump Company

### Versa-Matic's New Pump Offers Increased Air Efficiency and Improved Performance

Versa-Matic announces the release of its revolutionary Ultra-Matic 2" high efficiency pump. A completely redesigned air section provides increased pump performance while requiring less compressed air to operate. With a pumping capacity of up to 200 gallons per minute, the Ultra-Matic provides a performance increase of up to 30% compared to

other air-operated double diaphragm (AODD) pumps. "The challenge was not only to design a more efficient, high performance pump," said Nick Dorsch, president of Versa-Matic, "but also to maintain the level of dependability that customers have come to expect from our pumps. That meant integrating the innovative footprint and design features of our Elima-Matic® pump line. We're delighted that we were able to meet that challenge with the Ultra-Matic."

The Ultra-Matic's performance increase can be attributed to enhanced volumetric efficiency and the ability for compressed air to completely evacuate the pump. The redesigned air section efficiently utilizes space and eliminates friction by way of a patented sliding exhaust valve that enables air to exit directly into the atmosphere. Air flows smoothly through the valve and center section, entering through one port and exiting through another. This design results in streamlined efficiency that saves costly compressed air.

In addition, the Ultra-Matic has fewer moving parts, minimizing repair and maintenance while a positive pressure shifting mechanism eliminates stalling. Available for Versa-Matic's 2" AODD pumps, this industry-changing breakthrough is available in a variety of materials and styles, including plastic, aluminum, cast iron, and stainless steel. The Ultra-Matic is interchangeable with all existing bolted and clamped Versa-Matic pumps, and is retrofittable with Wilden® 2" clamped-style pumps."

Versa-Matic Pump Company, a unit of IDEX Corporation, is a recognized leader in the design and manufacture of air-operated double diaphragm pumps and accessories. The patented Elima-Matic air valve

system, Versa-Dome® diaphragms and Versa-Tuff extended life PTFE diaphragms have improved processes in industries worldwide.

**Versa-Matic Pump Company**  
724.327.7867  
www.versamatic.com  
Export, PA

### Trufresh® Introduces TruBlu™ Fresh Matrix™ Test

Trufresh® LLC, developers of the patented "unique fresh freezing method," has introduced a new way to determine the freshness of fish. The new Trufresh® TruBlu™ Fresh Matrix™ is being offered for the first time at the annual Boston Seafood Show.

Using a simple dye called Trypan Blue, Trufresh® is able to accurately help fish purveyors, restaurants, hospitality companies and food service companies know the age of the fresh fish they purchase. Until now, fresh fish quality has only been determined by smell, sight or trust. "We developed this test to prove that fresh fish may not always be as fresh as people say," said Kevin VanderVoort, CEO of Trufresh®, a purveyor of farm-raised fish. "Now our customers can see for themselves what fresh really is."

By inserting a tube into the flesh of a fish, users can draw a sample of the flesh into the tube. Once the sample is drawn, a drop of Trypan Blue is inserted into the sample. The Trypan Blue dye is used by microbiologists to determine cellular lysis. Within five minutes, the blue dye reacts with the fish sample. The cells which have lysed (deteriorated) absorb the dye. The older the fish, the more the dye is absorbed, the more intense the color and the greater the penetration of color in the sample. If the fish is

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## INDUSTRY PRODUCTS

one day old, the dye does not absorb into the fish sample. However, if the fish is older or has been stored at a temperature above 34 degrees, the dye is absorbed by the destroyed cells.

The Trufresh® Trublu™ FreshMatrix™ clearly establishes a standard of measure to determine the age (freshness) of fish as if it were held under appropriate refrigeration (34°F). The Trublu™ FreshMatrix™ was created by testing, with Trypan Blue, a Trufresh® salmon fillet which had been held at this ideal temperature over time and tested daily. The color and depth of penetration were recorded to establish the standard against which any salmon can be measured.

By using this simple test, Trublu™ FreshMatrix™, clearly answers the question "how fresh is that fish?" asked by many American consumers, food service companies, restaurateurs and chefs when they do decide to purchase fish.

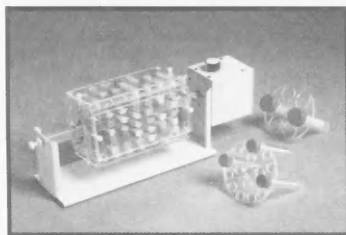
Trufresh® farm raised, antibiotic-free Norwegian Atlantic salmon, which is frozen using the Trufresh® patented unique fresh-freezing method is now available to consumers by visiting [www.trufresh.com](http://www.trufresh.com). In conjunction with its sublicensee, Nordlaks, a large Northern Norwegian fish farmer/processor, Trufresh® salmon are growing up antibiotic free. In Norway, north of the Arctic Circle, the waters are clear, the hydrology is better and everybody including the owners, plant managers, farm managers and workers at Nordlaks is educated in the Norwegian fish farm system. As a result, Trufresh® salmon are raised in conditions that are 100% antibiotic and PCB free.

The vacuum-packaged Trufresh® fish is immersed into a patented brine formulation. The fish freezes incredibly fast due to complex ice crystals forming in the brine at -40°F, and dissolving at -38°F, almost completely eliminating the formation of complex ice crystals in the muscle tissue cells of the fish.

Traditional freezing methods form ice crystals in the fish, which expand and crack the cell membranes, causing purge when thawed.

The Trufresh® process retains the highest qualities of resilience, aroma, texture, color and taste.

**Trufresh® LLC**  
212.243.1320  
[www.trufresh.com](http://www.trufresh.com)  
New York, NY



*Torrey Pines Scientific, Inc.*

### **New High Capacity Variable Speed Rotating Mixer from Torrey Pines Scientific, Inc.**

**T**orrey Pines Scientific, Inc. announces its new high capacity variable speed rotating mixer. This high capacity unit can mix 50-0.5 ml and 48-1.5 ml centrifuge tubes with snap-on caps or screw-down caps in an end-over-end motion at speeds varying from 4 to 40 rpm. Also avail-

able are accessory sample holders for 16-15 ml or 6-50 ml centrifuge tubes that are rotated horizontally.

The ruggedly designed rotator operates from a wall-mounted universal power supply providing 12VDC to the unit. The speed control has an off position fully counter-clockwise with 270° of rotation between off and full on.

**Torrey Pines Scientific, Inc.**  
866.573.9104  
[www.torreypinesscientific.com](http://www.torreypinesscientific.com)  
San Marcos, CA

### **UltraScan® PRO Spectrophotometer—the Professional Color Measurement Spectrophotometer from Hunter Associates Laboratory**

**T**he UltraScan PRO can measure both the reflected and transmitted color of food products. Having 5 nm optical resolution and wavelength range of 350 nm – 1100 nm, it is the ideal instrument for your laboratory. UltraScan PRO uses diffuse 8° geometry with automated specular component inclusion/exclusion. It also features three sizes of sample measurement areas with automated lens change.

UltraScan PRO includes Easy-Match® QC software and is superior for research and quality control applications in both laboratory and production environments. It is designed to be your reference instrument.

**Hunter Associates Laboratory, Inc.**  
703.471.6870  
[www.hunterlab.com](http://www.hunterlab.com)  
Reston, VA

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**Come Early for  
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**Golf Tournament**

*Arnold Palmer Signature  
Course at Wildfire Golf Club*  
Saturday, August 7  
6:00 a.m. – 11:00 a.m.

**Sedona and  
Verde Valley Tour**

Saturday, August 7  
8:00 a.m. – 4:00 p.m.

**Diamondbacks  
Baseball Game**

Saturday, August 7  
12:00 p.m. – 4:00 p.m.

Visit the Web site at [www.foodprotection.org](http://www.foodprotection.org) to sign up.

## **Announcing**

### **The inaugural "John H. Silliker Lecture"**



To be held at IAFP 2004 during a Plenary Session  
on Tuesday, August 10, 2004 in Phoenix, Arizona

Featured Speaker: R. Bruce Tompkin  
Retired Vice President—Product Safety  
ConAgra Refrigerated Prepared Foods

Presentation Title: "Guess Who's Come to Stay –  
The Resident Pathogen Issue"

Tuesday, August 10, 2004  
3:45 p.m.  
Phoenix, Arizona

***IAFP thanks Silliker, Inc. for their contribution  
to the IAFP Foundation in support of this Lecture.***



# Ivan Parkin Lecture

## *Advanced Food Protection Technology*

Sunday, August 8, 2004

7:00 p.m. – 8:00 p.m.

*Presented by*

### **Dr. Martin B. Cole**

Chief Research Scientist  
Food Science Australia  
North Ryde, New South Wales, Australia



**D**r. Martin B. Cole is the Deputy Chief Executive of Food Science Australia, Australia's premier food science organization. He has held a number of senior positions within the food industry, including Head of Microbiology for Unilever, located in UK and The Netherlands, as well as Group Director of Food Safety, Microbiology & Chemistry for Nabisco in the USA. He has presented and published over 80 papers on many aspects of food microbiology including predictive modeling, risk assessment and novel food preservation technology.

Dr. Cole has over 10 years experience within the CODEX Food Hygiene Committee where he has been a member of a number of different country delegations including the United States and more recently Australia. He is frequently asked to be a contributing expert to national and international consultations on a wide range of food safety issues. Within Australia, Dr. Cole is the Co-Director of the Australian Food Safety Centre of Excellence, a Fellow of Food Standards Australia and New Zealand (FSANZ) as well a Visiting Research Professor at the University of Tasmania. Internationally, he is the Chairman of the International Commission for the Microbiological Specifications of Foods (ICMSF), a member of the Editorial Board of Innovative Food Science & Emerging Technologies and a member of the Editorial Advisory Board for *Food Safety Magazine*.

# IAFP 2004

## Preliminary Program



### Sunday, August 8, 2004 – 7:00 p.m.

- Opening Session
- Ivan Parkin Lecturer — Martin B. Cole, Food Science, Australia — *Advancing Food Protection Technology*

### Monday, August 9, 2004

#### Morning – 8:30 a.m. – 12:00 p.m.

##### Symposium Topics

- Molecular Subtyping of Foodborne Pathogens: Tying It All Together
- Retail Food Safety Risks: Protecting Public Health and Changing Behaviors
- Validation and Verification of Pathogen Interventions in Meat and Poultry Processing
- Extending the Shelf Life of Fluid Dairy Products

##### Technical Session

- Don't be Sonoran (Antimicrobials and Produce)

#### Poster Session (9:00 a.m. – 1:00 p.m.)

- Antimicrobials and Foods of Animal Origin

#### Afternoon — 1:30 p.m. – 5:00 p.m.

##### Symposium Topics

- Postprocessing Intervention Technologies
- Water's Role in Food Contamination
- Recent Developments in *Listeria monocytogenes* Research
- Integrating Genomic Data into Quantitative Risk Assessments
- Sanitary and Hygienic Design, Construction and Fabrication of Dairy and Food Equipment

##### Technical Session

- General Microbiology and Sanitation

#### Poster Session (2:00 p.m. – 6:00 p.m.)

- Rattlesnake Roundup (General Microbiology and Sanitation, Methodology, and Toxicology)

### Tuesday, August 10, 2004

#### Morning — 8:30 a.m. – 12:00 p.m.

##### Symposium Topics

- Food Safety for Immunocompromised Populations
- Chatterbugs: Quorum Sensing and Food Safety
- Transfer and Spread of Pathogens in Food Environments
- Indicator Organisms and Testing — Where's the Value?

##### Technical Session

- Foods of Animal Origin

#### Poster Session (9:00 a.m. – 1:00 p.m.)

- Saguaro Soiree (Risk Assessment, Education, and Pathogens)

#### Afternoon — 1:30 p.m. – 3:30 p.m.

##### Symposium Topics

- Update on Foodborne Disease Outbreaks
- Everything You Wanted to Know about Adopting New Methods... But Were Afraid to Ask!
- Food Toxicology 101: Basics for the Food Safety Professional
- *Salmonella* Control in Broiler Chickens: What Can We Learn from the Scandinavian Experience

##### Technical Sessions

- Education
- Risk Assessment

#### Plenary Session — 3:45 p.m. – 4:30 p.m.

##### John H. Silliker Lecturer

- R. Bruce Tompkin, ConAgra Refrigerated Prepared Foods (Retired) — *Guess Who's Come to Stay – the Resident Pathogen Issue*

#### Business Meeting – 4:45 p.m. – 5:30 p.m.

### Wednesday, August 11, 2004

#### Morning — 8:30 a.m. – 12:00 p.m.

##### Symposium Topics

- Credibility in Science
- Risk and Control of *Enterobacter sakazakii*
- Impact of Environmental Viral and Parasitic Contamination on Food Safety
- Safety of Raw Milk Cheeses — The State of the Science
- Packaging Innovations, Safety Concerns and Seafood
- Heat-resistant Spoilage Microorganisms in the Juice and Beverage Industry

#### Poster Session (8:00 a.m. – 12:00 p.m.)

- Pathogens

#### Afternoon — 1:30 p.m. – 5:00 p.m.

##### Symposium Topics

- Sanitation — Because You Have to be Clean to be Safe
- The Global Food Safety Initiative
- Optimizing Data and Minimizing Risk
- Biofilms and Their Impact on Food Safety

##### Technical Sessions

- Chips and Salsa (General Food Microbiology and Methods)
- Pathogens

#### Poster Session (1:00 p.m. – 5:00 p.m.)

- Prickly Pear Potpourri (Dairy, Produce, and Other Commodities)

# IAFP 2004

## Networking Opportunities



### IAFP FUNCTIONS

#### NEW MEMBER RECEPTION

Saturday, August 7, 2004 • 4:30 p.m. – 5:30 p.m.

Sponsored by *Kluwer Academic Publishers*

If you recently joined the Association or if this is your first time attending an IAFP Annual Meeting, welcome! Attend this informal reception to learn how to get the most out of attending the Meeting and meet some of today's leaders.

#### AFFILIATE RECEPTION

Saturday, August 7, 2004 • 5:30 p.m. – 7:00 p.m.

Reception sponsored by *Capitol Vial*

Speakers sponsored by *Weber Scientific*

Affiliate Officers and Delegates plan to arrive in time to participate in this educational reception. This year's topic is "How to Add Fun Recreational Programs to Your Meeting/Event." See what ideas you can take back to spice up your next Affiliate Meeting.

#### COMMITTEE MEETINGS

Sunday, August 8, 2004 • 7:00 a.m. – 5:00 p.m.

Committees and Professional Development Groups (PDGs) plan, develop and institute many of the Association's projects, including workshops, publications, and educational sessions. Share your expertise by volunteering to serve on any number of committees or PDGs. All meetings are open.

#### STUDENT LUNCHEON

Sunday, August 8, 2004 • 12:00 p.m. – 1:30 p.m.

Sponsored by *Nestlé USA, Inc.*

The mission of the Student PDG is to provide students of food safety with a platform to enrich their experience as Members of IAFP. Sign up for the luncheon to help start building your professional network.

#### OPENING SESSION

Sunday, August 8, 2004 • 7:00 p.m. – 8:00 p.m.

Join us to kick off IAFP 2004 at the Opening Session. Listen to the prestigious Ivan Parkin Lecture delivered by Martin B. Cole, Chief Research Scientist, Food Science Australia, North Ryde, Australia. He will deliver a presentation titled "Advancing Food Protection Technology."

#### CHEESE AND WINE RECEPTION

Sunday, August 8, 2004 • 8:00 p.m. – 10:00 p.m.

Sponsored by *Kraft Foods, Inc.*

An IAFP tradition for attendees and guests. The reception begins immediately following the Ivan Parkin Lecture on Sunday evening in the Exhibit Hall.

#### IAFP JOB FAIR

Sunday, August 8 through Wednesday, August 11, 2004

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

#### COMMITTEE AND PDG CHAIRPERSON

##### BREAKFAST (By invitation)

Monday, August 9, 2004 • 7:00 a.m. – 9:00 a.m.

Chairpersons and Vice Chairpersons are invited to attend this breakfast to report on the activities of your committees.

##### EXHIBIT HALL RECEPTION

Monday, August 9, 2004 • 5:00 p.m. – 6:30 p.m.

Sponsored by *DuPont Qualicon and Oxoid, Inc.*

Join your colleagues in the exhibit hall to see the latest trends in food safety techniques and equipment. Discuss with exhibitors their latest products or use this time to view the poster presentations. Grab a drink and take advantage of this great networking reception.

##### JOHN H. SILLIKER LECTURE

Tuesday, August 10, 2004 • 3:45 p.m. – 4:30 p.m.

This plenary session will feature R. Bruce Tompkin, Retired Vice President — Product Safety, ConAgra Refrigerated Prepared Foods. He will deliver a presentation titled "Guess Who's Come to Stay — The Resident Pathogen Issue."

##### BUSINESS MEETING

Tuesday, August 10, 2004 • 4:45 p.m. – 5:30 p.m.

You are encouraged to attend the Business Meeting to keep informed of the actions of YOUR Association.

##### PRESIDENT'S RECEPTION (By invitation)

Tuesday, August 10, 2004 • 5:30 p.m. – 6:30 p.m.

Sponsored by *Fisher Scientific*

This by invitation event is held each year to honor those who have contributed to the Association during the year.

##### PAST PRESIDENTS' DINNER (By invitation)

Tuesday, August 10, 2004 • 6:30 p.m. – 10:00 p.m.

Past Presidents and their guests are invited to this dinner to socialize and reminisce.

##### AWARDS BANQUET

Wednesday, August 11, 2004 • 7:00 p.m. – 9:30 p.m.

Bring IAFP 2004 to a close at the Awards Banquet. Award recipients will be recognized for their outstanding achievements and the gavel will be passed from Dr. Paul Hall to Incoming President Dr. Kathy Glass.

# IAFP 2004 Event Information



## EVENTS

### MONDAY NIGHT SOCIAL AT RAWHIDE WESTERN TOWN

Monday, August 9, 2004 • 6:30 p.m. – 10:00 p.m.

Sponsored by Roche Applied Science



Step back in time to the days when the West ran wild! This is the Wild West of good guys, bad guys, balladeers, shoot-outs, saloon girls, and delightfully

crooked card dealers. Upon arrival at Rawhide, you will have the opportunity to stroll down Main Street, browse in the numerous shops and boutiques, witness a blacksmith at work and watch Rawhide's street entertainers. Satisfy your appetite by stopping in the Steakhouse and Saloon for a "Chuckwagon Feast". Grab your partners, jump on the bus and get ready for a rip-roarin good time — YEE HA!

### DIAMONDBACKS BASEBALL GAME

Saturday, August 7, 2004 • 12:00 p.m. – 4:00 p.m.



Enjoy a afternoon at the ballpark as the Arizona Diamondbacks take on the Atlanta Braves at Bank One Ballpark. From its signature swimming pool to

its retractable roof, Bank One Ballpark has become one of the game's most recognizable landmarks. Since the air-conditioned facility first opened its doors, fans have enjoyed the opportunity to watch the Arizona Diamondbacks without worrying about Phoenix's summer heat. Ticket price includes admission to the game and transportation to and from the JW Marriott Desert Ridge Resort.

## GOLF TOURNAMENT



### GOLF TOURNAMENT – Arnold Palmer Signature Course at Wildfire Golf Club

Saturday, August 7, 2004 • 6:00 a.m. – 11:00 a.m.

Everyone is invited to play in this best-ball golf tournament on the Arnold Palmer Signature Course at Wildfire Golf Club. A desert-style course of championship length, with generous fairways and large, bent-grass greens, the Palmer Course is challenging to all levels of golf skill. Begin IAFP 2004 with a round of golf playing before a backdrop of the Camelback Mountains!



## DAYTIME TOURS

### SEDONA AND VERDE VALLEY TOUR

Saturday, August 7, 2004 • 8:00 a.m. – 4:00 p.m.

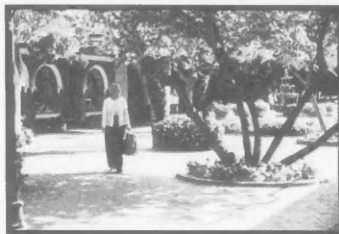
Known worldwide for its brilliant red rock mountains, breathtaking scenery and quaint artisan shops, Sedona is a "must see" destination for visitors to Arizona.

During the drive north, you will travel through the diverse terrain of the Sonoran Desert, Verde Valley and Camp Verde. Along the way, the guide will provide interesting narration about the area and answer questions.

Prior to reaching Sedona, we will stop at Montezuma's Castle, a twelfth century cliff dwelling built by the Sinagua Indians. This is considered one of the best-preserved cliff dwellings in the Southwest. Upon arrival in Sedona, your guide will point out the numerous red rock formations for which Sedona is famous — Snoopy Rock, Bell Rock, Chapel Rock, Submarine Rock and others. Lunch will be served at a quaint local eatery. Guests will have time to explore the galleries and shops of Main Street and Tlaquepaque.

## CITY TOUR AND OLD TOWN SCOTTSDALE

Sunday, August 8, 2004 • 10:00 a.m. – 3:00 p.m.



With amazing sunsets and spectacular mountain views, Arizona is a site to behold! The City Tour meanders through the amazing aspects of the

valley. Each tour is unique in that the guide will stop along the way at several of the most beautiful sites and private homes in the valley.

The Wrigley Mansion is well known for its unique architecture, the Biltmore Resort has had the pleasure of Frank Lloyd Wright's touch and the State Capitol is majestic against the blue sky backdrop of the city. This tour provides an opportunity to stop and enjoy the unique shopping experiences of Old Town Scottsdale as well as a delicious lunch. Old Town encompasses over a square mile of themed shopping streets. Walking the sidewalks of this section of Scottsdale, one can find everything from Native American jewelry and artwork to western clothing.

## DESERT BOTANICAL GARDEN AND HEARD MUSEUM TOUR

Monday, August 9, 2004 • 8:00 a.m. – 1:00 p.m.

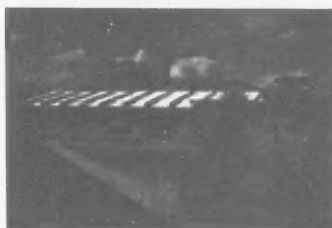


Two of the Southwest's most unique visitor attractions, The Desert Botanical Garden and Heard Museum, have teamed up to present an unbeatable tour designed to acquaint visitors with the diversity of the region and the resourcefulness of its Native American people. This tour includes

visits to both attractions plus lunch at the Heard Museum Cafe. Your visit begins at the Desert Botanical Garden which displays more than 10,000 desert plants in a spectacular outdoor setting. Plants and People of the Sonoran Desert, a three-acre permanent exhibit with authentic historic and prehistoric structures, shows how Sonoran Desert dwellers have used native plants for thousands of years for food, construction, fiber, and medicines. Continuing on you will visit the amazing Heard Museum, a museum of Native American cultures and art. The Heard Museum is internationally recognized for its collections of Native American artifacts and contemporary fine art.

## FRANK LLOYD WRIGHT – TALIESIN WEST TOUR

Tuesday, August 10, 2004 • 8:00 a.m. – 12:00 p.m.



Taliesin West in Scottsdale is considered one of Frank Lloyd Wright's greatest architectural masterpieces. From its inception, the buildings

at Taliesin West astounded architectural critics with their beauty and unusual form. Taliesin West still serves as a living, working educational facility with an on-site architectural firm. By touring Taliesin West visitors are able to broaden their appreciation of architecture and Wright's continuing contribution to it through his theories of organic design.

If you're interested in an in-depth, intimate look at Taliesin West, this exclusive experience is a must! Visit the Cabaret Cinema, Music Pavilion, Seminar Theater and Wright's private office — all linked by dramatic terraces, gardens and walkways overlooking the rugged Sonoran Desert and Valley below. You'll have the chance to talk to a Wright associate, have leisurely mid-morning refreshments in the colorful Taliesin Fellowship dining room and explore the dramatic Taliesin West living room — called the "Garden Room" by Wright. You'll sit in Wright-designed furniture and experience firsthand the drama of being a guest in Wright's famous Garden Room.

## SOUTHWESTERN COOKING CLASS

Wednesday, August 11, 2004 • 10:30 a.m. – 1:00 p.m.

This hands-on class explores the magic and mysteries of tamales, one of the great culinary traditions of the America's. While making tamales you will learn the secrets of choosing a filling and flavoring them with different types of wrappers, from cornhusks to banana leaves. You will also learn how to choose and make a complementary salsa to create a more satisfying and dynamic taste experience. This class is a total emersion into tamales and salsas that provides you with all the knowledge and skills to create your own tamales at home! Following the class you will enjoy lunch at Blue Sage.

## HOSPITALITY ROOM

Register your spouse/companion and they will have access to the hospitality room where a continental breakfast and afternoon snacks are provided Sunday through Wednesday.



**IMPORTANT! Please read this information before completing your registration form.**

### MEETING INFORMATION

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

Registration includes:

- Technical Sessions
- Symposia
- Poster Presentations
- Ivan Parkin Lecture
- Exhibit Hall Admittance
- Cheese and Wine Reception
- Exhibit Hall Reception
- Program and Abstract Book

### 4 EASY WAYS TO REGISTER

Complete the Attendee Registration Form and submit it to the International Association for Food Protection by:



Online: [www.foodprotection.org](http://www.foodprotection.org)



Fax: 515.276.8655



Mail: 6200 Aurora Avenue, Suite 200W,  
Des Moines, IA 50322-2864, USA



Phone: 800.369.6337; 515.276.3344

The early registration deadline is July 7, 2004. After this date, late registration fees are in effect.

### REFUND/CANCELLATION POLICY

Registration fees, less a \$50 administration fee and any applicable bank charges, will be refunded for written cancellations received by July 23, 2004. No refunds will be made after July 23, 2004; however, the registration may be transferred to a colleague with written notification. Refunds will be processed after August 16, 2004. **Event and tour tickets purchased are nonrefundable.**

### EXHIBIT HOURS

<b>Sunday, August 8, 2004</b>	8:00 p.m. – 10:00 p.m.
<b>Monday, August 9, 2004</b>	9:30 a.m. – 1:30 p.m. 3:00 p.m. – 6:30 p.m.
<b>Tuesday, August 10, 2004</b>	9:30 a.m. – 1:30 p.m.

### DAYTIME TOURS

<b>Saturday, August 7, 2004</b>	
Sedona and Verde Valley Tour (Lunch included)	8:00 a.m. – 4:00 p.m.
<b>Sunday, August 8, 2004</b>	
City Tour and Old Town Scottsdale (Lunch included)	10:00 a.m. – 3:00 p.m.
<b>Monday, August 9, 2004</b>	
Desert Botanical Garden and Heard Museum Tour (Lunch included)	8:00 a.m. – 1:00 p.m.
<b>Tuesday, August 10, 2004</b>	
Frank Lloyd Wright – Taliesin West Tour	8:00 a.m. – 12:00 p.m.
<b>Wednesday, August 11, 2004</b>	
Southwestern Cooking Class (Lunch included)	10:30 a.m. – 1:00 p.m.

### EVENTS

<b>Saturday, August 7, 2004</b>	
Diamondbacks Baseball Game	12:00 p.m. – 4:00 p.m.
<b>Sunday, August 8, 2004</b>	
Opening Session	7:00 p.m. – 8:00 p.m.
Cheese and Wine Reception <i>Sponsored by Kraft Foods North America</i>	8:00 p.m. – 10:00 p.m.
<b>Monday, August 9, 2004</b>	
Exhibit Hall Reception <i>Sponsored by DuPont Qualicon and Oxoid, Inc.</i>	5:00 p.m. – 6:30 p.m.
Monday Night Social at Rawhide Western Town <i>Sponsored by Roche Applied Science</i>	6:30 p.m. – 10:00 p.m.
<b>Wednesday, August 11, 2004</b>	
Awards Banquet Reception	6:00 p.m. – 7:00 p.m.
Awards Banquet	7:00 p.m. – 9:30 p.m.

### GOLF TOURNAMENT

<b>Saturday, August 7, 2004</b>	
Golf Tournament Arnold Palmer Signature Course at Wildfire Golf Club	6:00 a.m. – 11:00 a.m.

### HOTEL INFORMATION

For reservations, contact the hotel directly and identify yourself as an IAFP 2004 attendee to receive a special rate of \$139 per night, single/double or make your reservations online. This special rate is available only until July 7, 2004.

JW Marriott Desert Ridge Resort  
5350 E. Marriott Dr.  
Phoenix, Arizona 85054  
Phone: 800.228.9290 • 480.609.3646 • Fax: 480.293.3738  
Web site: [www.marriott.com/phxdr](http://www.marriott.com/phxdr)  
(Group Code INTINTA)

Visit our Web site at [www.foodprotection.org](http://www.foodprotection.org)  
for air travel and rental car information.

# Attendee Registration Form



**International Association for  
Food Protection®**

6200 Aurora Avenue, Suite 200W  
Des Moines, IA 50322-2864, USA  
Phone: 800.369.6337 • 515.276.3344  
Fax: 515.276.8655  
E-mail: info@foodprotection.org  
Web site: www.foodprotection.org

Name (Print or type your name as you wish it to appear on name badge) \_\_\_\_\_ Member Number: \_\_\_\_\_

Employer \_\_\_\_\_ Title \_\_\_\_\_

Mailing Address (Please specify:  Home  Work) \_\_\_\_\_

City \_\_\_\_\_ State/Province \_\_\_\_\_ Country \_\_\_\_\_ Postal/Zip Code \_\_\_\_\_

Telephone \_\_\_\_\_ Fax \_\_\_\_\_ E-mail \_\_\_\_\_

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

Member since: \_\_\_\_\_

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

## PAYMENT MUST BE RECEIVED BY JULY 7, 2004 TO AVOID LATE REGISTRATION FEES

### REGISTRATION FEES:

	MEMBERS	NONMEMBERS	TOTAL
Registration (Awards Banquet included)	\$ 365 (\$415 late)	\$ 555 (\$605 late)	_____
Association Student Member (Awards Banquet included)	\$ 75 (\$ 85 late)	Not Available	_____
Retired Association Member (Awards Banquet included)	\$ 75 (\$ 85 late)	Not Available	_____
One Day Registration:* <input type="checkbox"/> Mon. <input type="checkbox"/> Tues. <input type="checkbox"/> Wed.	\$ 200 (\$225 late)	\$ 305 (\$330 late)	_____
Spouse/Companion* (Name): _____	\$ 55 (\$ 55 late)	\$ 55 (\$ 55 late)	_____
Children 15 & Over* (Names): _____	\$ 25 (\$ 25 late)	\$ 25 (\$ 25 late)	_____
Children 14 & Under* (Names): _____	FREE	FREE	_____
*Awards Banquet not included			

### EVENTS:

		# OF TICKETS	
Golf Tournament - Arnold Palmer Signature Course (Saturday, 8/7)	\$ 105 (\$115 late)	_____	_____
Diamondbacks Baseball Game (Saturday, 8/7 - 12:00 p.m.-4:00 p.m.)	\$ 26 (\$ 36 late)	_____	_____
Student Luncheon (Sunday, 8/8)	\$ 5 (\$ 15 late)	_____	_____
Monday Night Social at Rawhide Western Town (Monday, 8/9)	\$ 42 (\$ 52 late)	_____	_____
Children 14 and under	\$ 37 (\$ 47 late)	_____	_____
Awards Banquet (Wednesday, 8/11)	\$ 50 (\$ 60 late)	_____	_____

### DAYTIME TOURS:

(Lunch included in daytime tours except on Tuesday)			
Sedona and Verde Valley Tour (Saturday, 8/7)	\$ 90 (\$100 late)	_____	_____
City Tour and Old Town Scottsdale (Sunday, 8/8)	\$ 55 (\$ 65 late)	_____	_____
Desert Botanical Garden and Heard Museum Tour (Monday, 8/9)	\$ 78 (\$ 88 late)	_____	_____
Frank Lloyd Wright - Taliesin West Tour (Tuesday, 8/10)	\$ 70 (\$ 80 late)	_____	_____
Southwestern Cooking Class (Wednesday, 8/11)	\$ 65 (\$ 75 late)	_____	_____

**PAYMENT OPTIONS:**

Check Enclosed

Credit Card # \_\_\_\_\_

Name on Card \_\_\_\_\_

Signature \_\_\_\_\_

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

**TOTAL AMOUNT ENCLOSED \$** \_\_\_\_\_  
US FUNDS on US BANK

Expiration Date \_\_\_\_\_

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

**EXHIBITORS DO NOT USE THIS FORM**

# IAFP 2004 Workshops



Sponsored by  
International Association for  
Food Protection.

## Workshop I — August 6-7

### Your Data, Your Job: Quality Systems for Microbial Food Analysis

This workshop will present principles for understanding and implementing microbial control in a food production environment by providing skills to address limitations in your current laboratory testing and documentation. You will learn, in an interactive environment, how to perform environmental and statistically sound food sampling for microbial testing that can be implemented into your standard operating procedures and will conform to today's QA and ISO requirements. Workshop participants will review and discuss material from practical case studies and present their findings to the group in an informal presentation that will facilitate open discussion. Workshop includes a binder of tools and reference materials to reinforce the practical experience gained from the workshop.

### Workshop Topics

- Microbial control: where and how raw ingredient and finished product testing fit into the big picture
- Microbial control: where and how environmental/investigational sampling fit into the big picture
- Outsourcing/Auditing: What should you expect from an outside food-testing laboratory relative to quality systems and capabilities
- Using data management and trend analysis techniques to drive continuous improvement
- Practical approaches to incorporating rapid methods into the laboratory
- Food Safety Testing in the 21st Century by PCR
- Laboratory quality assurance and preparing your laboratory to address ISO 17025

### Instructors

- Jay Ellingson, Ph.D., Marshfield Clinic Laboratories, Madison, WI  
W. Payton Pruett, Jr., Ph.D., ConAgra Foods, Inc., Omaha, NE  
Cindy Ryan, Nestlé USA, Dublin, OH  
Michael Sole, Canadian Food Inspection Agency, Ottawa, Ontario, Canada

### Organizers and Instructors

- Jeff Kornacki, Ph.D., Kornacki Food Safety Associates LLC, McFarland, WI  
Patricia Rule, bioMérieux, Inc., Hazelwood, MO

### Who Should Attend?

Laboratory managers, supervisors, scientists and technicians responsible for product sampling, as well as performing and documenting microbial tests in a food production environment and quality control laboratories.

### Hours for Workshop

Friday August 6, 2004	Saturday August 7, 2004
Registration – 7:30 a.m. Continental Breakfast	7:30 a.m. Continental Breakfast
Workshop – 8:00 a.m. – 5:00 p.m. (Lunch Provided)	Workshop – 8:00 a.m. – 4:00 p.m. (Lunch Provided)

## Workshop II — August 7 Best Practices for Safe and High Quality Aquaculture Products

Aquacultured seafoods are an increasingly important component of global trade in seafoods. Overexploitation of natural harvests has created a growing interest in aquaculture to provide seafoods to a demanding public. Because



aquaculture is a controlled enterprise, inventory control, quality, and safety issues are very different than wild catch products. This workshop is designed to give attendees an overview of practices necessary to deliver high quality and safe aquacultured products to today's discriminating consumer. The afternoon session will include an interactive field trip to Desert Sweet Shrimp Farm in Gila Bend, AZ.

### Workshop Topics

- Shellfish (Crustacean and Mollusks)
- Finfish warm water
- Finfish cold water
- What works for the industry
- Interactive field trip

### Instructors

Linda Andrews, Mississippi State University, Biloxi, MS

Andrew Kaelin, ASI Aqua Fods, Inc., Arroyo Seco, NM

Lisbeth Truelstrup Hansen, Canadian Institute of Fisheries Technology, Dalhousie University, Halifax, Nova Scotia, Canada

### Organizer and Instructor

Douglas L. Marshall, Mississippi State University, Mississippi State, MS

### Who Should Attend?

Seafood processors, seafood retailers, and food service.

### Hours for Workshop

Saturday, August 7, 2004

#### Registration –

7:30 a.m. Continental Breakfast

#### Workshop –

8:00 a.m. – 5:30 p.m.

(Lunch Provided)

### Workshop III — August 7

#### Converting to the NCIMS Voluntary HACCP System from Traditional Dairy Inspection

Take advantage of the new Grade A HACCP program for dairy plants that was adopted by the 2003 National Conference on Interstate Milk Shipments (NCIMS) and became effective on January 1, 2004. The guidelines for this new Grade A HACCP program are outlined in Appendix K of the Pasteurized Milk Ordinance (PMO). NCIMS HACCP is an alternative to the traditional inspection/rating program for Grade A Dairy

Processors that allows dairy plants to develop their own "PMO".

This workshop will give an overview of the NCIMS Voluntary HACCP Program with emphasis on the differences with the traditional PMO-based regulatory inspection system. Participants will hear perspectives of industry and regulatory participants involved in the 4 year pilot studies used to develop the program. Hands-on exercises will be provided to give participants a better understanding of what is required to document Prerequisite Programs, conduct a Hazard Analysis, develop a HACCP Plan and build a HACCP records system. An FDA presentation on state and FDA HACCP audits with comparisons to traditional inspections will conclude the program.

### Workshop Topics

- Transition to the NCIMS Voluntary HACCP Program
- NCIMS HACCP implementation perspectives
- Hands-on HACCP program development for dairy plants
- Prerequisite Program, Hazard Analysis and HACCP Plan
- Practical recommendations for State and Federal NCIMS oversight of dairy plant HACCP
- Auditing of dairy plant HACCP Systems
- Hands-on HACCP dairy plant auditing

### Instructors

Kristin Phillips, Publix Super Markets, Lakeland, FL

Greg Lockwood, Vermont Department of Agriculture, Montpelier, VT

Bill Sveum, Kraft Foods NA, Madison, WI

Lloyd Kinzel, FDA, North Wales, PA

Steve Sims, FDA, College Park, MD

Stephanie Olmsted, Safeway Foods, Bellevue, WA

Doug Pearson, Utah Department of Agriculture, Salt Lake City, UT

### Organizers and Instructors

Steven Murphy, Cornell University, Ithaca, NY

Allen Saylor, International Dairy Foods Association, Washington, D.C.

### Who Should Attend?

Grade "A" Dairy Processors, State and Federal Regulatory Personnel, Dairy Plant Suppliers, and Academicians.

### Hours for Workshop

Saturday, August 7, 2004

#### Registration –

7:30 a.m. Continental Breakfast

# Workshop Registration Form



Friday-Saturday, August 6-7, 2004

**Workshop 1:** Your Data, Your Job: Quality Systems for Microbial Food Analysis

**Saturday, August 7, 2004**

**Workshop 2:** Best Practices for Safe and High Quality Aquaculture Products

**Workshop 3:** Converting to the NCIMS Voluntary HACCP System from Traditional Dairy Inspection

First Name (will appear on badge) \_\_\_\_\_

Last Name \_\_\_\_\_

Company \_\_\_\_\_

Job Title \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State/Province \_\_\_\_\_

Country \_\_\_\_\_

Postal Code/Zip + 4 \_\_\_\_\_

Area Code & Telephone \_\_\_\_\_

Fax \_\_\_\_\_

E-mail \_\_\_\_\_

Member # \_\_\_\_\_

Check Enclosed



Total Amount Enclosed  
(US Funds on US Bank) \$ \_\_\_\_\_

Account Number \_\_\_\_\_

Signature \_\_\_\_\_

Expiration date \_\_\_\_\_

Register by July 16, 2004 to avoid late registration fees

## Registration

**WORKSHOP I:** Your Data, Your Job: Quality Systems for Microbial Food Analysis

**Early Rate** **Late Rate**

IAFP Member	\$450.00	\$525.00
NonMember	\$550.00	\$625.00

**WORKSHOP II:** Best Practices for Safe and High Quality Aquaculture Products

**Early Rate** **Late Rate**

IAFP Member	\$375.00	\$450.00
NonMember	\$475.00	\$550.00

**WORKSHOP III:** Converting to the NCIMS Voluntary HACCP System from Traditional Dairy Inspection

**Early Rate** **Late Rate**

IAFP Member	\$320.00	\$395.00
NonMember	\$420.00	\$495.00

### GROUP DISCOUNT:

Register 3 or more people from your company and receive a 15% discount. Registrations must be received as a group.

### Refund/Cancellation Policy

Registration fees, less a \$50 administrative charge, will be refunded for written cancellations received by July 23, 2004. No refunds will be made after that date; however, the registration may be transferred to a colleague with written notification. Refunds will be processed after August 16, 2004. The workshop may be cancelled if sufficient enrollment is not received by July 16, 2004.

For further information, please contact the Association office at 800.369.6337; 515.276.3344; Fax: 515.276.8655; E-mail: jccattanach@foodprotection.org.

## 4 Easy Ways to Register

To register, complete the Workshop Registration Form and submit it to the International Association for Food Protection by:



**Online:** [www.foodprotection.org](http://www.foodprotection.org)



**Phone:** 800.369.6337; 515.276.3344



**Fax:** 515.276.8655



**Mail:** 6200 Aurora Avenue, Suite 200W, Des Moines, IA 50322-2864

# Promotional Opportunities

We invite you to participate as a sponsor for IAFP 2004. Sponsorship participation provides an excellent opportunity to position your company or organization as a supporter of the Association.

Please review the event listing to select the one that will best position your organization. Reservations will be taken in order received for any open sponsorship events.

## Sponsorship Event List

Amount	Event	Amount	Event
\$17,000	Monday Evening Social Roche Applied Science (1/2 sponsor)	\$3,500	Coffee Break <i>(Wednesday Morning)</i>
<del>\$16,000</del> Sponsored	Opening Reception Kraft Foods North America	\$3,000	Coffee Break <i>(Wednesday Afternoon)</i>
<del>\$15,000</del> Sponsored	Exhibit Hall Reception DuPont Qualicon, Oxoid, Inc.	<del>\$3,750</del> Sponsored	Notepads with Sponsor's Logo Bio-Rad Laboratories
<del>\$12,000</del> Sponsored	Conference Program Bag bioMérieux, Inc.	\$3,500	Spouse/Companion Hospitality Room
<del>\$10,000</del> Sponsored	President's Reception Fisher Scientific	<del>\$3,500</del> Sponsored	Student PDG Luncheon Nestlé USA, Inc.
<del>\$8,000</del> Sponsored	Badge Holders w/Lanyards Strategic Diagnostics, Inc.	<del>\$3,000</del> Sponsored	Affiliate Educational Reception Capitol Vial, Weber Scientific
<del>\$6,000</del> Sponsored	Exhibit Hall Pastries and Coffee Deibel Laboratories, Inc. <i>(Monday Morning)</i>	<del>\$2,500</del> Sponsored	IAFP New Member Orientation Kluwer Academic Publishers
<del>\$6,000</del> Sponsored	Exhibit Hall Pastries and Coffee Nice-Pak Products, Inc. <i>(Tuesday Morning)</i>	<del>\$2,000</del> Sponsored	Awards Banquet Flowers PepsiCo
<del>\$3,500</del> Sponsored	Exhibit Hall Coffee Break NSF International <i>(Monday Afternoon)</i>	\$1,750	Committee Day Refreshments
<del>\$3,500</del> Sponsored	Coffee Break BD Diagnostic Systems <i>(Tuesday Afternoon)</i>	\$1,500	Exhibitor Move-in Refreshments
		\$1,000	Speaker Travel Support <small>(Multiple opportunities available)</small> Warren Analytical Laboratory

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# COMING EVENTS

## JULY

- **12-13, HACCP I: Documenting HACCP Prerequisites**, GFTC, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **12-16, IFT Annual Meeting**, Las Vegas Convention Center, Las Vegas, NV. For more information, contact www.am-fe.ift.org.
- **14-15, 10th Annual Hawaii Lodging, Hospitality and Foodservice Expo**, Neal Blaisdell Center, Honolulu, HI. For more information, call 800.525.5275; E-mail: kanter@lava.net.
- **14-16, HACCP II: Developing Your HACCP Plan**, GFTC, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **22-23, Food Safety Training**, ASI Food Safety Consultants, St. Louis, MO. For more information, contact Jeanette Huge at 800.477.0778 ext. 113; E-mail: jhuge@asifood.com.
- **31-Aug. 2, Louisiana Foodservice Expo**, Morial Convention Center, New Orleans, LA. For more information, call 800.256.4572 or go to www.lra.org.

## AUGUST

- **IAFP 2004 Workshops**, JW Marriott Desert Ridge Resort, Phoenix, AZ.
- **6-7, Workshop 1 - Your Data, Your Job: Quality Systems for Microbial Food Analysis**
- **7, Workshop 2 - Converting to the NCIMS Voluntary HACCP System from Traditional Dairy Inspection**
- **7, Workshop 3 - Best Practices for Quality Aquacultural Products**  
See page 456 of this issue for additional information.
- **8-11, IAFP 2004, the Association's 91st Annual Meeting**, JW Marriott Desert Ridge Resort, Phoenix, AZ. For more information, see page 453 of this issue for additional information or contact Julie Cattanach at 800.369.6337; E-mail: jattanach@foodprotection.org.

- **17-18, National Pork Board's Pork Quality and Safety Summit**, Holiday Inn, Des Moines, IA. For more information, call 515.223.3532 or go to www.porkboard.org.
- **19-20, Principles of HACCP**, ASI Food Safety Consultants, Baltimore, MD. For more information, contact Jeanette Huge at 800.477.0778 ext. 113; E-mail: jhuge@asifood.com.
- **20-21, Baking 101 Seminar**, Chicago, IL. For more information, contact AIB at 785.537.4750 or go to www.aibonline.org.
- **26-27, Lead Auditor**, ASI Food Safety Consultants, Chicago, IL. For more information, contact Jeanette Huge at 800.477.0778 ext. 113; E-mail: jhuge@asifood.com.
- **30-31, Forensic Food Microscopy**, GFTC, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.

## SEPTEMBER

- **1-3, Food Safety and HACCP in the 21st Century: From Theory to Practice**, Conrad Hotel, Bangkok, Thailand. Co-sponsored by IAFP. For more information, contact Chris Jones at 44.161.736.9172; E-mail: www.who.int/en.
- **12-15, International Symposium on Problem of Listeriosis (ISOPOL)**, Uppsala, Sweden. For more information, go to www.conference.slu.se/isopol.
- **19-22, American Association of Cereal Chemists (AACC) and the Tortilla Industry Association (TIA) Meeting**, San Diego Convention Center, San Diego, CA. For more information, contact AACC at 651.454.7250; E-mail: aacc@scisoc.org.
- **21-22, Upper Midwest Dairy Industry Association Annual Meeting**, Holiday Inn, St. Cloud, MN. For more information, contact Gene Watnaas at 218.769.4334; E-mail: saantaw@prtcl.com.
- **21-23, New York State Food Protection Association Annual Meeting**, Sheraton Four Points Hotel, Buffalo, NY. For more information, contact Janine Lucia at 607.255.2892; E-mail: jgg3@cornell.edu.

- **22-23, Fifth Annual Illinois Food Safety Symposium**, Hotel Pere Marquette, Peoria, IL. For more information, contact Jayne Nosari at 217.785.2439; E-mail: jnosari@idph.state.il.us.
- **28, Washington Association for Food Protection Annual Conference**, Campbell's Resort, Chelan, WA. For more information, contact Bill Brewer at 206.363.5411; E-mail: billbrewer1@juno.com.
- **28-29, Wisconsin Association for Food Protection Annual Meeting**, Ho-Chunk Casino & Hotel Convention Center, Wisconsin Dells, WI. For more information, contact Randy Daggs at 608.837.2087; E-mail: rdaggs@juno.com.
- **28-Oct. 2, World Dairy Expo 2004**, Madison, WI. For more information, go to www.worlddairyexpo.com.
- **29-Oct. 1, Wyoming Environmental Health Association Annual Educational Conference**, Great Divide Lodge, Breckenridge, CO. For more information, contact Roy Kroeger at 307.633.4090; E-mail: roykehs@laramiecounty.com.
- **29-Oct. 1, Bev Expo 2004**, Tampa Convention Center, Tampa, FL. For more information, go to www.bevexpo.com.

## OCTOBER

- **5-7, ASTM Committee E27 on Hazard Potential of Chemicals**, Omni Shoreham, Washington, D.C. For more information, contact Scott Orthey at 610.832.9730; E-mail: sorthey@astm.org.

## IAFP UPCOMING MEETINGS

**AUGUST 8-11, 2004**  
Phoenix, Arizona

**AUGUST 14-17, 2005**  
Baltimore, Maryland

**AUGUST 13-16, 2006**  
Calgary, Alberta, Canada

# COMING EVENTS

- **6-8, Kansas Environmental Health Association Annual Fall Meeting**, Best Western Inn, McPherson, KS. For more information, contact Cynthia Kastens at 620.842.6000; E-mail: ckastens@sedgwick.gov.
- **7-8, Advanced HACCP**, St. Louis, MO. For more information, contact ASI Food Safety Consultants at 800.477.0778 ext. 113; E-mail: jhuge@asifood.com.
- **12-13, Associated Illinois Milk, Food and Environmental Sanitarians Annual Fall Meeting**, Stoney Creek Inn, East Peoria, IL. For more information, contact Terry Fairfield at 815.490.5570; E-mail: terry\_fairfield@deanfoods.com.
- **12-14, Applied Extrusion Workshop**, University of Nebraska Food Processing Center, Lincoln, NE. For more information, contact Pauline Galloway at 402.472.9751; E-mail: pgalloway2@unl.edu.
- **17-20, UW-River Falls 24th Food Microbiology Symposium**, "Current Concepts in Foodborne Pathogens and Rapid and Automated Methods in Food Microbiology," University of Wisconsin-River Falls, WI. For more information, call 715.425.3704; E-mail: foodmicro@uwrf.edu.
- **19, Metropolitan Association for Food Protection Annual Meeting**, Rutgers, Cook College, New Brunswick, NJ. For more information, contact Carol Schwar at 908.689.6693; E-mail: cschwar@entermail.net.
- **19-20, 9th Annual Dairy Cleaning and Sanitation Short Course**, Cal Poly Dairy Products Technology Center, San Luis Obispo, CA. For more information, contact Laurie Jacobson at 805.756.6097; E-mail: ljacobso@calpoly.edu.
- **19-21, 2nd International Symposium on Spray Drying of Milk Products**, Maryborough House Hotel, Maryborough Hill, Douglas, Cork, Ireland. For more information, call 353.25.42237; E-mail: spraydrying2004@moorepark.teagasc.ie.
- **20-22, Florida Association for Food Protection Annual Educational Conference**, Adam's Mark Hotel, Clearwater Beach, FL. For more information, contact Marjorie Jones at 561.871.7405; E-mail: marjorie.jones@avendra.com.
- **25-26, Brazil Association for Food Protection Annual Fall Meeting**, Conselho Regional de Quimica, São Paulo, Brazil. For more information, contact Maria Teresa Destro at 55.113.091.2199; E-mail: mtdestro@usp.br.
- **25-29, Dairy Technology Workshop**, Birmingham, AL. For more information, call 205.595.6455; E-mail: us@randolphconsulting.com.
- **28-30, North Dakota Environmental Health Association Annual Fall Meeting**, Seven Seas Conference Center, Mandan, ND. For more information, contact Debra Larson at 701.328.1291; E-mail: djlarson@state.nd.us.

## NOVEMBER

- **4-5, Lead Auditor**, Atlanta, GA. For more information, contact ASI Food Safety Consultants at 800.477.0778 ext. 113; E-mail: jhuge@asifood.com.
- **9-10, Principles of Food Safety Auditing/Inspection**, Four Points Sheraton Hotel Chicago O'Hare, Chicago, IL. For more information, contact AIB at 785.537.4750; or go to [www.aibonline.org](http://www.aibonline.org).
- **9-10, Principles of Food Safety Auditing/Inspection**, Atlanta, GA. For more information, contact AIB at 785.537.4750 or go to [www.aibonline.org](http://www.aibonline.org).
- **18, Ontario Food Protection Association Annual Fall Meeting**, Stage West, Mississauga, Ontario. For more information, contact Gail Evans Seed at 519.463.6320; E-mail: ofpa\_info@worldchat.com.

## DECEMBER

- **1-2, Food Plant Sanitation**, GFTC, Guelph, Ontario, Canada. For more information, contact GFTC at 519.821.1246; E-mail: gftc@gftc.ca.

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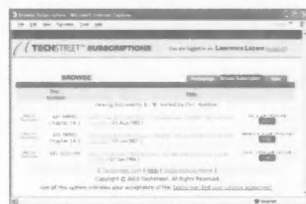


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# CAREER SERVICES SECTION

## **Food Safety Manager**

- **Location:** Midwest Corporate (world) headquarters.
- **Company:** Fortune 500 Company that is a leader in nutritional products.
- **Education:** MS degree in food science, chemistry, microbiology or equivalent. PhD highly desired.
- **Responsibilities:** As a key member of the company's global quality assurance organization, the Food Safety Manager will lead the organization in identifying a credible, very effective plan of action to support the company in monitoring global food safety consumer concerns and regulatory issues. The Food Safety Manager will be responsible for leading the organization in enhancing their presence in shaping and influencing global food safety regulations. In addition, this individual will assess the legislative activity and, where appropriate, develop internal policies in advance of government rule making. Travel will be approximately 10-20%.
- **Qualifications:** 5+ years of experience in a food environment known for achieving food safety excellence. A track record of leading an organization's food safety initiatives, working proactively with regulatory agencies, implementing food safety policies and HACCP plans, developing crisis management plans and identifying emerging food safety issues.
- **Compensation:** Commensurate with experience. Excellent bonus and benefit programs.
- **Please contact:** Tim Oliver with OSI Atlanta, food industry search specialists, phone: 770-760-7661, email: tim@osijobs.com.

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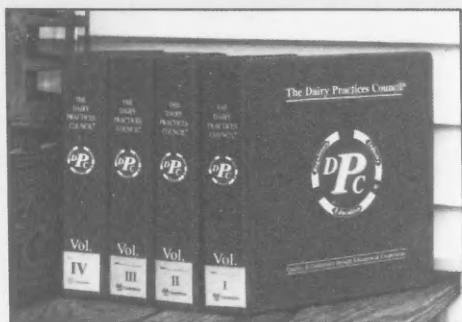
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- 45 Gravity Flow Gutters for Manure Removal in Milking Barns
- 46 Dairy Odor Management
- 48 Cooling Milk on the Farm
- 49 Pre- & Postmilking Teat Disinfectants
- 50 Farm Bulk Milk Collection Procedures
- 51 Controlling the Accuracy of Electronic Testing Instruments for Milk Components
- 53 Vitamin Fortification of Fluid Milk Products
- 54 Selection of Elevated Milking Parlors
- 54S Construction Materials for Milking Parlors
- 56 Dairy Product Safety (Pathogenic Bacteria) for Fluid Milk and Frozen Dessert Plants
- 57 Dairy Plant Sanitation
- 58 Sizing Dairy Farm Water Heater Systems
- 59 Production and Regulation of Quality Dairy Goat Milk
- 60 Trouble Shooting Microbial Defects: Product Line Sampling & Hygiene Monitoring
- 61 Frozen Dessert Processing
- 62 Resources For Dairy Equipment Construction Evaluation
- 63 Controlling The Quality And Use Of Dairy Product Rework
- 64 Control Points for Good Management Practices on Dairy Farms
- 65 Installing & Operating Milk Precoolers Properly on Dairy Farms
- 66 Planning A Dairy Complex - "100+ Questions To Ask"
- 69 Abnormal Milk - Risk Reduction and HACCP
- 71 Farmers Guide To Somatic Cell Counts In Sheep
- 72 Farmers Guide To Somatic Cell Counts In Goats
- 73 Layout of Dairy Milk Houses for Small Ruminant Operations
- 78 Biosecurity for Sheep and Goat Dairies
- 80 Food Allergen Awareness In Dairy Plant Operations
- 83 Bottling Water in Fluid Milk Plants
- 100 Food Safety in Farmstead Cheesemaking
- 103 Approving Milk and Milk Product Plants for Extended Runs

IAFP has agreed with The Dairy Practices Council to distribute their guidelines. DPC is a non-profit organization of education, industry and regulatory personnel concerned with milk quality and sanitation throughout the United States. In addition, its membership roster lists individuals and organizations throughout the world.

For the past 34 years, DPC's primary mission has been the development and distribution of educational guidelines directed to proper and improved sanitation practices in the production, processing, and distribution of high quality milk and milk products.

The DPC Guidelines are written by professionals who comprise six permanent task forces. Prior to distribution, every guideline is submitted for approval to the state regulatory agencies in each member state. Should any official have an exception to a section of a proposed guideline, that exception is noted in the final document.

The guidelines are renowned for their common sense and useful approach to proper and improved sanitation practices. We think they will be a valuable addition to your professional reference library.

If purchased individually, the entire set would cost \$327. We are offering the set, packaged in four looseleaf binders for \$245.00.

Information on how to receive new and updated guidelines will be included with your order.

To purchase this important source of information, complete the order form below and mail or fax (515-276-8655) to IAFP.

Please enclose \$245 plus \$17 shipping and handling for each set of guidelines within the U.S. Outside U.S., shipping will depend on existing rates. Payment in U.S. \$ drawn on a U.S. bank or by credit card.

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- D1010 The Bulk Milk Hauler: Protocol & Procedures
- D1030 Dairy Plant Cold Hard Facts
- D1031 Dairy Plant
- D1040 Ether Extraction Method for Determination of Raw Milk
- D1050 Food Safety: Dairy Details
- D1060 Frozen Dairy Products
- D1070 The Gerber Butterfat Test
- D1080 High-Temperature, Short-Time Pasteurizer
- D1090 Managing Milking Quality
- D1100 Mastitis Prevention and Control
- D1105 Milk Hauler Training
- D1110 Milk Plant Sanitation: Chemical Solution
- D1120 Milk Processing Plant Inspection Procedures
- D1125 Ohio Bulk Milk Hauling
- D1130 Pasteurizer - Design and Regulation
- D1140 Pasteurizer - Operation
- D1150 Processing Fluid Milk (slides)

## ENVIRONMENTAL

- E3010 The ABCs of Clean - A Handwashing & Cleanliness Program for Early Childhood Programs
- E3020 Acceptable Risks?
- E3030 Air Pollution: Indoor
- E3031 Allergy Beware
- E3040 Asbestos Awareness
- E3055 Effective Handwashing-Preventing Cross-Contamination in the Food Service Industry
- E3060 EPA Test Methods for Freshwater Effluent Toxicity Tests (Using Ceriodaphnia)
- E3070 EPA Test Methods for Freshwater Effluent Toxicity Tests (Using Fathead Minnow Larva)
- E3075 EPA: This is Superfund
- E3080 Fit to Drink
- E3110 Garbage: The Movie
- E3120 Global Warming: Hot Times Ahead
- E3130 Kentucky Public Swimming Pool & Bathing Facilities
- E3135 Plastic Recycling Today: A Growing Resource
- E3140 Putting Aside Pesticides
- E3150 Radon
- E3160 RCRA - Hazardous Waste
- E3161 The Kitchen Uncovered Orkin Sanitized EMP
- E3170 The New Superfund: What It is & How It Works-(1) Changes in the Remedial Process: Clean-up Standards & State Involvement Requirements
- E3180 The New Superfund: What It is & How It Works-(2) Changes in the Removal Process: Removal & Additional Program Requirements
- E3190 The New Superfund: What It is & How It Works-(3) Enforcement and Federal Facilities
- E3210 The New Superfund: What It is & How It Works-(4) Emergency Preparedness & Community Right-to-Know
- E3220 The New Superfund: What It is & How It Works-(5) Underground Storage Tank Trust Fund & Response Program
- E3230 The New Superfund: What It is & How It Works-(6) Research & Development/Closing Remarks
- E3240 Sink a Germ

- E3245 Wash Your Hands
- E3250 Waste Not: Reducing Hazardous Waste
- E3251 Would Your Restaurant Kitchen Pass Inspection?

## FOOD

- F2260 100 Degrees of Doom...The Time & Temperature Capers
- F2265 A Day in the Deli
- F2450 A Guide to Making Safe Smoked Fish
- F2005 A Lot on the Line
- F2007 The Amazing World of Microorganisms
- F2008 A Recipe for Food Safety Success
- F2009 Basic Personnel Practices
- F2440 Cleaning & Sanitizing in Vegetable Processing Plants: Do It Well, Do It Safely
- F2010 Close Encounters of the Bird Kind
- F2013 Control of *Listeria monocytogenes* in Small Meat and Poultry Establishments
- F2015 Controlling *Listeria*: A Team Approach
- F2111 Controlling *Salmonella*: Strategies that Work
- F2037 Cooking and Cooling of Meat and Poultry Products (2 Videos)
- F2030 "Egg Games" Foodservice Egg Handling and Safety
- F2020 Egg Handling & Safety
- F2021 Egg Production
- F2036 Emerging Pathogens and Grinding and Cooking Comminuted Beef (2 Videos)
- F2035 Fabrication and Curing of Meat and Poultry Products (2 Videos)
- F2500 *FastTrack Restaurant Video Kit*
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- F2504 Tape 4-Food Production
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- F2059 Food for Thought - The GMP Quiz Show
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- F2045 Food Microbiological Control (6 Videos)
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- F2090 Food Safety: An Educational Video for Institutional Food-Service Workers
- F2100 *Food Safety for Food Service - Series I*
- F2106 Tape 1-Cross Contamination
- F2101 Tape 2-HACCP
- F2102 Tape 3-Personal Hygiene
- F2105 Tape 4-Time and Temperature Controls
- F2103 *Food Safety for Food Service - Series II*
- F2104 Tape 1-Basic Microbiology and Foodborne Illness
- F2105 Tape 2-Handling Knives, Cuts and Burns
- F2106 Tape 3-Working Safely to Prevent Injury
- F2107 Tape 4-Sanitization
- F2120 Food Safety: For Goodness Sake, Keep Food Safe
- F2110 Food Safety: No Mystery
- F2130 Food Safety: You Make the Difference
- F2125 Food Safety Zone: Basic Microbiology
- F2126 Food Safety Zone: Cross Contamination
- F2127 Food Safety Zone: Personal Hygiene
- F2128 Food Safety Zone: Sanitation
- F2134 Food Safety: Fish and Shellfish Safety Video
- F2129 Food Technology: Irradiation
- F2136 GLP Basics: Safety in the Food Micro Lab
- F2137 GMP Basics: Avoiding Microbial Cross-Contamination
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- F2148 GMP - GSP Employee
- F2150 GMP: Personal Hygiene and Practices in Food Manufacturing
- F2147 GMP Basics: Process Control Practices
- F2151 *GMP Food Safety Video Services*
- F2152 Tape 1: Definitions
- F2153 Tape 2: Personnel and Personnel Facilities
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- F2155 Tape 4: Equipment and Utensils
- F2156 Tape 5: Production and Process Controls
- F2160 GMP: Sources & Control of Contamination during Processing
- F2161 *GMPs for Food Plant Employees: 5 Volume Video Series Based on European Standards and Regulations*
- F2161 Tape 1: Definitions
- F2161 Tape 2: Personnel and Personnel Facilities
- F2163 Tape 3: Building and Facilities
- F2164 Tape 4: Equipment and Utensils
- F2165 Tape 5: Production/Process Controls
- F2266 HACCP: A Basic Understanding
- F2180 HACCP: Safe Food Handling Techniques
- F2169 HACCP: Training for Employees--USDA Awareness
- F2172 HACCP: Training for Managers
- F2170 The Heart of HACCP
- F2171 HACCP: The Way to Food Safety
- F2173 Inside HACCP: Principles, Practices & Results
- F2175 Inspecting for Food Safety - Kentucky's Food Code
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- F2210 Northern Delight - From Canada to the World
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- F2270 Pest Control in Seafood Processing Plants
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- F2390 Take Aim at Sanitation
- F2391 Understanding Foodborne Pathogens
- F2410 Wide World of Food-Service Brushes
- F2420 Your Health in Our Hands - Our Health in Yours

## OTHER

- M4010 Diet, Nutrition & Cancer
- M4020 Eating Defensively: Food Safety Advice for Persons with AIDS
- M4030 Ice: The Forgotten Food
- M4050 Personal Hygiene & Sanitation for Food Processing Employees
- M4060 Psychiatric Aspects of Product Tampering
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	Food Safety at Temporary Events (minimum order of 10)	.60	1.20	
	*Developing HACCP Plans—A Five-Part Series (as published in DFES)	15.00	15.00	
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# *Invite a Colleague to Join*

**The International Association for Food Protection**, founded in 1911, is a non-profit educational association of over 3,000 food safety professionals with a mission *"to provide food safety professionals worldwide with a forum to exchange information on protecting the food supply."* Members belong to all facets of the food protection arena, including Industry, Government and Academia.

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